```
//////////////////////////////             DECLARATION DES TEMPERATURES        ////////////////////////////////////
float seuil_marche_ecs = 8.0; //seuil de démarrage ECS     ////////////////////// A OPTIMISER
float seuil_marche_reprise = 6.0; //seuil de redémarrage      ////////////////////// A OPTIMISER
float seuil_stop_ecs = 2.0; //seuil arret ECS     ////////////////////// A OPTIMISER
float seuil_marche_stock = 8.0; //seuil de démarrage STOCK      ////////////////////// A OPTIMISER
float seuil_stop_stock = 2.0; //seuil arret STOCK     ////////////////////// A OPTIMISER

float seuil_marche_piscine = 27.5; //seuil démarrage PISCINE     //////    27    /////////////// A OPTIMISER
float seuil_stop_piscine = 28.5; //seuil arret PISCINE     ////////////    28    //////// A OPTIMISER

float seuil_marche_chauffage_stock = 45.0; //seuil bascule CHAUFFAGE sur stock    ///////////    45     ////////// A OPTIMISER
float seuil_stop_chauffage_stock = 38.0; //seuil bascule CHAUFFAGE sur geothermie    //////    38     /////////////// A OPTIMISER
float seuil_marche_chauffage_stock_hiver = 33.0; //seuil bascule CHAUFFAGE sur stock    ///////////    31     ////////// A OPTIMISER
float seuil_stop_chauffage_stock_hiver = 31.0; //seuil bascule CHAUFFAGE sur geothermie    //////    30     /////////////// A OPTIMISER

float seuil_marche_chauffage_stock_geo = 35.0; //seuil chauffer stock en geothermie      ///////////////// A OPTIMISER
float seuil_stop_chauffage_stock_geo = 50.0; //seuil arret chauffer stock en geothermie      ///////////////// A OPTIMISER
float seuil_vidange = -3.0; //seuil pour vidanger      ///////////////// A OPTIMISER

float th_maxi_ecs = 65.0; //th maxi ECS     ////////////////////// A OPTIMISER
float th_mini_ecs = 45.0; //th min ECS demarrage chauffage ecs en ete             ////////////////////// A OPTIMISER
float th_maxi_ecs_ete = 65.0; //th maxi ECS en ete     ////////////////////// A OPTIMISER
float th_ecs_min_affichage = 45.0; //th mini pour affichage LEDs chaud / froid ECS ete
float th_ecs_max_affichage = 58.0; //th maxi pour affichage LEDs chaud / froid ECS ete
float th_ecs_hiver_min_affichage = 20.0; //th mini pour affichage LEDs chaud / froid ECS hiver
float th_ecs_hiver_max_affichage = 35.0; //th maxi pour affichage LEDs chaud / froid ECS hiver
float th_mini_ecs_hiver = 20.0; //th min ECS demarrage chauffage ecs en hiver             ////////////////////// A OPTIMISER
float th_maxi_ecs_hiver = 35.0; //th maxi ECS en hiver     ////////////////////// A OPTIMISER

float th_vidange = 13.0; //th vidange definitive panneau plein
//float th_stock_min_affichage = 38.0; //th mini pour affichage LEDs chaud / froid stock

float th_max_remplissage = 100.0; //th maxi de remplissage capteur
float th_pt1000_hs = 200.0; //th vidange si PT1000 capteur HS (donne 607 deg)
float th_thermistance_hs = -3.0; //th vidange si thermistance 10kohm HS (donne -8deg)

float th_maxi_stock = 60.0; //th maxi STOCK      ////////////////////// A OPTIMISER
float th_mini_grenier = -8.0; //th mini tuyaux vides au grenier pour préchauffage   ////////////////////// A OPTIMISER
float th_mini_grenier_stop = -15.0; //th mini tuyaux vides au grenier stop definitif   ////////////////////// A OPTIMISER

float th_capteur_high_flow = 80.0; //th de bascule sur C1 + C2
float th_capteur_high_flow_stop = 75.0; //th de stop sur C1 + C2    (que C1)

float delta_ecs = 0.0;
float delta_stock = 0.0;
float delta_secu_marche_solaire = 40.0; //delta th max SECURITE TROP CHAUD    ////////////////////// 30 /////// A OPTIMISER

float etalon_th_ecs = 10.0; //PT1000      //////// 6.0     valeur etalonnage des sondes PT1000 et thermistances
float majo_etalon_th_ecs = 0.0; //pour compenser chute de tension
float majo_ecs = 0.0;
float etalon_th_capteur = -2.0; //PT1000      ///////////  -2.0
float majo_etalon_th_capteur = 0.0; //pour compenser chute de tension
float majo_capteur = 0.0;
float etalon_th_grenier_bas = 0.0; //PT1000
```

```
float etalon_th_grenier_haut = 2.0; //PT1000    //////1.0
float etalon_th_stock_haut = 0.0; //////////// 0.0 /////// pour test piscine
float etalon_th_stock_mihaut = 0.0; //////////// 0.0
float etalon_th_stock_mibas = 0.0; //////////// 0.0
float etalon_th_stock_bas = 1.0; //////////// 1.0
float etalon_th_piscine = -1.6; //////////// -1.6
float etalon_th_entree_ecs = 0.0; //////////// -1.0
float etalon_th_sortie_ecs = 0.0; //////////// -1.0

/*
float coef_th_capteur_th_ext = 0.5; //pente de la droite: th_ext = (coef * th_capteur) + ajustement_ext
float ajustement_ext = 0.0; //ordonneea l'origine
float seuil_q_variable = 5.0; // temp de bascule sur Q variable du chauffage
*/



//////////////////////////////            DECLARATION DES VARIABLES        ////////////////////////////////////////
int a = 1; //variables d'execution une seule fois de la boucle while
int b = 1;
int c = 1;
int d = 1;
int e = 1;
int f = 1;
int g = 0; //variables bouclage prechauffage tuyaux grenier (x2 en tout)
int h = 1;
//int test_supervision = 0;
int init_mode = 1; //variable initialisation mode de fonctionnement (lecture etat BP de cote)

int test = 1; //variable test serial
String ordre_uno = "";

int premier_ecs = 0; //chauffer en priorité ECS
//int eh = 0; //variable de choix seuil ECS & seuil chauffage maison ete / hiver (1=ete /0=hiver)
int eh_ecs = 1; //variable de choix seuil ECS ete / hiver (1=ete /0=hiver)
int eh_chauff = 0; //variable de choix seuil chauffage maison ete / hiver (1=ete /0=hiver)
int chauff_stock_geo = 0; //variable chauffage stock geothermie
int ch_st_geo = 0; //variable priorité chauffage stock geothermie sur chauffage maison geothermie
int ch_pisc_maintien = 1; //variable maintien temp piscine sur stock en fonction programmateur
int ch_simultane_maison = 0; //variable de chauffe stock solaire & maison en simultane
int ch_q_variable_maison = 0; //variable de debit CH en Q variable (1=Q variable / 0=pas Q variable)
int ch_pisc_geo_HC = 0; //variable de chauffage piscine geothermie en HC seulement
int v_variable = 0; //etat pour affichage supervision vanne debit variable

int c1 = 0; //variables gestion manuelle C1_capteur_solaire
int c2 = 0; //variables gestion manuelle C2_amorce_capteur_solaire
int c3 = 0; //variables gestion manuelle C3_chauffage_solaire
int c4 = 0; //variables gestion manuelle C4_captage_geothermie
int c5 = 0; //variables gestion manuelle C5_chappe
int s = 1; //variable de saisie supervision (1=saisie / 0=pas saisie)
int s0 = 0; // variables de saisie en fonction de l'etape active (saisie 1 a 4)
int s1 = 0;
int s2 = 0;
```

```
int s3 = 0;
int s4 = 0;
int s5 = 0;
int s6 = 0;
int s7 = 0;
//int premiereFois_saisie_data = 0;

int ve2_piscine = 0; //affichage etat vannes en supervision
int vs2_piscine = 0;
int ve2_geothermie = 0;
int vs2_geothermie = 0;
int ve2_chauffage = 0;
int vs2_chauffage = 0;
int ve2_echangeur = 0;
int vs2_echangeur = 0;
int v2_debit_capteur = 0;
int ve2_3v = 0;
int vs2_3v = 0;
int v2_retour_stock = 0;

int C1_capteur_solaire_s = 0; //affichage etat circulateurs en supervision
int C2_amorce_capteur_solaire_s = 0;
int C3_chauffage_solaire_s = 0;
int C4_captage_geothermie_s = 0;
int C5_chappe_s = 0;

float th_ext = 0.0;
float th_ecs_tot = 0.0;
float th_ecs = 0.0; //valeur equivalente en deg celcius
float th_capteur_tot = 0.0;
float th_capteur = 0.0;
float th_grenier_bas_tot = 0.0;
float th_grenier_bas = 0.0;
float th_grenier_haut_tot = 0.0;
float th_grenier_haut = 0.0;
float th_stock_bas_tot = 0.0;
float th_stock_bas = 0.0;
float th_stock_mibas_tot = 0.0;
float th_stock_mibas = 0.0;
float th_stock_mihaut_tot = 0.0;
float th_stock_mihaut = 0.0;
float th_stock_haut_tot = 0.0;
float th_stock_haut = 0.0;
float th_entree_stock_tot = 0.0;
float th_entree_stock = 0.0;
float th_sortie_stock_tot = 0.0;
float th_sortie_stock = 0.0;
float th_entree_ecs_tot = 0.0;
float th_entree_ecs = 0.0;
float th_sortie_ecs_tot = 0.0;
float th_sortie_ecs = 0.0;
float th_piscine_tot = 0.0;
float th_piscine = 0.0;
```

```
int PISC = 0; //variable PISCINE ou PAS PISCINE



//////////////////////////////            DECLARATION DES PINS        ////////////////////////////////////////
const int led13 = 13; //LEDs
const int led_verte = 10;
const int led_bleue = 11;
const int led_rouge = 12;
const int led_orange_etape_init_solaire = 44; //9
const int led_orange_etape_init_chauffe = 9; //44
const int led_orange_etape_init_ch_st_geo = 8; //8
const int led_rouge_ECS_chaud = 7;
const int led_bleue_ECS_froid = 6;
const int led_rouge_stock_chaud = 5;
const int led_bleue_stock_froid = 4;
const int led_rouge_chauffer_stock = 3;
const int led_rouge_chauffer_ECS = 2;
const int led_verte_chauffage_stock = 27; // 1
const int led_verte_piscine_stock = 26; // 0
const int led_bleue_chauffage_geothermie = 14;
const int led_bleue_piscine_geothermie = 15;
const int led_bleue_chauffer_stock_geo = 35;

const int ve_chauffage = 36; //sorties relais vanne entree geothermie chauffage  /////////// CIRCUIT RELAIS 1   ///////////////
const int ve_piscine = 37; //sorties relais vanne entree geothermie piscine
const int ve_geothermie = 38; //sorties relais vanne entree geothermie
const int ve_echangeur = 39; //sorties relais vanne entree echangeur stock
const int vs_chauffage = 40; //sorties relais vanne sortie geothermie chauffage
const int vs_piscine = 41; //sorties relais vanne sortie geothermie piscine
//const int v_variable = 53; //mise en vanne variable (vs_piscine - vs_chauffage)  ////// A CONFIRMER
const int vs_geothermie = 42; //sorties relais vanne sortie geothermie
const int vs_echangeur = 43; //sorties relais vanne sortie echangeur stock

const int ve_3v = 30; //sorties relais vanne entree geothermie chauffage   /////////// CIRCUIT RELAIS 2  ////////////////////////
const int v_retour_stock = 33; //sorties relais vanne 3 voies chauffage stock avec géothermie
const int v_bloc_capteur = 34; //sorties relais vanne bloquage circulation capteur en mode chauffage stock géothermie
const int vs_3v = 32; //sorties relais vanne sortie geothermie chauffage
//const int vs_ecs = 33; //sorties relais vanne sortie geothermie chauffage
const int v_debit_capteur = 31; //sorties relais vanne sortie regul debit capteur
/*
++++++++++++++++++++++++++++++ dans UNO
const int led13 = 13;
const int vs_piscine_variable = 3; //mise en vanne variable (vs_piscine)
const int vs_chauffage_variable = 4; //mise en vanne variable (vs_chauffage)
const int v_shunt_mitigeur_ch = 5; //sorties relai vanne pour shunter le mitigeur thermostatique de chauffage maison pour chauffer stock en geothermie
const int BP_ecs_ete = 2; //BP gestion ECS ete
const int BP_maintien_temp_pisc = 6; //BP maintien temperature PISC
const int BP_chauff_stock_geo = 7; //BP chauffage stock geothermie
const int BP_chauff_stock_maison_simul = 8; //BP chauffage stock etmaison en simultanne
const int BP_chauff_maison_Q_variable = 9; //BP chauffage maison debit variable
const int BP_chauff_ete = 10; //BP gestion chauffage ete
const int BP_supervision = 11; //BP supervision
```

```
++++++++++++++++++++++++++++++
*/
//const int v_shunt_mitigeur_ch = 1; //sorties relais vanne pour shunter le mitigeur thermostatique de chauffage maison pour chauffer stock en geothermie

const int C1_capteur_solaire = 46; //sorties relais circulateur C1 capteur solaire      /////////// CIRCUIT RELAIS 3  /////////
const int C2_amorce_capteur_solaire = 47; //sorties relais circulateur amorce C2 capteur solaire
const int C3_chauffage_solaire = 48; //sorties relais circulateur C3 chauffage solaire
const int C4_captage_geothermie = 49; //sorties relais circulateur C4 INTERNE GEOTHERMIE captage geothermie
const int C5_chappe = 50; //sorties relais circulateur C5 INTERNE GEOTHERMIE dalle
const int sonde_ext_geothermie = 45; //sorties relais sonde ext geothermie sur aquastat piscine en série
const int compresseur = 51; //sorties relais tempo 10min compresseur GEOTHERMIE
const int pompe_piscine = 52; //sorties relais pompe piscine
const int pilote_HP_HC = 28; //prise en compte HP et HC pour chauffer stock en geothermie en HC (1=HC / 0=HP)
const int pilote_maintien_pisc = 53; //prise en compte marche pompe piscine pour maintien temperature sur stock

const int bp_bis = 16; //bouton poussoir bis hors joystick
const int bp_tris = 17; //bouton poussoir tris hors joystick
const int cycle = 18; //interrupteur CYCLE
const int manu = 19; //interrupteur MANUEL
const int prio_ecs = 20; //interrupteur priorité ECS
const int prio_chauffage = 21; //interrupteur priorité CHAUFFAGE
const int prio_piscine = 22; //interrupteur priorité PISCINE
const int piscine_geothermie = 23; //interrupteur PISCINE geothermie
const int CH = 24; //signal CHAUFFAGE de la geothermie (pris sur circulateur plancher)

const int VERT = A14; // déclaration ANALOGIQUE entrees joystick
const int HORIZ = A13;
const int SEL = A15; //15

const int pressostat_ecs = 25; //limitation pression fluide solaire en config ECS
const int pressostat_chauff = 29; //limitation pression dans ecahngeur chauffage

const int sonde_capteur = A0; //déclaration ANALOGIQUE sondes th
const int sonde_ecs = A1;
const int sonde_stock_bas = A2;
const int sonde_stock_mibas = A3;
const int sonde_stock_mihaut = A4;
const int sonde_stock_haut = A5;
const int sonde_entree_stock = A6;
const int sonde_sortie_stock = A7;
const int sonde_entree_ecs = A8;
const int sonde_sortie_ecs = A9;
//const int sonde_chauffage = 8;
const int sonde_piscine = A10;
const int sonde_grenier_bas = A11;
const int sonde_grenier_haut = A12;



//////////////////////////////             DECLARATION DES TEMPORISATIONS        ////////////////////////////////////////
int t = 0; //variables de remise a zero du delai de saisie
int occupe = 0; //variable occupation arduino durant remplissage ou vidange capteur
unsigned long time_supervision = 51000; //delai de saisie des valeurs en supervision
unsigned long current_time = 0;
```

```
unsigned long delta_time = 0;
unsigned long time = 0;

int tt = 0; //variables de remise a zero du delai de stop panneau plein
unsigned long time_vidange = 1800000; //delai de vidange sans soleil (1000 * 60sec * 30min)
unsigned long current_time1 = 0;
unsigned long delta_time1 = 0;
unsigned long time1 = 0;

int ttt = 0; //variables de remise a zero du delai de stop ECS panneau plein
unsigned long time_vidange2 = 1800000; //delai de vidange sans soleil (1000 * 60sec * 30min)
unsigned long current_time2 = 0;
unsigned long delta_time2 = 0;
unsigned long time2 = 0;

int tttt = 0; //variables de remise a zero du delai de montee en temp ch geothermie
//int ttttbis = 0; //variables montee en temp CH geothermie une seule fois
unsigned long time_montee = 7200000; //delai de vidange sans soleil (1000 * 60sec * 120min)
unsigned long current_time3 = 0;
unsigned long delta_time3 = 0;
unsigned long time3 = 0;

const int delai300 = 300;  //gestion tempos en ms65
const int delai500 = 500;
const int delai1000 = 1000;
const int delai8000 = 8000;
const int delai_vannes_manu2 = 13000; //delai manip vannes en manuelle 2
const int delai_manip_vanne = 13000; //delai de manipulation vanne 2v & 3v                    9sec     ////////////////////// A OPTIMISER
const int delai_vs_piscine_ouvrir_variable = 8500; //delai ouverture variable vanne vs_piscine          ////////////////////// A OPTIMISER
const int delai_saisie_supervision = 20000; //delai de saisie des valeurs en supervision      max 30sec   ///////   26000 (x2)  ////////////////////// A OPTIMISER
const int delai_remplir_capteur = 30000; //delai de remplissage et stabilisation               max 30sec   ///////   30000 (x1) + (x3)  ////////////////////// A OI
const int delai_prechauff_grenier = 7000; //delai de pre-remplissage tuyaux grenier           11sec     ////////////////////// A OPTIMISER
//const int delai_stabiliser_capteur = 10000; //delai de remplissage et stabilisation         max 30sec          ////////////////////// A OPTIMISER
const int delai_vider_capteur = 30000; //delai de vidange et stabilisation                    max 30sec   ///////   30000 (x3)    ////////////////////// A OPTIMISE
const int delai_config_vannes_ecs = 13000; //delai de config chauffe CES                      13sec     ////////////////////// A OPTIMISER
const int delai_config_vannes_stock = 13000; //delai de config chauffe STOCK                  13sec     ////////////////////// A OPTIMISER
const int delai_config_vannes_chauffage = 13000; //delai de config chauffe STOCK              13sec     ////////////////////// A OPTIMISER
const int delai_config_vannes_chauffage_solaire = 13000; //delai de config chauffe STOCK       13sec     ////////////////////// A OPTIMISER
const int delai_config_vannes_piscine = 13000; //delai de config chauffe STOCK                13sec     ////////////////////// A OPTIMISER
const int delai_config_vannes_piscine_solaire = 10000; //delai de config chauffe STOCK        13sec     ////////////////////// A OPTIMISER
const int delai_demarrage_compresseur = 5000; //delai de config chauffe STOCK                .......     ////////////////////// A OPTIMISER
const int delai_baisser_pression = 8000; //delai de config chauffe STOCK                      8sec     ////////////////////// A OPTIMISER
const int delai_config_vannes_stock_geothermie = 13000; //delai de config chauffe STOCK       13sec     ////////////////////// A OPTIMISER
const int delai_config_vannes_stock_solaire = 13000; //delai de config chauffe STOCK           13sec     ////////////////////// A OPTIMISER


//*************************************************************************************************************************************

void setup() {
  pinMode(led13, OUTPUT);    // outputs LEDs
  pinMode(led_verte, OUTPUT);
  pinMode(led_bleue, OUTPUT);
  pinMode(led_rouge, OUTPUT);
  pinMode(led_orange_etape_init_solaire,  OUTPUT);
```

```
pinMode(led_orange_etape_init_chauffe,  OUTPUT);
pinMode(led_orange_etape_init_ch_st_geo,  OUTPUT);
pinMode(led_rouge_ECS_chaud,  OUTPUT);
pinMode(led_bleue_ECS_froid,  OUTPUT);
pinMode(led_rouge_stock_chaud,  OUTPUT);
pinMode(led_bleue_stock_froid,  OUTPUT);
pinMode(led_rouge_chauffer_stock,  OUTPUT);
pinMode(led_rouge_chauffer_ECS,  OUTPUT);
pinMode(led_verte_chauffage_stock,  OUTPUT);
pinMode(led_verte_piscine_stock,  OUTPUT);
pinMode(led_bleue_chauffage_geothermie,  OUTPUT);
pinMode(led_bleue_piscine_geothermie,  OUTPUT);
pinMode(led_bleue_chauffer_stock_geo,  OUTPUT);

pinMode(ve_chauffage,  OUTPUT);   // outputs vannes
pinMode(ve_piscine,  OUTPUT);
pinMode(ve_geothermie,  OUTPUT);
pinMode(ve_echangeur,  OUTPUT);
pinMode(vs_chauffage,  OUTPUT);
pinMode(vs_piscine,  OUTPUT);
pinMode(vs_geothermie,  OUTPUT);
pinMode(vs_echangeur,  OUTPUT);
pinMode(ve_3v,  OUTPUT);
pinMode(v_retour_stock,  OUTPUT);
pinMode(vs_3v,  OUTPUT);
pinMode(v_bloc_capteur,  OUTPUT);
pinMode(v_debit_capteur,  OUTPUT);
pinMode(C1_capteur_solaire,  OUTPUT);
pinMode(C2_amorce_capteur_solaire,  OUTPUT);
pinMode(C3_chauffage_solaire,  OUTPUT);
pinMode(C4_captage_geothermie,  OUTPUT);
pinMode(C5_chappe,  OUTPUT);
pinMode(sonde_ext_geothermie,  OUTPUT);
pinMode(compresseur,  OUTPUT);
pinMode(pompe_piscine,  OUTPUT);
/*
 ++++++++++++++++++++++++++++++++++++++++++++++++++      dans UNO
 pinMode(BP_ecs_ete,  INPUT);
 pinMode(BP_maintien_temp_pisc,  INPUT);
 pinMode(BP_chauff_stock_geo,  INPUT);
 pinMode(BP_chauff_stock_maison_simul,  INPUT);
 pinMode(BP_chauff_maison_Q_variable,  INPUT);
 pinMode(BP_chauff_ete,  INPUT);
 pinMode(BP_supervision,  INPUT);

 pinMode(led13,  OUTPUT);
 pinMode(vs_piscine_variable,  OUTPUT);
 pinMode(vs_chauffage_variable,  OUTPUT);
 pinMode(v_shunt_mitigeur_ch,  OUTPUT);
  ++++++++++++++++++++++++++++++++++++++++++++++++++
*/
//pinMode(v_shunt_mitigeur_ch, OUTPUT);
//pinMode(v_variable, OUTPUT);
```

```
pinMode(bp_bis, INPUT);         //inputs
pinMode(bp_tris, INPUT);
pinMode(cycle, INPUT);
pinMode(manu, INPUT);
pinMode(prio_ecs, INPUT);
pinMode(prio_chauffage, INPUT);
pinMode(prio_piscine, INPUT);
pinMode(piscine_geothermie, INPUT);
pinMode(SEL, INPUT); //bp joystick
pinMode(HORIZ, INPUT);
pinMode(VERT, INPUT);
pinMode(CH, INPUT);
pinMode(pressostat_ecs, INPUT);
pinMode(pressostat_chauff, INPUT);
pinMode(pilote_HP_HC, INPUT);
pinMode(pilote_maintien_pisc, INPUT);
pinMode(sonde_capteur, INPUT);
pinMode(sonde_ecs, INPUT);
pinMode(sonde_stock_bas, INPUT);
pinMode(sonde_stock_mibas, INPUT);
pinMode(sonde_stock_mihaut, INPUT);
pinMode(sonde_stock_haut, INPUT);
pinMode(sonde_piscine, INPUT);
pinMode(sonde_entree_stock, INPUT);
pinMode(sonde_sortie_stock, INPUT);
pinMode(sonde_entree_ecs, INPUT);
pinMode(sonde_sortie_ecs, INPUT);
pinMode(sonde_grenier_bas, INPUT);
pinMode(sonde_grenier_haut, INPUT);


digitalWrite(led13, LOW); //etat initial des sorties
digitalWrite(ve_chauffage, LOW); //vanne ouverte
digitalWrite(ve_piscine, HIGH);
digitalWrite(ve_geothermie, LOW); //vanne ouverte
//digitalWrite(ve_echangeur, HIGH);
digitalWrite(ve_echangeur, LOW);
digitalWrite(vs_chauffage, LOW); //vanne ouverte
digitalWrite(vs_geothermie, LOW); //vanne ouverte
digitalWrite(vs_piscine, HIGH);
digitalWrite(vs_echangeur, HIGH);
digitalWrite(ve_3v, HIGH); //position stock
digitalWrite(v_retour_stock, HIGH);
digitalWrite(vs_3v, HIGH); //position stock
digitalWrite(v_bloc_capteur, HIGH); //NF (vanne ouverte)
digitalWrite(v_debit_capteur, HIGH);
//digitalWrite(v_shunt_mitigeur_ch, HIGH);
digitalWrite(C1_capteur_solaire, HIGH);
digitalWrite(C2_amorce_capteur_solaire, HIGH);
digitalWrite(C3_chauffage_solaire, HIGH);
digitalWrite(C4_captage_geothermie, HIGH); //NF
digitalWrite(C5_chappe, HIGH); //NF
digitalWrite(sonde_ext_geothermie, HIGH); //NF (arret geothermie)
digitalWrite(compresseur, HIGH); //NF
```

```
  digitalWrite (pompe_piscine,  HIGH); //NO                  ////////////////////////////////////A CONFIRMER ////////////////////////////////
  /*
   +++++++++++++++++++++++++++++++ dans UNO
   digitalWrite(led13, LOW); //etat initial des sorties
   digitalWrite(vs_piscine_variable, HIGH);   //NF en TOR (pilotage normal en tout ou rien)
   digitalWrite(vs_chauffage_variable, HIGH);   //NF en TOR (pilotage normal en tout ou rien)
    digitalWrite(v_shunt_mitigeur_ch, HIGH);
    +++++++++++++++++++++++++++++++
  */
  //digitalWrite(v_shunt_mitigeur_ch, HIGH);
  //digitalWrite(v_variable, HIGH); //NF (pilotage normal en tout ou rien)

  Serial.begin(128000); //serial port communication PC
  Serial.println("CLEARDATA"); // on efface les données déjà présentes, s'il y a lieu
  Serial.println("LABEL,Time,TH1_entree_ecs,ve2_piscine,TH2_sortie_ecs,vs2_piscine,TH3_capteur,ve2_geothermie,TH4_stock_haut,vs2_geothermie,TH5_stock_bas,ve2_chauff
}
//*****************************************************************************************************************************************

void loop() {

  /*
     //int hh = analogRead (SEL);
     //int hhh = digitalRead (led_orange_etape_init_chauffe);
     calcul_th_piscine();
     Serial.print("th piscine  ");
      Serial.print(th_piscine);
     Serial.print("                PISC  ");
      Serial.print(PISC);
     Serial.println("    ");
     // calcul_th_stock_bas();
     delay(500);
      //Serial.println(th_stock_bas); //TH5
     */

  ////////////////////////////////////////////////////////////////////////  PROG  PRINCIPALE  GESTION  SOLAIRE    ////////////////////////////////////////////

  ////////////// TEST INTIAUX ET CONFIG BP INITIALES ///////////////
  while (test == 1) {
    Serial.write("coucou]"); //test serial
    //digitalWrite(led13, HIGH);
    delay(100);
    //digitalWrite(led13, LOW);
    ordre_uno = Serial.readStringUntil (']');
    if (ordre_uno == "salut") {
      //digitalWrite(led13, HIGH);
      digitalWrite (led_orange_etape_init_chauffe,  HIGH);
      digitalWrite (led_orange_etape_init_ch_st_geo,  HIGH);
      delay(500);
      digitalWrite (led_orange_etape_init_chauffe,  LOW);
      digitalWrite (led_orange_etape_init_ch_st_geo,  LOW);
      delay(500);
      digitalWrite (led_orange_etape_init_chauffe,  HIGH);
      digitalWrite (led_orange_etape_init_ch_st_geo,  HIGH);
      delay(500);
```

```
    digitalWrite(led_orange_etape_init_chauffe,  LOW);
    digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
    delay(500);
    digitalWrite(led_orange_etape_init_chauffe,  HIGH);
    digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
     test = test + 1;
  }
  else {
  }
}
while (init_mode == 1) {
   choix_supervision();
   choix_ecs_hiver_ete();
   choix_chauff_hiver_ete();
   choix_maintien_temp_pisc();
   choix_chauff_pisc_geo_HC();
   choix_chauff_stock_geo();
   choix_ch_simultane_maison();
   choix_ch_q_variable_maison();
  init_mode = init_mode + 1;
}
////////////// FIN TEST INTIAUX ET CONFIG BP INITIALES ///////////////

////////////// CHOIX MODES AFFICHAGES ETATS VANNES DANS EXCEL ///////////////
if (digitalRead (prio_chauffage) == 1) {
  if (s4 == 1 && occupe == 0 && digitalRead(pilote_HP_HC) == 1) {  //chauffer maison geothermie HC
    occupe = 1;
     timing_saisie400();
    occupe = 0;
  }
  if (s5 == 1 && occupe == 0 && digitalRead(pilote_HP_HC) == 1) {  //chauffer maison solaire HC
    occupe = 1;
     timing_saisie500();
    occupe = 0;
  }
  if (s4 == 1 && s2 == 1 && occupe == 0) { //chauffer maison geothermie & chauffer stock solaire
    occupe = 1;
     timing_saisie42();
    occupe = 0;
  }
  if (s5 == 1 && s2 == 1 && occupe == 0) { //chauffer maison solaire & chauffer stock solaire
    occupe = 1;
     timing_saisie52();
    occupe = 0;
  }
  if (s4 == 1 && s1 == 1 && occupe == 0) { //chauffer maison geothermie & chauffer ECS solaire
    occupe = 1;
     timing_saisie41();
    occupe = 0;
  }
  if (s5 == 1 && s1 == 1 && occupe == 0) { //chauffer maison solaire & chauffer ECS solaire
    occupe = 1;
     timing_saisie51();
    occupe = 0;
```

```
  }
  if (s4 == 1 && occupe == 0) { //chauffer maison geothermie
    occupe = 1;
     timing_saisie4();
    occupe = 0;
  }
  if (s5 == 1 && occupe == 0) { //chauffer maison solaire
    occupe = 1;
     timing_saisie5();
    occupe = 0;
  }
}

if (digitalRead (prio_piscine) == 1) {
  if (s6 == 1 && occupe == 0 && digitalRead(pilote_HP_HC) == 1) {  //chauffer piscine geothermie HC
    occupe = 1;
     timing_saisie600();
    occupe = 0;
  }
  if (s7 == 1 && occupe == 0 && digitalRead(pilote_HP_HC) == 1) {  //chauffer piscine solaire HC
    occupe = 1;
     timing_saisie700();
    occupe = 0;
  }
  if (s6 == 1 && s2 == 1 && occupe == 0) { //chauffer piscine geothermie & chauffer stock solaire
    occupe = 1;
     timing_saisie62();
    occupe = 0;
  }
  if (s7 == 1 && s2 == 1 && occupe == 0) { //chauffer piscine solaire & chauffer stock solaire
    occupe = 1;
     timing_saisie72();
    occupe = 0;
  }
  if (s6 == 1 && s1 == 1 && occupe == 0) { //chauffer piscine geothermie & chauffer ECS solaire
    occupe = 1;
     timing_saisie61();
    occupe = 0;
  }
  if (s7 == 1 && s1 == 1 && occupe == 0) { //chauffer piscine solaire & chauffer ECS solaire
    occupe = 1;
     timing_saisie71();
    occupe = 0;
  }
  if (s6 == 1 && occupe == 0) { //chauffer piscine geothermie
    occupe = 1;
     timing_saisie6();
    occupe = 0;
  }
  if (s7 == 1 && occupe == 0) { //chauffer piscine solaire
    occupe = 1;
     timing_saisie7();
    occupe = 0;
  }
```

```
}

if ((s1 == 1  || s0 == 1) && occupe == 0) { //chauffer ECS solaire & sécurité chaude / froide
  occupe = 1;
   timing_saisie();
  occupe = 0;
}
if (s2 == 1 && occupe == 0) { //chauffers stock solaire & stop stock panneau plein
  occupe = 1;
   timing_saisie2();
  occupe = 0;
}
if (s3 == 1 && occupe == 0) { //stop ECS panneau plein
  occupe = 1;
   timing_saisie3();
  occupe = 0;
}

/*
if (ch_q_variable_maison = 1 && occupe == 0) { //montee en temp CH geothermie
  occupe = 1;
   timing_saisie_montee();
  occupe = 0;
}
*/
////////////// FIN CHOIX MODES AFFICHAGES ETATS VANNES DANS EXCEL ///////////////

static  enum
{
   INITIAL_1,
  X1, //gestion manuelle
  X1bis, //gestion manuelle 2
  X2,
  X2bis,
  X3,
  X3bis,
  X3tris,
  X4,
  X5,
  X6,
  X7,
  X8,
  X8bis,
  X8tris,
  X8quadris,
  X9,
  X10,
  X10bis,
  X10tris,
  X10quadris,
  X11,
  X100,
  X200
}
```

```
etat = INITIAL_1;
switch (etat)
{
  case (INITIAL_1) :
    s1 = 1;
    digitalWrite(led_verte, HIGH);
    digitalWrite(led_bleue, LOW);
    digitalWrite(led_rouge, LOW);
    /*
    if (occupe == 0) {
      timing_saisie();
    }
    */
    digitalWrite(led_orange_etape_init_solaire, HIGH);
    X100; //lancement programme principal de gestion chauffage
    X200; //lancement programme principal de gestion chauffage stock geothermie
    if (digitalRead (prio_ecs) == 1 && digitalRead (prio_chauffage) == 1 && digitalRead (prio_piscine) == 1) {
      choix_supervision();
      choix_ecs_hiver_ete();
      choix_chauff_hiver_ete();
      choix_maintien_temp_pisc();
      choix_chauff_pisc_geo_HC();
      choix_chauff_stock_geo();
      choix_ch_simultane_maison();
      choix_ch_q_variable_maison();
    }
    if (s == 0) {
      digitalWrite(led_orange_etape_init_solaire, HIGH);
      delayWithMillis(500);
      digitalWrite(led_orange_etape_init_solaire, LOW);
      delayWithMillis(500);
      digitalWrite(led_orange_etape_init_solaire, HIGH);
      delayWithMillis(500);
      digitalWrite(led_orange_etape_init_solaire, LOW);
      delayWithMillis(500);
      digitalWrite(led_orange_etape_init_solaire, HIGH);
    }
    //if (eh == 0) { //hiver
    if (eh_ecs == 0) { //ECS hiver
      digitalWrite(led_verte, HIGH);
      delayWithMillis(500);
      digitalWrite(led_verte, LOW);
      delayWithMillis(500);
      digitalWrite(led_verte, HIGH);
      delayWithMillis(500);
      digitalWrite(led_verte, LOW);
      delayWithMillis(500);
      digitalWrite(led_verte, HIGH);
      delayWithMillis(1500);
    }
    if (ch_pisc_maintien == 1) {
      digitalWrite(led_verte_piscine_stock, HIGH);
      delayWithMillis(500);
      digitalWrite(led_verte_piscine_stock, LOW);
```

```
    delayWithMillis(500);
   digitalWrite(led_verte_piscine_stock,  HIGH);
    delayWithMillis(500);
   digitalWrite(led_verte_piscine_stock,  LOW);
 }
 if (ch_pisc_geo_HC == 1) {
   digitalWrite(led_bleue_piscine_geothermie,  HIGH);
    delayWithMillis(500);
   digitalWrite(led_bleue_piscine_geothermie,  LOW);
    delayWithMillis(500);
   digitalWrite(led_bleue_piscine_geothermie,  HIGH);
    delayWithMillis(500);
   digitalWrite(led_bleue_piscine_geothermie,  LOW);
 }
 if (eh_chauff == 0) { //CHAUFF hiver
   digitalWrite(led_verte, HIGH);
    delayWithMillis(500);
   digitalWrite(led_verte, LOW);
    delayWithMillis(500);
   digitalWrite(led_verte, HIGH);
    delayWithMillis(500);
   digitalWrite(led_verte, LOW);
    delayWithMillis(500);
   digitalWrite(led_verte, HIGH);
    delayWithMillis(500);
   digitalWrite(led_verte, LOW);
    delayWithMillis(500);
   digitalWrite(led_verte, HIGH);
    delayWithMillis(1500);
 }
 if (chauff_stock_geo == 1) {
   digitalWrite(led_bleue_chauffer_stock_geo,  HIGH);
    delayWithMillis(500);
   digitalWrite(led_bleue_chauffer_stock_geo,  LOW);
    delayWithMillis(500);
   digitalWrite(led_bleue_chauffer_stock_geo,  HIGH);
    delayWithMillis(500);
   digitalWrite(led_bleue_chauffer_stock_geo,  LOW);
 }
 if (ch_simultane_maison == 1) {
   digitalWrite(led_verte_chauffage_stock,  HIGH);
    delayWithMillis(500);
   digitalWrite(led_verte_chauffage_stock,  LOW);
    delayWithMillis(500);
   digitalWrite(led_verte_chauffage_stock,  HIGH);
    delayWithMillis(500);
   digitalWrite(led_verte_chauffage_stock,  LOW);
 }
 if (ch_q_variable_maison == 1) {
   digitalWrite(led_bleue_chauffage_geothermie,  HIGH);
    delayWithMillis(500);
   digitalWrite(led_bleue_chauffage_geothermie,  LOW);
    delayWithMillis(500);
   digitalWrite(led_bleue_chauffage_geothermie,  HIGH);
```

```
     delayWithMillis(500);
    digitalWrite(led_bleue_chauffage_geothermie,  LOW);
  }
   affichage_temp_ecs_stock(); // gere l'affichage de l'etat chaud / froid LEDs ECS & stock
  if ( digitalRead (cycle) == 1 && digitalRead (manu) == 0) {
    s1 = 0;
    etat = X2;
  }
  if ( digitalRead (cycle) == 0 && digitalRead (manu) == 1 && digitalRead (bp_bis) == 1) { //gestion manuelle 2
    etat = X1bis; // mode manu 2
  }
  else if ( digitalRead (cycle) == 0 && digitalRead (manu) == 1) { //gestion manuelle
    s1 = 0;
    etat = X1; // mode manu
  }
  //s1 = 0;
  break;

case (X1) : //action pour joystick ////////////////////////////////////////////////////////// GESTION MANUELLE       ////////////////////////////////////
  digitalWrite(led_orange_etape_init_solaire,  LOW);
  digitalWrite(led_verte, HIGH);
  digitalWrite(led_bleue, HIGH);
  digitalWrite(led_rouge, HIGH);
   delayWithMillis(delai300);
  if (s == 1) {
     saisie_data();
    //delayWithMillis(delai_saisie_supervision);
  }

  if (digitalRead(bp_bis) == 0 &&  digitalRead(bp_tris) == 0) {
    if ( analogRead(SEL) == 0 ) { //        0 car connecté sur pin analogique
       valid_manu();
        config_vannes_chauffage_geothermie();
      //saisie_data();
    }

    else if ( analogRead(HORIZ) < 100 ) { //gauche
       valid_manu();
       config_vannes_stock();
      //saisie_data();
    }

    else if ( analogRead(HORIZ) > 900 ) { //droite
       valid_manu();
       config_vannes_ecs();
      //saisie_data();
    }

    else if ( analogRead(VERT) < 100 ) { //haut
       valid_manu();
        config_vannes_chauffage_solaire();
      //saisie_data();
    }
```

```
  else if ( analogRead(VERT) > 900 ) { //bas
     valid_manu();
      config_vannes_piscine_solaire();
     //saisie_data();
  }
}
if (digitalRead(bp_bis) == 1 &&  digitalRead(bp_tris) == 0) {  ////////////////////////////////////  BP  BIS     ////////////////////////////////////////
  if ( analogRead(SEL) == 0 ) { //SEL & bp bis
     valid_manu();
      config_vannes_piscine_geothermie();
     //saisie_data();
  }

  else if ( analogRead(HORIZ) < 100 ) { //gauche & bp bis
     valid_manu();
     vider_capteur();
     //saisie_data();
  }

  else if ( analogRead(HORIZ) > 900 ) { //droite & bp bis
     valid_manu();
     remplir_capteur();
     //saisie_data();
  }

  else if ( analogRead(VERT) < 100 ) { //haut & bp bis
     valid_manu();
     if (c2 == 0) {
       digitalWrite(C2_amorce_capteur_solaire,  LOW);
       c2 = 1;
       delay(500);
     }
     else if (c2 == 1) {
       digitalWrite(C2_amorce_capteur_solaire,  HIGH);
       c2 = 0;
       delay(500);
     }
     //saisie_data();
  }

  else if ( analogRead(VERT) > 900 ) { //bas & bp bis
     valid_manu();
     if (c1 == 0) {
       digitalWrite(C1_capteur_solaire,  LOW);
       c1 = 1;
       delay(500);
     }
     else if (c1 == 1) {
       digitalWrite(C1_capteur_solaire,  HIGH);
       c1 = 0;
       delay(500);
     }
     //saisie_data();
  }
```

```
}
if (digitalRead(bp_bis) == 0 &&  digitalRead(bp_tris) == 1) {  ////////////////////////////////  BP  TRIS     ////////////////////////////////////////
  if ( analogRead(SEL) == 0 ) { //SEL & bp tris
     valid_manu();
      config_vannes_chauffer_stock_solaire();
    //saisie_data();
  }

  else if ( analogRead(HORIZ) < 100 ) { //gauche & bp tris
     valid_manu();
    if (c4 == 0) {
      digitalWrite(C4_captage_geothermie,  LOW);
      c4 = 1;
      delay(500);
    }
    else if (c4 == 1) {
      digitalWrite(C4_captage_geothermie,  HIGH);
      c4 = 0;
      delay(500);
    }
    //saisie_data();
  }

  else if ( analogRead(HORIZ) > 900 ) { //droite & bp tris
     valid_manu();
    if (c5 == 0) {
      digitalWrite(C5_chappe,  LOW);
      c5 = 1;
      delay(500);
    }
    else if (c5 == 1) {
      digitalWrite(C5_chappe,  HIGH);
      c5 = 0;
      delay(500);
    }
    //saisie_data();
  }

  else if ( analogRead(VERT) > 900 ) { //bas & bp tris
     valid_manu();
    if (c3 == 0) {
      digitalWrite(C3_chauffage_solaire,  LOW);
      c3 = 1;
      delay(500);
    }
    else if (c3 == 1) {
      digitalWrite(C3_chauffage_solaire,  HIGH);
      c3 = 0;
      delay(500);
    }
    //envoi_data_circulateur();
    //saisie_data();
  }
```

```
      else if ( analogRead(VERT) < 100 ) { //haut & bp tris
         valid_manu();
          config_vannes_chauffer_stock_geothermie();
        //saisie_data();
      }
    }
    if (digitalRead(bp_bis) == 1 && digitalRead(bp_tris) == 1) { ////////////////////////////////// BP BIS    &     BP TRIS    ////////////////////////////
      if ( analogRead(HORIZ) > 900 ) { //droite & bp bis & bp tris
         valid_manu();
         purge_solaire();
         vider_capteur();
         purge_solaire();
         vider_capteur();
        /*
         if (digitalRead(ve_3v) == HIGH) {
           digitalWrite(ve_3v, LOW);
           delay(delai_vannes_manu2);
        }
         else if (digitalRead(ve_3v) == LOW) {
           digitalWrite(ve_3v, HIGH);
           delay(delai_vannes_manu2);
        }
        */
        //saisie_data();
      }
    }
    else if ( digitalRead (manu) == 0 ) { //retour état repos partie commande
       etat = INITIAL_1; ////////////////////////////////////////////////////////////////  FIN  GESTION  MOUVEMENT  MANUEL       ////////////////////////////
    }
    break;

  case (X1bis) : //action  pour  joystick  ////////////////////////////////////////////////////  GESTION  MANUELLE  2     ////////////////////////////
    digitalWrite(led_orange_etape_init_solaire,  LOW);
    digitalWrite(led_verte,  HIGH);
    digitalWrite(led_bleue,  HIGH);
    digitalWrite(led_rouge,  HIGH);
     delayWithMillis(delai500);
    digitalWrite(led_verte,  LOW);
    digitalWrite(led_bleue,  LOW);
    digitalWrite(led_rouge,  LOW);
     delayWithMillis(delai500);
    digitalWrite(led_verte,  HIGH);
    digitalWrite(led_bleue,  HIGH);
    digitalWrite(led_rouge,  HIGH);
     delayWithMillis(delai500);
    digitalWrite(led_verte,  LOW);
    digitalWrite(led_bleue,  LOW);
    digitalWrite(led_rouge,  LOW);
     delayWithMillis(delai500);
    digitalWrite(led_verte,  HIGH);
    digitalWrite(led_bleue,  HIGH);
    digitalWrite(led_rouge,  HIGH);
    if (s == 1) {
       saisie_data();
```

```
  //delayWithMillis(delai_saisie_supervision);
}

if (digitalRead(bp_bis) == 0 && digitalRead(bp_tris) == 0) {
  if ( analogRead(SEL) == 0 ) { //        0 car connecté sur pin analogique
     valid_manu();
     if (digitalRead(v_bloc_capteur) == HIGH) { //NF (vanne ouverte)
       digitalWrite(v_bloc_capteur, LOW); //NO (vanne fermee)
       delay(delai_vannes_manu2);
     }
     else if (digitalRead(v_bloc_capteur) == LOW) { //NO (vanne fermee)
       digitalWrite(v_bloc_capteur, HIGH); //NF (vanne ouverte)
       delay(delai_vannes_manu2);
     }
     //saisie_data();
  }

  else if ( analogRead(HORIZ) < 100 ) { //gauche
     valid_manu();
     if (digitalRead(ve_chauffage) == HIGH) {
       digitalWrite(ve_chauffage, LOW);
       delay(delai_vannes_manu2);
     }
     else if (digitalRead(ve_chauffage) == LOW) {
       digitalWrite(ve_chauffage, HIGH);
       delay(delai_vannes_manu2);
     }
     //saisie_data();
  }

  else if ( analogRead(HORIZ) > 900 ) { //droite
     valid_manu();
     if (digitalRead(ve_piscine) == HIGH) {
       digitalWrite(ve_piscine, LOW);
       delay(delai_vannes_manu2);
     }
     else if (digitalRead(ve_piscine) == LOW) {
       digitalWrite(ve_piscine, HIGH);
       delay(delai_vannes_manu2);
     }
     //saisie_data();
  }

  else if ( analogRead(VERT) < 100 ) { //haut
     valid_manu();
     if (digitalRead(ve_geothermie) == HIGH) {
       digitalWrite(ve_geothermie, LOW);
       delay(delai_vannes_manu2);
     }
     else if (digitalRead(ve_geothermie) == LOW) {
       digitalWrite(ve_geothermie, HIGH);
       delay(delai_vannes_manu2);
     }
     //saisie_data();
```

```
  }

  else if ( analogRead(VERT) > 900 ) { //bas
     valid_manu();
    if (digitalRead(ve_echangeur) == HIGH) {
      digitalWrite(ve_echangeur, LOW);
      delay(delai_vannes_manu2);
    }
    else if (digitalRead(ve_echangeur) == LOW) {
      digitalWrite(ve_echangeur, HIGH);
      delay(delai_vannes_manu2);
    }
    //saisie_data();
  }
}

if (digitalRead(bp_bis) == 1 && digitalRead(bp_tris) == 0) { ////////////////////////////////// BP BIS //////////////////////////////////////
  if ( analogRead(SEL) == 0 ) { //SEL & bp bis
     valid_manu();
    if (digitalRead(v_debit_capteur) == HIGH) {
      digitalWrite(v_debit_capteur, LOW);
      delay(delai_vannes_manu2);
    }
    else if (digitalRead(v_debit_capteur) == LOW) {
      digitalWrite(v_debit_capteur, HIGH);
      delay(delai_vannes_manu2);
    }
    //saisie_data();
  }

  else if ( analogRead(HORIZ) < 100 ) { //gauche
     valid_manu();
    if (digitalRead(vs_chauffage) == HIGH) {
      digitalWrite(vs_chauffage, LOW);
      delay(delai_vannes_manu2);
    }
    else if (digitalRead(vs_chauffage) == LOW) {
      digitalWrite(vs_chauffage, HIGH);
      delay(delai_vannes_manu2);
    }
    //saisie_data();
  }

  else if ( analogRead(HORIZ) > 900 ) { //droite
     valid_manu();
    if (digitalRead(vs_geothermie) == HIGH) {
      digitalWrite(vs_geothermie, LOW);
      delay(delai_vannes_manu2);
    }
    else if (digitalRead(vs_geothermie) == LOW) {
      digitalWrite(vs_geothermie, HIGH);
      delay(delai_vannes_manu2);
    }
    //saisie_data();
```

```
  }

  else if ( analogRead(VERT) < 100 ) { //haut
     valid_manu();
    if (digitalRead(vs_piscine) == HIGH) {
      digitalWrite(vs_piscine, LOW);
      delay(delai_vannes_manu2);
    }
    else if (digitalRead(vs_piscine) == LOW) {
      digitalWrite(vs_piscine, HIGH);
      delay(delai_vannes_manu2);
    }
    //saisie_data();
  }

  else if ( analogRead(VERT) > 900 ) { //bas
     valid_manu();
    if (digitalRead(vs_echangeur) == HIGH) {
      digitalWrite(vs_echangeur, LOW);
      delay(delai_vannes_manu2);
    }
    else if (digitalRead(vs_echangeur) == LOW) {
      digitalWrite(vs_echangeur, HIGH);
      delay(delai_vannes_manu2);
    }
    //saisie_data();
  }
}

if (digitalRead(bp_bis) == 0 && digitalRead(bp_tris) == 1) { ////////////////////////////////// BP TRIS //////////////////////////////////////
  if ( analogRead(SEL) == 0 ) { //SEL & bp tris
     valid_manu();
    if (c4 == 0) {
      digitalWrite(C4_captage_geothermie, LOW);
      c4 = 1;
      delay(500);
    }
    else if (c4 == 1) {
      digitalWrite(C4_captage_geothermie, HIGH);
      c4 = 0;
      delay(500);
    }
    //saisie_data();
  }

  else if ( analogRead(HORIZ) < 100 ) { //gauche & bp tris
     valid_manu();
    if (c2 == 0) {
      digitalWrite(C2_amorce_capteur_solaire, LOW);
      c2 = 1;
      delay(500);
    }
    else if (c2 == 1) {
      digitalWrite(C2_amorce_capteur_solaire, HIGH);
```

```
      c2 = 0;
      delay(500);
    }
    //saisie_data();
  }

  else if ( analogRead(HORIZ) > 900 ) { //droite & bp tris
     valid_manu();
    if (c5 == 0) {
      digitalWrite(C5_chappe, LOW);
      c5 = 1;
      delay(500);
    }
    else if (c5 == 1) {
      digitalWrite(C5_chappe, HIGH);
      c5 = 0;
      delay(500);
    }
    //saisie_data();
  }

  else if ( analogRead(VERT) > 900 ) { //bas & bp tris
     valid_manu();
    if (c3 == 0) {
      digitalWrite(C3_chauffage_solaire, LOW);
      c3 = 1;
      delay(500);
    }
    else if (c3 == 1) {
      digitalWrite(C3_chauffage_solaire, HIGH);
      c3 = 0;
      delay(500);
    }
    //saisie_data();
  }

  else if ( analogRead(VERT) < 100 ) { //haut & bp tris
     valid_manu();
    if (c1 == 0) {
      digitalWrite(C1_capteur_solaire, LOW);
      c1 = 1;
      delay(500);
    }
    else if (c1 == 1) {
      digitalWrite(C1_capteur_solaire, HIGH);
      c1 = 0;
      delay(500);
    }
    //saisie_data();
  }
}

if (digitalRead(bp_bis) == 1 && digitalRead(bp_tris) == 1) { ////////////////////////////////// BP BIS & BP TRIS ////////////////////////////
  if ( analogRead(SEL) == 0 ) { //SEL & BP TRIS & BP BIS
```

```
   valid_manu();
   if (digitalRead(ve_3v) == HIGH) {
     digitalWrite(ve_3v, LOW);
     delay(delai_vannes_manu2);
   }
   else if (digitalRead(ve_3v) == LOW) {
     digitalWrite(ve_3v, HIGH);
     delay(delai_vannes_manu2);
   }
   //saisie_data();
}

else if ( analogRead(HORIZ) > 900 ) { //droite
   valid_manu();
   if (digitalRead(vs_3v) == HIGH) {
     digitalWrite(vs_3v, LOW);
     delay(delai_vannes_manu2);
   }
   else if (digitalRead(vs_3v) == LOW) {
     digitalWrite(vs_3v, HIGH);
     delay(delai_vannes_manu2);
   }
   //saisie_data();
}

else if ( analogRead(HORIZ) < 100 ) { //gauche
   valid_manu();
   if (digitalRead(sonde_ext_geothermie) == HIGH) {
     digitalWrite(sonde_ext_geothermie, LOW); //NO (marche geothermie)
     delay(500);
   }
   else if (digitalRead(sonde_ext_geothermie) == LOW) {
     digitalWrite(sonde_ext_geothermie, HIGH); //NF (arret geothermie)
     delay(500);
   }
   //saisie_data();
}

else if ( analogRead(VERT) < 100 ) { //haut
   valid_manu();
   if (digitalRead(v_retour_stock) == HIGH) {
     digitalWrite(v_retour_stock, LOW);
     delay(delai_vannes_manu2);
   }
   else if (digitalRead(v_retour_stock) == LOW) {
     digitalWrite(v_retour_stock, HIGH);
     delay(delai_vannes_manu2);
   }
   //saisie_data();
}

////////////////////////////////////////////++++++++++++++++++++
else if ( analogRead(VERT) > 900 ) { //bas
   valid_manu();
```

```
      if (digitalRead(v_retour_stock) ==  HIGH) {
        digitalWrite(ve_3v, LOW); //position ecs
        digitalWrite(v_retour_stock, LOW); //position retour stock
        digitalWrite(v_bloc_capteur, LOW); //NO (vanne fermee)
        digitalWrite(v_debit_capteur, LOW); //vanne ouverte
        delay(delai_vannes_manu2);
      }
      else if (digitalRead(v_retour_stock) ==  LOW) {
        digitalWrite(ve_3v, HIGH); //position stock
        digitalWrite(v_retour_stock, HIGH); //position retour solaire
        digitalWrite(v_bloc_capteur, HIGH); //NF (vanne ouverte)
        digitalWrite(v_debit_capteur, HIGH); //vanne fermee
        delay(delai_vannes_manu2);
      }
      //saisie_data();
    }
    ////////////////////////////////////////////++++++++++++++++++++++++++++++
  }

  else if ( digitalRead (manu) == 0 ) { //retour état repos partie commande
     etat = INITIAL_1; ////////////////////////////////////////////////////////////////////  FIN  GESTION  MOUVEMENT  MANUEL  2    ////////////////////////////
  }
  break;

case (X2) :
  s1 = 1;
  digitalWrite(led_verte, HIGH);
  digitalWrite(led_bleue, LOW);
  digitalWrite(led_rouge, LOW);
   calcul_th_ecs();
   calcul_th_capteur();
   calcul_th_stock_bas();
   delta_ecs = th_capteur - th_ecs;
   delta_stock = th_capteur - th_stock_bas;
  if (eh_ecs == 1) { //ete
    if (digitalRead (prio_ecs) == 1 && (th_ecs <= th_mini_ecs)) {
       premier_ecs = 1;
    }
    if (digitalRead (prio_ecs) == 1 && (th_ecs > th_mini_ecs)) {
       premier_ecs = 0;
    }
    if (digitalRead (prio_ecs) == 0) {
       premier_ecs = 0;
    }
  }
  if (eh_ecs == 0) { //hiver
    if (digitalRead (prio_ecs) == 1 && (th_ecs <= th_mini_ecs_hiver)) {
       premier_ecs = 1;
    }
    if (digitalRead (prio_ecs) == 1 && (th_ecs > th_mini_ecs_hiver)) {
       premier_ecs = 0;
    }
    if (digitalRead (prio_ecs) == 0) {
       premier_ecs = 0;
```

```
  }
}
digitalWrite(led_orange_etape_init_solaire,  LOW);
if (premier_ecs == 1) {
  digitalWrite(led_rouge_chauffer_ECS,  HIGH);
   delayWithMillis(500);
  digitalWrite(led_rouge_chauffer_ECS,  LOW);
   delayWithMillis(500);
  digitalWrite(led_rouge_chauffer_ECS,  HIGH);
   delayWithMillis(500);
  digitalWrite(led_rouge_chauffer_ECS,  LOW);
}
if (s == 0) {
  digitalWrite(led_orange_etape_init_solaire,  HIGH);
   delayWithMillis(500);
  digitalWrite(led_orange_etape_init_solaire,  LOW);
   delayWithMillis(500);
  digitalWrite(led_orange_etape_init_solaire,  HIGH);
   delayWithMillis(500);
  digitalWrite(led_orange_etape_init_solaire,  LOW);
   delayWithMillis(500);
}
if (eh_ecs == 0 || eh_chauff == 0) { //hiver
  //if (eh == 0) { //hiver
  digitalWrite(led_verte, HIGH);
   delayWithMillis(500);
  digitalWrite(led_verte, LOW);
   delayWithMillis(500);
  digitalWrite(led_verte, HIGH);
   delayWithMillis(500);
  digitalWrite(led_verte, LOW);
   delayWithMillis(500);
  digitalWrite(led_verte, HIGH);
}
if ( digitalRead (pressostat_ecs) == 0 ) { //fait chuter la pression dans l'échangeur ECS
   occupe = 1;
  digitalWrite(vs_3v, LOW); //a confirmer
  delay(delai_baisser_pression);
  digitalWrite(vs_3v, HIGH);
  delay(delai_manip_vanne);
   occupe = 0;
}
 affichage_temp_ecs_stock(); // gere l'affichage de l'etat chaud / froid LEDs ECS & stock
if ( digitalRead (cycle) == 0 ) {
  s1 = 0;
   etat = INITIAL_1;
}
else if ( digitalRead (manu) == 1 ) {
  s1 = 0;
   etat = INITIAL_1;
}
else if ((th_stock_bas < th_thermistance_hs) || (th_ecs > th_pt1000_hs)) { //securite sondes HS
   etat = X2bis;
}
```

```
  else if ((delta_ecs < seuil_marche_ecs) && (delta_stock < seuil_marche_stock)) {
    etat = X2bis;
  }
  //else if (((delta_ecs >= seuil_marche_ecs) && (digitalRead (prio_ecs) == 1) && (premier_ecs == 1)) || (delta_stock >= seuil_marche_stock && ((digitalRe
  else if ((delta_ecs >= seuil_marche_ecs) && (digitalRead (prio_ecs) == 1) && (premier_ecs == 1)) {
    s1 = 0;
    etat = X3; //vers  remplissage
  }
  else if (((delta_stock >= seuil_marche_stock) && (premier_ecs == 0)) && ((digitalRead (prio_chauffage) == 1) || (digitalRead (prio_piscine) == 1))) {
    s1 = 0;
    etat = X3; //vers  remplissage
  }
  else if (digitalRead (cycle) == 1 && digitalRead (manu) == 0 && digitalRead (prio_ecs) == 0 && digitalRead (prio_chauffage) == 0 && digitalRead (prio_pi
    etat = X2bis;
  }
  else {
    etat = X2bis;
  }
  //s1 = 0;
  break;

case (X2bis) :
  etat = X2;
  break;

case (X3) :
  s0 = 1;
   calcul_th_ecs();
   calcul_th_stock_bas();
   calcul_th_stock_mibas();
   calcul_th_grenier_bas();
   calcul_th_grenier_haut();
   calcul_th_capteur();
   delta_ecs = th_capteur - th_ecs;
   delta_stock = th_capteur - th_stock_bas;
  if ((th_grenier_bas < th_mini_grenier_stop) || (th_grenier_haut < th_mini_grenier_stop)) {
    digitalWrite(led_bleue, HIGH); //gere le clignotement LED gel!
    delay (500);
    digitalWrite(led_bleue, LOW);
    delay (500);
    digitalWrite(led_bleue, HIGH);
    delay (500);
    digitalWrite(led_bleue, LOW);
    s0 = 0;
    etat = X2;
  }
  if ((th_grenier_bas < th_mini_grenier) || (th_grenier_haut < th_mini_grenier)) {
    digitalWrite(led_bleue, HIGH); //gere le clignotement LED gel!
    delay (500);
    digitalWrite(led_bleue, LOW);
    delay (500);
    digitalWrite(led_bleue, HIGH);
    delay (500);
    digitalWrite(led_bleue, LOW);
```

```
  //s0 = 0;
   etat = X3bis;
}
if (delta_stock > delta_secu_marche_solaire) {
  digitalWrite(led_rouge, HIGH); //gere le clignotement LED trop chaud!
  delay (500);
  digitalWrite(led_rouge, LOW);
  delay (500);
  digitalWrite(led_rouge, HIGH);
  delay (500);
  digitalWrite(led_rouge, LOW);
  s0 = 0;
  etat = X2;
}
if (premier_ecs == 1) {
  digitalWrite(led_rouge_chauffer_ECS, HIGH);
   delayWithMillis(500);
  digitalWrite(led_rouge_chauffer_ECS, LOW);
   delayWithMillis(500);
  digitalWrite(led_rouge_chauffer_ECS, HIGH);
   delayWithMillis(500);
  digitalWrite(led_rouge_chauffer_ECS, LOW);
}

//////////////////////++++++++++++++++++++++++++
if ((th_stock_mibas >= th_maxi_stock) && (th_ecs >= th_maxi_ecs)) {
  //s0 = 0;
  etat = X2;
  break;
}
/*
 if (th_ecs >= th_maxi_ecs) {
  s0 = 0;
  etat = X2;
  break;
}
*/
//////////////////////++++++++++++++++++++++++++


//if (((th_ecs < th_maxi_ecs) || (th_stock_bas < th_maxi_stock)) && ((th_grenier_bas >= th_mini_grenier) && (th_grenier_haut >= th_mini_grenier)) && (th
if (((th_ecs < th_maxi_ecs) && (premier_ecs == 1)) && ((th_grenier_bas >= th_mini_grenier) && (th_grenier_haut >= th_mini_grenier)) && (th_capteur < th
  s0 = 0;
  etat = X4;
  break;
}
if (th_stock_mibas >= th_maxi_stock) {
  //s0 = 0;
  //etat = INITIAL_1;
  etat = X2;
  break;
}
//if (((th_ecs < th_maxi_ecs) || (th_stock_bas < th_maxi_stock)) && ((th_grenier_bas >= th_mini_grenier) && (th_grenier_haut >= th_mini_grenier)) && (th
if ((th_stock_mibas < th_maxi_stock) && ((th_grenier_bas >= th_mini_grenier) && (th_grenier_haut >= th_mini_grenier)) && (th_capteur < th_max_remplissag
```

```
      s0 = 0;
      etat = X4;
      break;
    }
    break;

  case (X3bis) : //prechauffage tuyaux grenier avant remplissage
    g = g + 1;
     prechauffage_tuyau_grenier();
     calcul_th_ecs();
     calcul_th_capteur();
     calcul_th_grenier_bas();
     calcul_th_grenier_haut();
    if ((th_grenier_bas < th_mini_grenier_stop) || (th_grenier_haut < th_mini_grenier_stop)) {
      digitalWrite(led_bleue, HIGH); //gere le clignotement LED gel!
      delay (500);
      digitalWrite(led_bleue, LOW);
      delay (500);
      digitalWrite(led_bleue, HIGH);
      delay (500);
      digitalWrite(led_bleue, LOW);
      //s0 = 0;
      g = 0;
      etat = X2;
    }
    if (((th_grenier_bas < th_mini_grenier) || (th_grenier_haut < th_mini_grenier)) &&  g < 2) {
      digitalWrite(led_bleue, HIGH); //gere le clignotement LED gel!
      delay (500);
      digitalWrite(led_bleue, LOW);
      delay (500);
      digitalWrite(led_bleue, HIGH);
      delay (500);
      digitalWrite(led_bleue, LOW);
      //s0 = 0;
      etat = X3tris;
    }
    if (((th_ecs < th_maxi_ecs) && (premier_ecs == 1)) && ((th_grenier_bas >= th_mini_grenier) && (th_grenier_haut >= th_mini_grenier)) && (th_capteur < th
      s0 = 0;
      g = 0;
      etat = X4;
      break;
    }
    if (((th_ecs < th_maxi_ecs) || (th_stock_bas < th_maxi_stock)) && ((th_grenier_bas >= th_mini_grenier) && (th_grenier_haut >= th_mini_grenier)) && (th_c
      s0 = 0;
      g = 0;
      etat = X4;
      break;
    }
    if (g >= 2) {
      s0 = 0;
      g = 0;
      etat = X2;
    }
    break;
```

```
case (X3tris) :
  etat = X3bis;
  break;

case (X4) :
  digitalWrite(led_verte, HIGH);
  digitalWrite(led_bleue, HIGH);
  digitalWrite(led_rouge, LOW);
   remplir_capteur();
  etat = X5;
  break;

case (X5) :
  digitalWrite(led_verte, LOW);
  digitalWrite(led_bleue, LOW);
  digitalWrite(led_rouge, HIGH);
  //calcul_th_capteur();
   calcul_th_ecs();
   calcul_th_stock_bas();
  if (premier_ecs == 1) {
    digitalWrite(led_rouge_chauffer_ECS, HIGH);
     delayWithMillis(500);
    digitalWrite(led_rouge_chauffer_ECS, LOW);
     delayWithMillis(500);
    digitalWrite(led_rouge_chauffer_ECS, HIGH);
     delayWithMillis(500);
    digitalWrite(led_rouge_chauffer_ECS, LOW);
  }
  if ((digitalRead (prio_ecs) == 1) && (th_ecs < th_maxi_ecs) && (premier_ecs == 1)) {
    //if ((digitalRead (prio_ecs) == 1) && (th_ecs < th_maxi_ecs) && (delta_ecs >= seuil_marche_ecs)) {
    etat = X7; //chauffer ecs
  }
  else if ((th_stock_bas < th_maxi_stock) && ((digitalRead (prio_chauffage) == 1) || (digitalRead (prio_piscine) == 1))) {
    //else if ((th_stock_bas < th_maxi_stock) && (delta_stock >= seuil_marche_stock) && ((digitalRead (prio_chauffage) == 1) || (digitalRead (prio_piscine
    etat = X6;//chauffer stock
  }
  else {
    etat = X11;
  }
  break;

case (X6) :
   config_vannes_stock();
  //delay(delai_config_vannes_stock);
  etat = X10;
  break;

case (X7) :
   config_vannes_ecs();
  //delay(delai_config_vannes_ecs);
  if (eh_ecs == 0) {
     th_maxi_ecs = th_maxi_ecs_hiver;
  }
```

```
    if (eh_ecs == 1) {
      th_maxi_ecs = th_maxi_ecs_ete;
    }
    etat = X8;
    break;

  case (X8) : //chauffage ECS
    s1 = 1;
    digitalWrite(led_verte, LOW);
    digitalWrite(led_rouge_chauffer_ECS, HIGH);
    digitalWrite(led_rouge_chauffer_stock, LOW);
    calcul_th_ecs();
    calcul_th_capteur();
    delta_ecs = th_capteur - th_ecs;
    while (f == 1) {
      occupe = 1;
      delayWithMillis(delai_remplir_capteur);
      if ( digitalRead (pressostat_ecs) == 0 ) { //fait chuter la pression dans l'échangeur ECS
        digitalWrite(vs_3v, HIGH); //a confirmer
        delay(delai_baisser_pression);
        digitalWrite(vs_3v, LOW);
        delay(delai_manip_vanne);
      }
      delayWithMillis(delai_remplir_capteur);
      if ( digitalRead (pressostat_ecs) == 0 ) { //fait chuter la pression dans l'échangeur ECS
        digitalWrite(vs_3v, HIGH); //a confirmer
        delay(delai_baisser_pression);
        digitalWrite(vs_3v, LOW);
        delay(delai_manip_vanne);
      }
      delayWithMillis(delai_remplir_capteur);
      if ( digitalRead (pressostat_ecs) == 0 ) { //fait chuter la pression dans l'échangeur ECS
        digitalWrite(vs_3v, HIGH); //a confirmer
        delay(delai_baisser_pression);
        digitalWrite(vs_3v, LOW);
        delay(delai_manip_vanne);
      }
      delayWithMillis(delai_remplir_capteur);
      if ( digitalRead (pressostat_ecs) == 0 ) { //fait chuter la pression dans l'échangeur ECS
        digitalWrite(vs_3v, HIGH); //a confirmer
        delay(delai_baisser_pression);
        digitalWrite(vs_3v, LOW);
        delay(delai_manip_vanne);
      }
      delayWithMillis(delai_remplir_capteur);
      if ( digitalRead (pressostat_ecs) == 0 ) { //fait chuter la pression dans l'échangeur ECS
        digitalWrite(vs_3v, HIGH); //a confirmer
        delay(delai_baisser_pression);
        digitalWrite(vs_3v, LOW);
        delay(delai_manip_vanne);
      }
      delayWithMillis(delai_remplir_capteur);
      calcul_th_ecs();
      calcul_th_capteur();
```

```
   delta_ecs = th_capteur - th_ecs;
   occupe = 0;
   f = f + 1;
}
digitalWrite(vs_3v, LOW);
/*
if (occupe == 0) {
   timing_saisie();
}
*/
digitalWrite(led_orange_etape_init_solaire, LOW);
if (s == 0) {
  digitalWrite(led_orange_etape_init_solaire, HIGH);
   delayWithMillis(500);
  digitalWrite(led_orange_etape_init_solaire, LOW);
   delayWithMillis(500);
  digitalWrite(led_orange_etape_init_solaire, HIGH);
   delayWithMillis(500);
  digitalWrite(led_orange_etape_init_solaire, LOW);
   delayWithMillis(500);
}
if (eh_ecs == 0 || eh_chauff == 0) { //hiver
  //if (eh == 0) {
  digitalWrite(led_verte, HIGH);
   delayWithMillis(500);
  digitalWrite(led_verte, LOW);
   delayWithMillis(500);
  digitalWrite(led_verte, HIGH);
   delayWithMillis(500);
  digitalWrite(led_verte, LOW);
}
 affichage_temp_ecs_stock(); // gere l'affichage de l'etat chaud / froid LEDs ECS & stock
if ( digitalRead (pressostat_ecs) == 0 ) { //fait chuter la pression dans l'échangeur ECS
   occupe = 1;
  digitalWrite(vs_3v, HIGH); //a confirmer
  delay(delai_baisser_pression);
  digitalWrite(vs_3v, LOW);
  delay(delai_manip_vanne);
   occupe = 0;
}
digitalWrite(vs_3v, LOW);
if ( digitalRead (pressostat_chauff) == 0 ) { //fait chuter la pression dans l'échangeur chauffage
   occupe = 1;
  digitalWrite(ve_echangeur, LOW); //a confirmer !!!
  digitalWrite(ve_geothermie, LOW);
  delay(delai_baisser_pression);  ////////////////////// A OPTIMISER
  digitalWrite(ve_echangeur, HIGH);
  digitalWrite(ve_geothermie, HIGH);
  delay(delai_manip_vanne);
   occupe = 0;
}
//calcul_th_capteur();
if ( th_capteur >= th_capteur_high_flow ) {
  digitalWrite(C2_amorce_capteur_solaire, LOW);
```

```
}
if ( th_capteur <= th_capteur_high_flow_stop ) {
  digitalWrite(C2_amorce_capteur_solaire,  HIGH);
}
if ((th_capteur > th_pt1000_hs)  || (th_ecs > th_pt1000_hs)) { //securite sondes HS
  etat = X9; //vidanger
}
if (delta_ecs < seuil_stop_ecs) {
  //digitalWrite(led_rouge_chauffer_ECS, LOW);
  //occupe = 1;
   config_stop_ecs_panneau_plein(); //stop circulateur ECS panneaux pleins
  ttt = 1;
  //occupe = 0;
  s1 = 0;
  etat = X8tris;
  break;
}
//if ( digitalRead (cycle) == 0 || digitalRead (manu) == 1 || digitalRead (prio_ecs) == 0) {
if ( digitalRead (cycle) == 0 || digitalRead (manu) == 1) {
  digitalWrite(led_rouge_chauffer_ECS,  LOW);
  f = 1;
  s1 = 0;
  etat = X9; //vidanger
}
if ( digitalRead (prio_ecs) == 0 && ((digitalRead (prio_chauffage) == 0) && (digitalRead (prio_piscine) == 0))) {
  digitalWrite(led_rouge_chauffer_ECS,  LOW);
  f = 1;
  s1 = 0;
  etat = X9; //vidanger
}
if ( digitalRead (prio_ecs) == 0 && ((digitalRead (prio_chauffage) == 1) || (digitalRead (prio_piscine) == 1))) {
  digitalWrite(led_rouge_chauffer_ECS,  LOW);
  premier_ecs = 0;
  f = 1;
  s1 = 0;
  etat = X6; //chauffer stock
}
else if (((delta_ecs < seuil_stop_ecs) || (th_ecs >= th_maxi_ecs)) && ((digitalRead (prio_chauffage) == 1) || (digitalRead (prio_piscine) == 1))) {
  digitalWrite(led_rouge_chauffer_ECS,  LOW);
  if (eh_ecs == 1) {
    if (digitalRead (prio_ecs) == 1 && (th_ecs <= th_mini_ecs)) {
      premier_ecs = 1;
    }
    if (digitalRead (prio_ecs) == 1 && (th_ecs > th_mini_ecs)) {
      premier_ecs = 0;
    }
    if (digitalRead (prio_ecs) == 0) {
      premier_ecs = 0;
    }
  }
  if (eh_ecs == 0) {
    if (digitalRead (prio_ecs) == 1 && (th_ecs <= th_mini_ecs_hiver)) {
      premier_ecs = 1;
    }
```

```
      if (digitalRead (prio_ecs) == 1 && (th_ecs > th_mini_ecs_hiver)) {
        premier_ecs = 0;
      }
      if (digitalRead (prio_ecs) == 0) {
        premier_ecs = 0;
      }
    }
    f = 1;
    s1 = 0;
    etat = X6; //chauffer stock
  }
  else if (((delta_ecs < seuil_stop_ecs) || (th_ecs >= th_maxi_ecs)) && (digitalRead (prio_chauffage) == 0) && (digitalRead (prio_piscine) == 0)) {
    digitalWrite(led_rouge_chauffer_ECS, LOW);
    if (eh_ecs == 1) {
      if (digitalRead (prio_ecs) == 1 && (th_ecs <= th_mini_ecs)) {
        premier_ecs = 1;
      }
      if (digitalRead (prio_ecs) == 1 && (th_ecs > th_mini_ecs)) {
        premier_ecs = 0;
      }
      if (digitalRead (prio_ecs) == 0) {
        premier_ecs = 0;
      }
    }
    if (eh_ecs == 0) {
      if (digitalRead (prio_ecs) == 1 && (th_ecs <= th_mini_ecs_hiver)) {
        premier_ecs = 1;
      }
      if (digitalRead (prio_ecs) == 1 && (th_ecs > th_mini_ecs_hiver)) {
        premier_ecs = 0;
      }
      if (digitalRead (prio_ecs) == 0) {
        premier_ecs = 0;
      }
    }
    f = 1;
    s1 = 0;
    etat = X9; //vidanger
  }
  //else if ((delta_ecs >= seuil_stop_ecs) && (th_ecs < th_maxi_ecs) && digitalRead (cycle) == 1 && digitalRead (manu) == 0 && digitalRead (aquastat) == 0
  else if ((delta_ecs >= seuil_stop_ecs) && (th_ecs < th_maxi_ecs) && digitalRead (cycle) == 1 && digitalRead (manu) == 0) {
    etat = X8bis;
  }
  //s1 = 0;
  break;

case (X8bis) :
  etat = X8;
  break;

case (X8tris) : //gestion arret ECS panneau plein
  //delayWithMillis(delai_saisie_supervision);
  s3 = 1;
  digitalWrite(led_rouge_chauffer_ECS, HIGH);
```

```
 calcul_th_capteur();
 calcul_th_ecs();
//calcul_th_stock_bas();
 delta_ecs = th_capteur - th_ecs;
/*
 if (occupe == 0) {
   timing_saisie3();
}
*/
if ( digitalRead (pressostat_ecs) == 0 ) { //fait chuter la pression dans l'échangeur ECS
   occupe = 1;
   digitalWrite(vs_3v, HIGH); //a confirmer
   delay(delai_baisser_pression);
   digitalWrite(vs_3v, LOW);
   delay(delai_manip_vanne);
   occupe = 0;
}
if ((th_capteur > th_pt1000_hs)  || (th_ecs > th_pt1000_hs)) { //securite sondes HS
   etat = X9; //vidanger
}
if (delta_ecs >= seuil_marche_reprise) {
    config_reprise_ecs_panneau_plein(); //reprise circulateur panneaux pleins
   ttt = 0;
   s3 = 0;
   etat = X8; //chauffer ECS
   break;
}
if (digitalRead (cycle) == 0 || (delta_ecs < seuil_vidange)) {
   digitalWrite(led_rouge_chauffer_ECS,  LOW);
   tt = 0;
   s3 = 0;
   etat = X9; //vidanger
   break;
}
if (digitalRead (cycle) == 0 || (th_capteur <= th_vidange)) {
   digitalWrite(led_rouge_chauffer_ECS,  LOW);
   ttt = 0;
   s3 = 0;
   etat = X9; //vidanger
   break;
}
if (ttt == 1) {
   time2 = millis();
   ttt = 0;
}
 current_time2 = millis();
 delta_time2 = current_time2 - time2;
if (delta_time2 >= time_vidange2) {
   digitalWrite(led_rouge_chauffer_ECS,  LOW);
   ttt = 0;
   s3 = 0;
   etat = X9; //vidanger
   break;
}
```

```
  digitalWrite(led_rouge_chauffer_ECS,  HIGH);
  digitalWrite(led_rouge_chauffer_stock,  HIGH);
  delay(250);
  digitalWrite(led_rouge_chauffer_ECS,  LOW);
  digitalWrite(led_rouge_chauffer_stock,  LOW);
  delay(250);
  digitalWrite(led_rouge_chauffer_ECS,  HIGH);
  digitalWrite(led_rouge_chauffer_stock,  HIGH);
  delay(250);
  digitalWrite(led_rouge_chauffer_stock,  LOW);
   etat = X8quadris;
  break;

case (X8quadris) :
   etat = X8tris;
  break;

case (X9) :
   config_vannes_stock();
  delay(delai_config_vannes_stock);
   etat = X11;
  break;

case (X10) : //chauffage stock
  s2 = 1;
  digitalWrite(led_verte,  LOW);
  digitalWrite(led_rouge_chauffer_ECS,  LOW);
  digitalWrite(led_rouge_chauffer_stock,  HIGH);
   calcul_th_ecs();
  //calcul_th_entree_stock();
   calcul_th_capteur();
   calcul_th_stock_haut();
   calcul_th_stock_mibas();
   calcul_th_stock_bas();
   calcul_th_sortie_stock();
   calcul_th_entree_stock();
   delta_ecs = th_capteur - th_ecs;
  //delta_stock = th_entree_stock - th_stock_bas;
  //delta_stock = th_capteur - th_stock_bas;
   delta_stock = th_capteur - th_sortie_stock;
  //delta_stock = th_capteur - th_stock_haut;
  //delta_stock = th_capteur - th_stock_mibas;
  //delta_stock = th_entree_stock - th_stock_haut;
  /*
   if (occupe == 0) {
     timing_saisie2();
  }
  */
  digitalWrite(led_orange_etape_init_solaire,  LOW);
  if (s == 0) {
    digitalWrite(led_orange_etape_init_solaire,  HIGH);
     delayWithMillis(500);
    digitalWrite(led_orange_etape_init_solaire,  LOW);
     delayWithMillis(500);
```

```
  digitalWrite(led_orange_etape_init_solaire,  HIGH);
   delayWithMillis(500);
  digitalWrite(led_orange_etape_init_solaire,  LOW);
   delayWithMillis(500);
}
if (eh_ecs == 0 || eh_chauff == 0) { //hiver
  //if (eh == 0) {
  digitalWrite(led_verte,  HIGH);
   delayWithMillis(500);
  digitalWrite(led_verte,  LOW);
   delayWithMillis(500);
  digitalWrite(led_verte,  HIGH);
   delayWithMillis(500);
  digitalWrite(led_verte,  LOW);
}
 affichage_temp_ecs_stock(); // gere l'affichage de l'etat chaud / froid LEDs ECS & stock
if ( th_capteur >= th_capteur_high_flow ) {
  digitalWrite(C2_amorce_capteur_solaire,  LOW);
}
if ( th_capteur <= th_capteur_high_flow_stop ) {
  digitalWrite(C2_amorce_capteur_solaire,  HIGH);
}
if ((th_capteur > th_pt1000_hs) || (th_stock_bas < th_thermistance_hs)) { //securite sondes HS
   etat = X11; //vidanger
}
if (delta_stock < seuil_stop_stock) {
  digitalWrite(led_rouge_chauffer_stock,  LOW);
   config_stop_panneau_plein(); //stop circulateur panneaux pleins
   tt = 1;
   s2 = 0;
   etat = X10tris;
  break;
}
else if (th_stock_mibas >= th_maxi_stock) {
  digitalWrite(led_rouge_chauffer_stock,  LOW);
   s2 = 0;
   etat = X11; //vidanger
}
else if (digitalRead (cycle) == 0) {
  digitalWrite(led_rouge_chauffer_stock,  LOW);
   s2 = 0;
   etat = X11; //vidanger
}
else if (digitalRead (manu) == 1) {
  digitalWrite(led_rouge_chauffer_stock,  LOW);
   s2 = 0;
   etat = X11; //vidanger
}
else if (eh_ecs == 1) {
  if ((delta_ecs >= seuil_marche_ecs) && (th_ecs < th_maxi_ecs) && (digitalRead (prio_ecs) == 1) && (th_ecs <= th_mini_ecs)) {
    digitalWrite(led_rouge_chauffer_stock,  LOW);
     s2 = 0;
     etat = X7; //chauffer ecs
  }
```

```
    if ((th_capteur > th_ecs) && (th_ecs < th_maxi_ecs) && (digitalRead (prio_ecs) == 1) && (th_ecs <= th_mini_ecs)) {
      digitalWrite(led_rouge_chauffer_stock,  LOW);
      s2 = 0;
      etat = X7; //chauffer ecs
    }
  }
  else if (eh_ecs == 0) {
    if ((delta_ecs >= seuil_marche_ecs) && (th_ecs < th_maxi_ecs) && (digitalRead (prio_ecs) == 1) && (th_ecs <= th_mini_ecs_hiver)) {
      digitalWrite(led_rouge_chauffer_stock,  LOW);
      s2 = 0;
      etat = X7; //chauffer ecs
    }
    if ((th_capteur > th_ecs) && (th_ecs < th_maxi_ecs) && (digitalRead (prio_ecs) == 1) && (th_ecs <= th_mini_ecs_hiver)) {
      digitalWrite(led_rouge_chauffer_stock,  LOW);
      s2 = 0;
      etat = X7; //chauffer ecs
    }
  }
  else if ((delta_ecs >= seuil_marche_ecs) && (th_ecs < th_maxi_ecs) && (digitalRead (prio_ecs) == 0)) {
    etat = X10bis;
  }
  //else if ((delta_stock >= seuil_stop_stock) && (th_stock_bas < th_maxi_stock) && digitalRead (cycle) == 1 && digitalRead (manu) == 0 && digitalRead (ac
  else if ((delta_stock >= seuil_stop_stock) && (th_stock_mibas < th_maxi_stock) && digitalRead (cycle) == 1 && digitalRead (manu) == 0 && (delta_ecs < s
    etat = X10bis;
  }
  //s2 = 0;
  break;

case (X10bis) :
  etat = X10;
  break;

case (X10tris) : //gestion arret panneau plein
  //delayWithMillis(delai_saisie_supervision);
  s2 = 1;
  digitalWrite(led_rouge_chauffer_stock,  HIGH);
   calcul_th_capteur();
   calcul_th_stock_bas();
   calcul_th_sortie_stock();
  //delta_stock = th_capteur - th_stock_bas;
   delta_stock = th_capteur - th_sortie_stock;
  /*
   if (occupe == 0) {
     timing_saisie2();
  }
  */
  if ( digitalRead (pressostat_chauff) == 0 ) { //fait chuter la pression dans l'échangeur chauffage
    occupe = 1;
    digitalWrite(ve_echangeur,  LOW); //a confirmer !!!
    digitalWrite(ve_geothermie,  LOW);
    delay(delai_baisser_pression);  ////////////////////// A OPTIMISER
    digitalWrite(ve_echangeur,  HIGH);
    digitalWrite(ve_geothermie,  HIGH);
    delay(delai_manip_vanne);
```

```
    occupe = 0;
  }
  if ((th_capteur > th_pt1000_hs) || (th_stock_bas < th_thermistance_hs)) { //securite sondes HS
    etat = X11; //vidanger
  }
  if (delta_stock >= seuil_marche_reprise) {
     config_reprise_panneau_plein(); //reprise circulateur panneaux pleins
    tt = 0;
    etat = X10; //chauffer stock
    s2 = 0;
   break;
  }
  if (digitalRead (cycle) == 0 || (delta_stock < seuil_vidange)) {
    digitalWrite(led_rouge_chauffer_stock, LOW);
    tt = 0;
    etat = X11; //vidanger
    s2 = 0;
   break;
  }
  if (digitalRead (cycle) == 0 || th_capteur <= th_vidange) {
    digitalWrite(led_rouge_chauffer_stock, LOW);
    tt = 0;
    etat = X11; //vidanger
    s2 = 0;
   break;
  }
  if (tt == 1) {
    time1 = millis();
    tt = 0;
  }
   current_time1 = millis();
   delta_time1 = current_time1 - time1;
  if (delta_time1 >= time_vidange) {
    digitalWrite(led_rouge_chauffer_stock, LOW);
    tt = 0;
    etat = X11; //vidanger
    s2 = 0;
   break;
  }
  digitalWrite(led_rouge_chauffer_ECS, HIGH);
  digitalWrite(led_rouge_chauffer_stock, HIGH);
  delay(250);
  digitalWrite(led_rouge_chauffer_ECS, LOW);
  digitalWrite(led_rouge_chauffer_stock, LOW);
  delay(250);
  digitalWrite(led_rouge_chauffer_ECS, HIGH);
  digitalWrite(led_rouge_chauffer_stock, HIGH);
  delay(250);
  digitalWrite(led_rouge_chauffer_ECS, LOW);
   etat = X10quadris;
  break;

case (X10quadris) :
  etat = X10tris;
```

```
      break;

    case (X11) :
      digitalWrite(led_verte, LOW);
      digitalWrite(led_bleue, HIGH);
      digitalWrite(led_rouge, HIGH);
       vider_capteur();
      //delayWithMillis(delai_saisie_supervision);
      if ( digitalRead (cycle) == 1 && digitalRead (manu) == 0) {
        etat = X2;
      }
      else if (digitalRead (cycle) == 0) {
         etat = INITIAL_1;
      }
      else if (digitalRead (manu) == 1) {
         etat = INITIAL_1;
      }
      break;

    default :
       etat = INITIAL_1;
      break;
  }

  ////////////////////////////////////////////////////////////////////////  FIN  PROG  PRINCIPAL  GESTION  SOLAIRE     ////////////////////////////////////////////

  ////////////////////////////////////////////////////////////////////////  PROG  PRINCIPALE  GESTION  CHAUFFAGE    ////////////////////////////////////////////
X100:

  //int hh = analogRead (SEL);
  //int hhh = digitalRead (cycle);
  //Serial.print(hhh);
  //Serial.println("   ");



  {
    static enum
    {
       INITIAL_100,
      X101,
      X101bis,
      X102,
      X103,
      X103bis,
      X104,
      X104bis,
      X105,
      X106,
      X106bis,
      X107,
      X107bis,
      X108,
```

```
  X108bis,
  X109,
  X110,
  X110bis,
  X111,
  X111bis,
  X112,
  X113
}
etat = INITIAL_100;
switch (etat)
{
  case (INITIAL_100) :
    digitalWrite(led_orange_etape_init_chauffe,  HIGH);
    if ( digitalRead (cycle) == 1 && digitalRead (manu) == 0 ) {
      etat = X101;
    }
    break;

  case (X101) :
    digitalWrite(led_orange_etape_init_chauffe,  LOW);
     calcul_th_piscine();
     calcul_th_stock_haut();
     calcul_th_stock_mihaut();
    ////////////////////////++++++++++++++++++++++++++++++
    if (eh_chauff == 0) { //hiver
        seuil_marche_chauffage_stock = seuil_marche_chauffage_stock_hiver;
        seuil_stop_chauffage_stock = seuil_stop_chauffage_stock_hiver;
    }
    ////////////////////////++++++++++++++++++++++++++++++
    if (th_piscine >= seuil_stop_piscine) {
      PISC = 0;
    }
    else if (th_piscine < seuil_marche_piscine) {
      PISC = 1;
    }
    if ( digitalRead (pressostat_chauff) == 0 ) { //fait chuter la pression dans l'échangeur chauffage
      occupe = 1;
      digitalWrite(ve_echangeur, LOW); //a confirmer !!!
      digitalWrite(ve_geothermie, LOW);
      delay(delai_baisser_pression);  ////////////////////// A OPTIMISER
      digitalWrite(ve_echangeur, HIGH);
      digitalWrite(ve_geothermie, HIGH);
      delay(delai_manip_vanne);
      occupe = 0;
    }
    if ( digitalRead (cycle) == 0 ) {
      etat = INITIAL_100;
      break;
    }
    if ( digitalRead (manu) == 1 ) {
      etat = INITIAL_100;
      break;
    }
```

```
  if (ch_simultane_maison == 1) {
    //if (digitalRead (prio_chauffage) == 1 && digitalRead (CH) == 0 && ch_st_geo == 0 && s2 == 1 && (th_stock_haut >= seuil_marche_chauffage_stock)) {
    if (digitalRead (prio_chauffage) == 1 && digitalRead (CH) == 0 && ch_st_geo == 0 && s2 == 1 && (th_stock_mihaut >= seuil_marche_chauffage_stock)) {
      etat = X104; //chauffage solaire force
     break;
    }
  }
  if (digitalRead (prio_chauffage) == 1 && digitalRead (CH) == 1 && ch_st_geo == 0) {
    etat = X102; //chauffage solaire ou geothermie
   break;
  }
  if ((digitalRead (prio_piscine) == 1) && PISC == 1) {
    etat = X106; //chauffage piscine
   break;
  }
  etat = X101bis;
 break;

case (X101bis) :
  etat = X101;
 break;

case (X102) :
   calcul_th_stock_haut();
  if (th_stock_haut < seuil_marche_chauffage_stock) {
    //ttttbis = 1;
    tttt = 1;
    etat = X103; //chauffage maison en geothermie
  }
  else if (th_stock_haut >= seuil_stop_chauffage_stock) {
    etat = X104; //chauffage maison en solaire
  }
  break;

case (X103) : //chauffage maison en geothermie
  s4 = 1;
  while (a == 1) {
    digitalWrite(led_bleue_chauffage_geothermie, HIGH);
    digitalWrite(C3_chauffage_solaire, HIGH);
    //digitalWrite(C4_captage_geothermie, LOW); //NO
    //digitalWrite(C5_chappe, LOW); //NO
    //digitalWrite(compresseur, LOW); //NO
     config_vannes_chauffage_geothermie();
    digitalWrite(C4_captage_geothermie, HIGH); //NF
    digitalWrite(C5_chappe, HIGH); //NF
    digitalWrite(compresseur, HIGH); //NF
    //envoi_data_circulateur();
    a = a + 1;
  }
  /*
   if (ch_q_variable_maison == 1) {
    digitalWrite(led_bleue_chauffage_geothermie, LOW);
   delayWithMillis(500);
    digitalWrite(led_bleue_chauffage_geothermie, HIGH);
```

```
 delayWithMillis(500);
  digitalWrite(led_bleue_chauffage_geothermie, LOW);
 delayWithMillis(500);
  digitalWrite(led_bleue_chauffage_geothermie, HIGH);
}
*/
 calcul_th_stock_haut();
//calcul_th_ext(); //inclu calcul th_capteur
if (digitalRead (CH) == 0 || digitalRead (cycle) == 0 || digitalRead (manu) == 1 || digitalRead (prio_chauffage) == 0) {
  digitalWrite(led_bleue_chauffage_geothermie, LOW);
  a = 1;
  s4 = 0;
  //ttttbis = 0;
  tttt = 0;
   etat = INITIAL_100;
}
else if (digitalRead (CH) == 1 && (th_stock_haut >= seuil_marche_chauffage_stock)) {
  digitalWrite(led_bleue_chauffage_geothermie, LOW);
  a = 1;
  s4 = 0;
  etat = X104; // CH solaire
}
//else if (digitalRead (CH) == 1 && (th_stock_haut < seuil_marche_chauffage_stock) && digitalRead (cycle) == 1 && digitalRead (manu) == 0 && digitalR
else if (digitalRead (CH) == 1 && (th_stock_haut < seuil_marche_chauffage_stock) && digitalRead (cycle) == 1 && digitalRead (manu) == 0 && digitalRead
  a = 1;
  etat = X111; //Q variable
}
else if (digitalRead (CH) == 1 && (th_stock_haut < seuil_marche_chauffage_stock) && digitalRead (cycle) == 1 && digitalRead (manu) == 0 && digitalRead
   etat = X103bis;
}
break;

case (X103bis) :
  etat = X103;
 break;

case (X104) : //chaufage maison en solaire
  s5 = 1;
  while (b == 1) {
    digitalWrite(led_verte_chauffage_stock, HIGH);
    digitalWrite(C4_captage_geothermie, LOW); //NO
    //digitalWrite(C4_captage_geothermie, HIGH); //modif temporaire pour test yoyo geo/solaire
    digitalWrite(C5_chappe, LOW); //NO
    digitalWrite(compresseur, LOW); //NO
     config_vannes_chauffage_solaire();
    digitalWrite(C3_chauffage_solaire, LOW);
    //envoi_data_circulateur();
    b = b + 1;
  }
  if ( digitalRead (pressostat_chauff) == 0 ) { //fait chuter la pression dans l'échangeur chauffage
    occupe = 1;
    digitalWrite(ve_echangeur, LOW); //a confirmer !!!
    digitalWrite(ve_geothermie, LOW);
    delay(delai_baisser_pression); ////////////////////// A OPTIMISER
```

```
    digitalWrite(ve_echangeur, HIGH);
    digitalWrite(ve_geothermie, HIGH);
    delay(delai_manip_vanne);
    occupe = 0;
  }
   calcul_th_stock_haut();
   calcul_th_stock_mihaut();
  //if (digitalRead (CH) == 0 && (th_stock_haut >= seuil_stop_chauffage_stock) && digitalRead (cycle) == 1 && digitalRead (manu) == 0 && digitalRead (pr
  //if (digitalRead (CH) == 0 && (th_stock_mihaut >= seuil_stop_chauffage_stock) && digitalRead (cycle) == 1 && digitalRead (manu) == 0 && digitalRead (
  if (digitalRead (CH) == 1 && (th_stock_mihaut >= seuil_stop_chauffage_stock) && digitalRead (cycle) == 1 && digitalRead (manu) == 0 && digitalRead (pr
    etat = X104bis; ////////////////////////////////
    break;
  }
  //else if (digitalRead (CH) == 0 && (th_stock_haut < seuil_stop_chauffage_stock)) {
  else if (digitalRead (CH) == 0 && (th_stock_mihaut < seuil_stop_chauffage_stock)) {
    digitalWrite(led_verte_chauffage_stock, LOW);
    b = 1;
    s5 = 0;
    etat = X105; //chauffage geothermie et etape init X100 ////////////////////////////////////
    break;
  }
  else if (digitalRead (CH) == 0 || digitalRead (cycle) == 0 || digitalRead (manu) == 1 || digitalRead (prio_chauffage) == 0) {
    digitalWrite(led_verte_chauffage_stock, LOW);
    b = 1;
    s5 = 0;
    etat = X105;  //chauffage geothermie et etape init X100
  }
  else if (digitalRead (CH) == 1 && (th_stock_haut < seuil_stop_chauffage_stock)) {
    digitalWrite(led_verte_chauffage_stock, LOW);
     config_vannes_chauffage_geothermie();

    digitalWrite(ve_echangeur, LOW); //permet de limiter la montee pression dans echangeur apres bascule sur geothermie
     delayWithMillis(30000); ////////////// A OPTIMISER

    b = 1;
    s5 = 0;
    etat = X102; //chauffage solaire ou geothermie
  }
  else if (digitalRead (CH) == 1 && (th_stock_haut >= seuil_stop_chauffage_stock) && digitalRead (cycle) == 1 && digitalRead (manu) == 0 && digitalRead
    etat = X104bis;
  }
  break;

case (X104bis) :
  etat = X104;
  break;

case (X105) :
  digitalWrite(C3_chauffage_solaire, HIGH);
  digitalWrite(C4_captage_geothermie, HIGH); //NF
  digitalWrite(C5_chappe, HIGH); //NF
  digitalWrite(compresseur, HIGH); //NF
   config_vannes_chauffage_geothermie();
```

```
  digitalWrite(ve_echangeur, LOW); //permet de limiter la montee pression dans echangeur apres bascule sur geothermie
   delayWithMillis(30000); ////////////// A OPTIMISER

   etat = INITIAL_100;
  break;

case (X106) :
  if ( digitalRead (pressostat_chauff) == 0 ) { //fait chuter la pression dans l'échangeur chauffage
    occupe = 1;
    digitalWrite(ve_echangeur, LOW); //a confirmer !!!
    digitalWrite(ve_geothermie, LOW);
    delay(delai_baisser_pression); ////////////////////// A OPTIMISER
    digitalWrite(ve_echangeur, HIGH);
    digitalWrite(ve_geothermie, HIGH);
    delay(delai_manip_vanne);
    occupe = 0;
  }
   calcul_th_piscine();
   calcul_th_stock_haut();
   calcul_th_stock_mihaut();
   calcul_th_stock_mibas();
  //if ((th_stock_haut < seuil_marche_chauffage_stock) && digitalRead (piscine_geothermie) == 1) {
  if ((th_stock_haut < seuil_marche_chauffage_stock) && digitalRead (piscine_geothermie) == 1) {
    if ((ch_pisc_geo_HC == 1 && digitalRead(pilote_HP_HC) == 1) || (ch_pisc_geo_HC == 0)) {
      etat = X107; //piscine geothermie si pas calories dans stock
    }
    else {
    }
  }
  //else if ((th_stock_haut >= seuil_stop_chauffage_stock) && (ch_pisc_maintien == 0)) {
  //else if ((th_stock_mihaut >= seuil_marche_chauffage_stock) && (ch_pisc_maintien == 0)) {
  else if ((th_stock_mibas >= seuil_marche_chauffage_stock) && (ch_pisc_maintien == 0)) {
    etat = X108; //piscine solaire permanent tant qu'il y a les calories dans stock
  }
  //else if ((th_stock_haut < seuil_stop_chauffage_stock) && (ch_pisc_maintien == 1) && (digitalRead (v_variable) == 1)) {
  else if ((th_stock_haut < seuil_marche_chauffage_stock) && (ch_pisc_maintien == 1) && (digitalRead (pilote_maintien_pisc) == 1)) {
    //else if ((th_stock_mihaut < seuil_stop_chauffage_stock) && (ch_pisc_maintien == 1) && (digitalRead (pilote_maintien_pisc) == 1)) {
    etat = X106bis;
  }
  //else if ((th_stock_haut >= seuil_stop_chauffage_stock) && (ch_pisc_maintien == 1) && (digitalRead (v_variable) == 1)) {
  //else if ((th_stock_haut >= seuil_stop_chauffage_stock) && (ch_pisc_maintien == 1) && (digitalRead (pilote_maintien_pisc) == 1)) {
  //else if ((th_stock_mihaut >= seuil_marche_chauffage_stock) && (ch_pisc_maintien == 1) && (digitalRead (pilote_maintien_pisc) == 1)) {
  //else if ((th_stock_mibas >= seuil_marche_chauffage_stock) && ch_pisc_maintien == 1 && digitalRead (pilote_maintien_pisc) == 1) {
  else if ((th_stock_mihaut >= seuil_marche_chauffage_stock) && ch_pisc_maintien == 1 && digitalRead (pilote_maintien_pisc) == 1 && (th_piscine < seuil
    etat = X110; //piscine solaire seulement en maintien de temperature durant filtration
  }
  else if (((th_stock_haut < seuil_marche_chauffage_stock) && digitalRead (piscine_geothermie) == 0) || digitalRead (prio_piscine) == 0) {
    etat = INITIAL_100;
  }
  else {
    etat = X106bis;
  }
  break;
```

```
case (X106bis) :
  etat = X106;
  break;

case (X107) : //chauffage PISC en geothermie continu (HP ou HC) si pas calories dans stock
  s6 = 1;
  while (c == 1) {
    digitalWrite(led_bleue_piscine_geothermie,  HIGH);
    digitalWrite(C3_chauffage_solaire,  HIGH);
    //digitalWrite(C4_captage_geothermie, LOW); //NO
    //digitalWrite(C5_chappe, LOW); //NO
    //digitalWrite(compresseur, LOW); //NO
     config_vannes_piscine_geothermie();
    digitalWrite(C4_captage_geothermie,  HIGH); //NF
    digitalWrite(C5_chappe,  HIGH); //NF
    digitalWrite(compresseur,  HIGH); //NF
    digitalWrite(pompe_piscine,  HIGH); //NO         ////////////////////////////////////A CONFIRMER ////////////////////////////////
    //digitalWrite(pilote_piscine_geothermie,  HIGH);  //NF       ////////////////////////////////////A CONFIRMER ////////////////////////////////
    digitalWrite(sonde_ext_geothermie,  LOW); //NO
    c = c + 1;
  }
   calcul_th_stock_haut();
   calcul_th_piscine();


  /*
    if (((digitalRead(vs_3v) == 1) && (digitalRead(ve_3v) == 1)) && ((digitalRead(C1_capteur_solaire) == 1) || (digitalRead(C2_amorce_capteur_solaire) ==
    s2 = 1;
      digitalWrite(led_orange_etape_init_chauffe, LOW);
  }
  else {
    s1 = 1;
      digitalWrite(led_orange_etape_init_chauffe, LOW);
  }
  */


  if (th_piscine >= seuil_stop_piscine) {
    PISC = 0;
  }
  else if (th_piscine < seuil_marche_piscine) {
    PISC = 1;
  }


  if (digitalRead(pilote_HP_HC) == 0 && ch_pisc_geo_HC == 1) {
    digitalWrite(led_bleue_piscine_geothermie,  LOW);
    digitalWrite(sonde_ext_geothermie,  HIGH); //NF
    digitalWrite(ve_echangeur,  LOW); //limiter pression dans échangeur stock
    c = 1;
    //s1 = 0;
    //s2 = 0;
    s6 = 0;
     etat = INITIAL_100;
```

```
  }
  else {
  }


  if (digitalRead (piscine_geothermie) == 0) {
    digitalWrite(led_bleue_piscine_geothermie,  LOW);
    digitalWrite(sonde_ext_geothermie,  HIGH); //NF
    digitalWrite(ve_echangeur,  LOW); //limiter pression dans échangeur stock
    c = 1;
    //s1 = 0;
    //s2 = 0;
    s6 = 0;
     etat = INITIAL_100;
  }
  else if (PISC == 0 || digitalRead (cycle) == 0 || digitalRead (manu) == 1 || digitalRead (prio_piscine) == 0) {
    //digitalWrite(pilote_piscine_geothermie,  HIGH);      ////////////////////////////////////A  CONFIRMER  ////////////////////////////////
    digitalWrite(sonde_ext_geothermie,  HIGH); //NF
    /*
     digitalWrite(compresseur, HIGH);
     digitalWrite(C4_captage_geothermie, HIGH);
     digitalWrite(C5_chappe, HIGH);
    */
    digitalWrite(led_bleue_piscine_geothermie,  LOW);
    digitalWrite(ve_echangeur,  LOW); //limiter pression dans échangeur stock
    c = 1;
    //s1 = 0;
    //s2 = 0;
    s6 = 0;
     etat = INITIAL_100;
  }
  else if (PISC == 1 && (th_stock_haut >= seuil_marche_chauffage_stock)) {
    digitalWrite(led_bleue_piscine_geothermie,  LOW);
    digitalWrite(sonde_ext_geothermie,  HIGH); //NF
    c = 1;
    //s1 = 0;
    //s2 = 0;
    s6 = 0;
    etat = X108;
  }
  else if (PISC == 1 && (th_stock_haut < seuil_marche_chauffage_stock) && digitalRead (cycle) == 1 && digitalRead (manu) == 0 && digitalRead (prio_pisci
    etat = X107bis;
  }
  break;

case (X107bis) :
  etat = X107;
  break;

case (X108) : //chauffage PISC en solaire continu avant geothermie
  s7 = 1;
  while (d == 1) {
    digitalWrite(led_verte_piscine_stock,  HIGH);
    digitalWrite(C4_captage_geothermie,  LOW); //NO
```

```
  digitalWrite(C5_chappe, LOW); //NO
  digitalWrite(compresseur, LOW); //NO
   config_vannes_piscine_solaire();
  digitalWrite(C3_chauffage_solaire, LOW);
  digitalWrite(pompe_piscine, LOW); //NF        ////////////////////////////////////A CONFIRMER ////////////////////////////////
  //digitalWrite(pilote_piscine_geothermie, LOW);    ////////////////////////////////////A CONFIRMER ////////////////////////////////
  digitalWrite(sonde_ext_geothermie, HIGH); //NF
  d = d + 1;
}
if ( digitalRead (pressostat_chauff) == 0 ) { //fait chuter la pression dans l'échangeur chauffage
  occupe = 1;
  digitalWrite(ve_echangeur, LOW); //a confirmer !!!
  digitalWrite(ve_geothermie, LOW);
  delay(delai_baisser_pression);  ////////////////////// A OPTIMISER
  digitalWrite(ve_echangeur, HIGH);
  digitalWrite(ve_geothermie, HIGH);
  delay(delai_manip_vanne);
  occupe = 0;
}
 calcul_th_stock_haut();
 calcul_th_piscine();




/*
  if (((digitalRead(vs_3v) == 1) && (digitalRead(ve_3v) == 1)) && ((digitalRead(C1_capteur_solaire) == 1) || (digitalRead(C2_amorce_capteur_solaire) ==
  s2 = 1;
    digitalWrite(led_orange_etape_init_chauffe, LOW);
}
else {
  s1 = 1;
    digitalWrite(led_orange_etape_init_chauffe, LOW);
}
*/



if (th_piscine >= seuil_stop_piscine) {
  PISC = 0;
}
else if (th_piscine < seuil_marche_piscine) {
  PISC = 1;
}
if (PISC == 0 || digitalRead (cycle) == 0 || digitalRead (manu) == 1 || digitalRead (prio_piscine) == 0) {
  digitalWrite(led_verte_piscine_stock, LOW);
  digitalWrite(C3_chauffage_solaire, HIGH);
  digitalWrite(pompe_piscine, HIGH); //NO        ////////////////////////////////////A CONFIRMER ////////////////////////////////
  d = 1;
  //s1 = 0;
  //s2 = 0;
  s7 = 0;
  etat = X109;
}
```

```
  else if (PISC == 1 && (th_stock_haut < seuil_stop_chauffage_stock)) {
    digitalWrite(led_verte_piscine_stock, LOW);
    digitalWrite(C3_chauffage_solaire, HIGH);
    digitalWrite(pompe_piscine, HIGH); //NO       ////////////////////////////////////A CONFIRMER ////////////////////////////////
     config_vannes_chauffage_geothermie();

    digitalWrite(ve_echangeur, LOW); //permet de limiter la montee pression dans echangeur apres bascule sur geothermie
     delayWithMillis(30000); ////////////// A OPTIMISER


    d = 1;
    //s1 = 0;
    //s2 = 0;
    s7 = 0;
    etat = X106;
  }
  else if (PISC == 1 && (th_stock_haut >= seuil_stop_chauffage_stock) && digitalRead (cycle) == 1 && digitalRead (manu) == 0 && digitalRead (prio_piscin
    etat = X108bis;
  }
  break;

case (X108bis) :
  etat = X108;
  break;

case (X109) :
  digitalWrite(C4_captage_geothermie, HIGH); //NF
  digitalWrite(C5_chappe, HIGH); //NF
  digitalWrite(compresseur, HIGH); //NF
  //digitalWrite(pilote_piscine_geothermie, LOW);    ////////////////////////////////////A CONFIRMER ////////////////////////////////
  digitalWrite(sonde_ext_geothermie, HIGH); //NF
  digitalWrite(C3_chauffage_solaire, HIGH);
  digitalWrite(pompe_piscine, HIGH); //NO       ////////////////////////////////////A CONFIRMER ////////////////////////////////
   config_vannes_piscine_geothermie();

  digitalWrite(ve_echangeur, LOW); //permet de limiter la montee pression dans echangeur apres bascule sur geothermie
  digitalWrite(ve_geothermie, LOW); //permet de limiter la montee pression dans echangeur apres bascule sur geothermie
   delayWithMillis(30000); ////////////// A OPTIMISER

   etat = INITIAL_100;
  break;

case (X110) : //maintien PISC en solaire
  s7 = 1;
  while (d == 1) {
    digitalWrite(led_verte_piscine_stock, HIGH);
    digitalWrite(C4_captage_geothermie, LOW); //NO
    digitalWrite(C5_chappe, LOW); //NO
    digitalWrite(compresseur, LOW); //NO
     config_vannes_piscine_solaire();
    digitalWrite(C3_chauffage_solaire, LOW);
    //digitalWrite(pompe_piscine, LOW); //NF       ////////////////////////////////////A CONFIRMER ////////////////////////////////
    //digitalWrite(pilote_piscine_geothermie, LOW);    ////////////////////////////////////A CONFIRMER ////////////////////////////////
    digitalWrite(sonde_ext_geothermie, HIGH); //NF
```

```
  d = d + 1;
}
if ( digitalRead (pressostat_chauff) == 0 ) { //fait chuter la pression dans l'échangeur chauffage
  occupe = 1;
  digitalWrite(ve_echangeur, LOW); //a confirmer !!!
  digitalWrite(ve_geothermie, LOW);
  delay(delai_baisser_pression);  ////////////////////// A OPTIMISER
  digitalWrite(ve_echangeur, HIGH);
  digitalWrite(ve_geothermie, HIGH);
  delay(delai_manip_vanne);
  occupe = 0;
}
 calcul_th_stock_haut();
 calcul_th_piscine();




/*
  if (((digitalRead(vs_3v) == 1) && (digitalRead(ve_3v) == 1)) && ((digitalRead(C1_capteur_solaire) == 1) || (digitalRead(C2_amorce_capteur_solaire) ==
  s2 = 1;
    digitalWrite(led_orange_etape_init_chauffe, LOW);
}
else {
  s1 = 1;
    digitalWrite(led_orange_etape_init_chauffe, LOW);
}
*/




if (th_piscine >= seuil_stop_piscine) {
  PISC = 0;
}
else if (th_piscine < seuil_marche_piscine) {
  PISC = 1;
}
//if (PISC == 0 || digitalRead (cycle) == 0 || digitalRead (manu) == 1 || digitalRead (prio_piscine) == 0 || digitalRead (v_variable) == 0) {
if (PISC == 0 || digitalRead (cycle) == 0 || digitalRead (manu) == 1 || digitalRead (prio_piscine) == 0 || digitalRead (pilote_maintien_pisc) == 0) {
  digitalWrite(led_verte_piscine_stock,  LOW);
  digitalWrite(C3_chauffage_solaire,  HIGH);

  digitalWrite(ve_echangeur, LOW); //permet de limiter la montee pression dans echangeur apres bascule sur geothermie
  digitalWrite(ve_geothermie, LOW); //permet de limiter la montee pression dans echangeur apres bascule sur geothermie

  d = 1;
  //s1 = 0;
  //s2 = 0;
  s7 = 0;
   etat = INITIAL_100;
}
else if (PISC == 0 || (th_stock_haut < seuil_stop_chauffage_stock)) {
```

```
    digitalWrite(led_verte_piscine_stock,  LOW);
    digitalWrite(C3_chauffage_solaire,  HIGH);
     config_vannes_chauffage_geothermie();

    digitalWrite(ve_echangeur,  LOW); //permet de limiter la montee pression dans echangeur apres bascule sur geothermie
    digitalWrite(ve_geothermie,  LOW); //permet de limiter la montee pression dans echangeur apres bascule sur geothermie
    //delayWithMillis(30000); /////////////// A OPTIMISER

    d = 1;
    //s1 = 0;
    //s2 = 0;
    s7 = 0;
    etat = X106;
  }
  else if (PISC == 1 && (th_stock_haut >= seuil_stop_chauffage_stock)) {
    etat = X110bis;
  }
  break;

case (X110bis) :
  etat = X110;
  break;

case (X111) :
  while (h == 1) {
    digitalWrite(ve_piscine,  LOW);
     vs_piscine_ouvrir_variable ();
    h = h + 1;
    time3 = millis();
    /*
     if (ch_q_variable_maison = 1 && occupe == 0) { //montee en temp CH geothermie
      occupe = 1;
       timing_saisie_montee();
      occupe = 0;
    }
    */
  }
   current_time3 = millis();
   delta_time3 = current_time3 - time3;
  if (delta_time3 >= time_montee) {
    tttt = 2;
  }
  //if (ch_q_variable_maison == 1) {
  digitalWrite(led_bleue_chauffage_geothermie,  LOW);
   delayWithMillis(500);
  digitalWrite(led_bleue_chauffage_geothermie,  HIGH);
   delayWithMillis(500);
  digitalWrite(led_bleue_chauffage_geothermie,  LOW);
   delayWithMillis(500);
  digitalWrite(led_bleue_chauffage_geothermie,  HIGH);
  //}
   calcul_th_stock_haut();
  //calcul_th_ext();  //inclu  calcul  th_capteur
  if (digitalRead  (CH) == 0 || digitalRead  (cycle) == 0 || digitalRead  (manu) == 1 || digitalRead  (prio_chauffage) == 0) {
```

```
          digitalWrite(led_bleue_chauffage_geothermie,  LOW);
          h = 1;
          s4 = 0;
          //ttttbis = 0;
          tttt = 0;
           vannes_piscine_fermer_tor();
          etat = INITIAL_100;
        }
        else if (digitalRead (CH) == 1 && (th_stock_haut >= seuil_marche_chauffage_stock)) {
          digitalWrite(led_bleue_chauffage_geothermie,  LOW);
          h = 1;
          s4 = 0;
          etat = X113; //Q normal TOR vers CH solaire
        }
        //else if (digitalRead (CH) == 1 && (th_stock_haut < seuil_marche_chauffage_stock) && digitalRead (cycle) == 1 && digitalRead (manu) == 0 && digitalRe
        else if (digitalRead (CH) == 1 && (th_stock_haut < seuil_marche_chauffage_stock) && digitalRead (cycle) == 1 && digitalRead (manu) == 0 && digitalRead
          h = 1;
          //ttttbis = 2;
          //tttt = 0;
          etat = X112; //Q normal TOR vers CH geothermie
        }
        else if (digitalRead (CH) == 1 && (th_stock_haut < seuil_marche_chauffage_stock) && digitalRead (cycle) == 1 && digitalRead (manu) == 0 && digitalRead
          etat = X111bis;
        }
        break;

      case (X111bis) :
        etat = X111;
        break;

      case (X112) : //fermer vannes piscine en TOR
         vannes_piscine_fermer_tor();
        etat = X103; //CH  geothermie
        break;

      case (X113) : //fermer vannes piscine en TOR
         vannes_piscine_fermer_tor();
        etat = X104; //CH  solaire
        break;

      default :
        etat = INITIAL_100;
        break;
    }
  }
  ////////////////////////////////////////////////////////////////////////  FIN  PROG  PRINCIPALE  GESTION  CHAUFFAGE    ////////////////////////////////////

  ////////////////////////////////////////////////////////////////////////  PROG  PRINCIPALE  GESTION  CHAUFFAGE  STOCK  GEOTHERMIE    ////////////////////////
X200:
  {
    static enum
    {
      INITIAL_200,
      X201,
```

```
  X201bis,
  X202,
  X202bis,
  X203
}
etat = INITIAL_200;
switch (etat)
{
  case (INITIAL_200) :
    digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
    if ( digitalRead (cycle) == 1 && digitalRead (manu) == 0 && digitalRead (prio_chauffage) == 1 && digitalRead (CH) == 0 && digitalRead(pilote_HP_HC) ==
      etat = X201;
    }
    break;

  case (X201) :
     ch_st_geo = 1;
    digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
     calcul_th_stock_mihaut();
    if (digitalRead (cycle) == 0 || digitalRead (manu) == 1 || digitalRead(pilote_HP_HC) == 0 ||  digitalRead (CH) == 1) {
      etat = INITIAL_200;
    }
    else if (th_stock_mihaut < seuil_marche_chauffage_stock_geo) {
      etat = X202;
    }
    else if (th_stock_mihaut >= seuil_marche_chauffage_stock_geo) {
      etat = X201bis;
    }
    break;

  case (X201bis) :
    etat = X201;
    break;

  case (X202) :
    while (e == 1) {
      digitalWrite(led_bleue_chauffer_stock_geo,  HIGH); ////// A CONFIRMER
      digitalWrite(C3_chauffage_solaire,  HIGH);
      //digitalWrite(v_shunt_mitigeur_ch, LOW);
      //digitalWrite(C4_captage_geothermie, LOW); //NO
      //digitalWrite(C5_chappe, LOW); //NO
      //digitalWrite(compresseur, LOW); //NO
        config_vannes_chauffer_stock_geothermie();
      digitalWrite(C4_captage_geothermie,  HIGH); //NF
      digitalWrite(C5_chappe,  HIGH); //NF
      digitalWrite(compresseur,  HIGH); //NF
      e = e + 1;
    }


    digitalWrite(sonde_ext_geothermie,  LOW); //NO (marche geothermie)
```

```
        calcul_th_stock_mihaut();
        if (digitalRead (cycle) == 0 || digitalRead (manu) == 1 || digitalRead(pilote_HP_HC) == 0 || (th_stock_mihaut >= seuil_stop_chauffage_stock_geo) || di
          e = 1;
          etat = X203;
        }
        else if ((th_stock_mihaut < seuil_stop_chauffage_stock_geo) && digitalRead(pilote_HP_HC) == 1) {
          etat = X202bis;
        }
        break;

      case (X202bis) :
        etat = X202;
        break;

      case (X203) :
        ch_st_geo = 0;
        digitalWrite(led_bleue_chauffer_stock_geo, LOW);


        digitalWrite(sonde_ext_geothermie, HIGH); //NF (arret geothermie)


        digitalWrite(C3_chauffage_solaire, HIGH);
        /*
         digitalWrite(C4_captage_geothermie, LOW); //NO
         digitalWrite(C5_chappe, LOW); //NO
         digitalWrite(compresseur, LOW); //NO
        */
        //digitalWrite(v_shunt_mitigeur_ch, HIGH);
         config_vannes_chauffer_stock_solaire();
        digitalWrite(ve_echangeur, LOW); //limiter pression dans échangeur stock
        etat = INITIAL_200;
        break;

      default :
        etat = INITIAL_200;
        break;
    }
  }
  ////////////////////////////////////////////////////////////////////////  FIN PROG PRINCIPALE GESTION CHAUFFAGE STOCK GEOTHERMIE    ////////////////////
}

////////////// GESTION TIMING SAISIE DATA  ///////////////
void timing_saisie() {
  if (s == 1) {
    if (t == 1) {
      time = millis();
      t = 0;
    }
    current_time = millis();
    delta_time = current_time - time;
    if (delta_time >= time_supervision) {
      digitalWrite(led_orange_etape_init_solaire, HIGH);
      digitalWrite(led_orange_etape_init_chauffe, HIGH);
```

```
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
       saisie_data();
      t = 1;
    }
  }
}
////////////// FIN GESTION TIMING SAISIE DATA  ///////////////

////////////// GESTION TIMING SAISIE DATA2  ///////////////
void timing_saisie2() {
  if (s == 1) {
    if (t == 1) {
      time = millis();
      t = 0;
    }
    current_time = millis();
    delta_time = current_time - time;
    if (delta_time >= time_supervision) {
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
       saisie_data2();
      t = 1;
    }
  }
}
////////////// FIN GESTION TIMING SAISIE DATA2  ///////////////
```

```
////////////// GESTION TIMING SAISIE DATA3  ///////////////
void timing_saisie3() {
  if (s == 1) {
    if (t == 1) {
      time = millis();
      t = 0;
    }
    current_time = millis();
    delta_time = current_time - time;
    if (delta_time >= time_supervision) {
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
       saisie_data3();
      t = 1;
    }
  }
}
////////////// FIN GESTION TIMING SAISIE DATA3  ///////////////

////////////// GESTION TIMING SAISIE DATA4  ///////////////
void timing_saisie4() {
  if (s == 1) {
    if (t == 1) {
      time = millis();
      t = 0;
    }
    current_time = millis();
    delta_time = current_time - time;
    if (delta_time >= time_supervision) {
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
```

```
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
       saisie_data4();
      t = 1;
    }
  }
}
////////////// FIN GESTION TIMING SAISIE DATA4  ///////////////

////////////// GESTION TIMING SAISIE DATA5  ///////////////
void timing_saisie5() {
  if (s == 1) {
    if (t == 1) {
      time = millis();
      t = 0;
    }
    current_time = millis();
    delta_time = current_time - time;
    if (delta_time >= time_supervision) {
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
       saisie_data5();
      t = 1;
    }
  }
}
////////////// FIN GESTION TIMING SAISIE DATA5  ///////////////

////////////// GESTION TIMING SAISIE DATA6  ///////////////
void timing_saisie6() {
  if (s == 1) {
    if (t == 1) {
      time = millis();
      t = 0;
    }
    current_time = millis();
    delta_time = current_time - time;
```

```
    if (delta_time >= time_supervision) {
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
       saisie_data6();
      t = 1;
    }
  }
}
////////////// FIN GESTION TIMING SAISIE DATA6  ///////////////

////////////// GESTION TIMING SAISIE DATA7  ///////////////
void timing_saisie7() {
  if (s == 1) {
    if (t == 1) {
      time = millis();
      t = 0;
    }
    current_time = millis();
    delta_time = current_time - time;
    if (delta_time >= time_supervision) {
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
       saisie_data7();
      t = 1;
    }
  }
```

```
}
////////////// FIN GESTION TIMING SAISIE DATA7   ///////////////

////////////// GESTION TIMING SAISIE DATA41   ///////////////
void timing_saisie41() {
  if (s == 1) {
    if (t == 1) {
      time = millis();
      t = 0;
    }
    current_time = millis();
    delta_time = current_time - time;
    if (delta_time >= time_supervision) {
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
       saisie_data41();
      t = 1;
    }
  }
}
////////////// FIN GESTION TIMING SAISIE DATA41   ///////////////

////////////// GESTION TIMING SAISIE DATA51   ///////////////
void timing_saisie51() {
  if (s == 1) {
    if (t == 1) {
      time = millis();
      t = 0;
    }
    current_time = millis();
    delta_time = current_time - time;
    if (delta_time >= time_supervision) {
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
```

```
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
       saisie_data51();
      t = 1;
    }
  }
}
////////////// FIN GESTION TIMING SAISIE DATA51  ///////////////

////////////// GESTION TIMING SAISIE DATA61  ///////////////
void timing_saisie61() {
  if (s == 1) {
    if (t == 1) {
      time = millis();
      t = 0;
    }
    current_time = millis();
    delta_time = current_time - time;
    if (delta_time >= time_supervision) {
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
       saisie_data61();
      t = 1;
    }
  }
}
////////////// FIN GESTION TIMING SAISIE DATA61  ///////////////

////////////// GESTION TIMING SAISIE DATA71  ///////////////
void timing_saisie71() {
  if (s == 1) {
    if (t == 1) {
      time = millis();
      t = 0;
```

```
    }
    current_time = millis();
    delta_time = current_time - time;
    if (delta_time >= time_supervision) {
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
       saisie_data71();
      t = 1;
    }
  }
}
////////////// FIN GESTION TIMING SAISIE DATA71  ///////////////

////////////// GESTION TIMING SAISIE DATA42  ///////////////
void timing_saisie42() {
  if (s == 1) {
    if (t == 1) {
      time = millis();
      t = 0;
    }
    current_time = millis();
    delta_time = current_time - time;
    if (delta_time >= time_supervision) {
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
       saisie_data42();
```

```
      t = 1;
    }
  }
}
////////////// FIN GESTION TIMING SAISIE DATA42   ///////////////

////////////// GESTION TIMING SAISIE DATA52   ///////////////
void timing_saisie52() {
  if (s == 1) {
    if (t == 1) {
      time = millis();
      t = 0;
    }
    current_time = millis();
    delta_time = current_time - time;
    if (delta_time >= time_supervision) {
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
       saisie_data52();
      t = 1;
    }
  }
}
////////////// FIN GESTION TIMING SAISIE DATA52   ///////////////

////////////// GESTION TIMING SAISIE DATA62   ///////////////
void timing_saisie62() {
  if (s == 1) {
    if (t == 1) {
      time = millis();
      t = 0;
    }
    current_time = millis();
    delta_time = current_time - time;
    if (delta_time >= time_supervision) {
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
```

```
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
       saisie_data62();
      t = 1;
    }
  }
}
////////////// FIN GESTION TIMING SAISIE DAT62  ///////////////

////////////// GESTION TIMING SAISIE DATA72  ///////////////
void timing_saisie72() {
  if (s == 1) {
    if (t == 1) {
      time = millis();
      t = 0;
    }
    current_time = millis();
    delta_time = current_time - time;
    if (delta_time >= time_supervision) {
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
       saisie_data72();
      t = 1;
    }
  }
}
////////////// FIN GESTION TIMING SAISIE DAT72  ///////////////

////////////// GESTION TIMING SAISIE DATA400 HC  ///////////////
void timing_saisie400() {
  if (s == 1) {
```

```
    if (t == 1) {
      time = millis();
      t = 0;
    }
    current_time = millis();
    delta_time = current_time - time;
    if (delta_time >= time_supervision) {
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
       saisie_data400();
      t = 1;
    }
  }
}
////////////// FIN GESTION TIMING SAISIE DATA400 HC  ///////////////

////////////// GESTION TIMING SAISIE DATA500 HC  ///////////////
void timing_saisie500() {
  if (s == 1) {
    if (t == 1) {
      time = millis();
      t = 0;
    }
    current_time = millis();
    delta_time = current_time - time;
    if (delta_time >= time_supervision) {
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
```

```
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
       saisie_data500();
      t = 1;
    }
  }
}
////////////// FIN GESTION TIMING SAISIE DATA500 HC  ///////////////

////////////// GESTION TIMING SAISIE DATA600 HC  ///////////////
void timing_saisie600() {
  if (s == 1) {
    if (t == 1) {
      time = millis();
      t = 0;
    }
    current_time = millis();
    delta_time = current_time - time;
    if (delta_time >= time_supervision) {
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
      digitalWrite(led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite(led_orange_etape_init_solaire,  LOW);
      digitalWrite(led_orange_etape_init_chauffe,  LOW);
      digitalWrite(led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
       saisie_data600();
      t = 1;
    }
  }
}
////////////// FIN GESTION TIMING SAISIE DATA600 HC  ///////////////

////////////// GESTION TIMING SAISIE DATA700 HC  ///////////////
void timing_saisie700() {
  if (s == 1) {
    if (t == 1) {
      time = millis();
      t = 0;
    }
    current_time = millis();
    delta_time = current_time - time;
    if (delta_time >= time_supervision) {
      digitalWrite(led_orange_etape_init_solaire,  HIGH);
      digitalWrite(led_orange_etape_init_chauffe,  HIGH);
```

```
      digitalWrite (led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite (led_orange_etape_init_solaire,  LOW);
      digitalWrite (led_orange_etape_init_chauffe,  LOW);
      digitalWrite (led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
      digitalWrite (led_orange_etape_init_solaire,  HIGH);
      digitalWrite (led_orange_etape_init_chauffe,  HIGH);
      digitalWrite (led_orange_etape_init_ch_st_geo,  HIGH);
      delay (250);
      digitalWrite (led_orange_etape_init_solaire,  LOW);
      digitalWrite (led_orange_etape_init_chauffe,  LOW);
      digitalWrite (led_orange_etape_init_ch_st_geo,  LOW);
      delay (250);
       saisie_data700();
      t = 1;
    }
  }
}
////////////// FIN GESTION TIMING SAISIE DATA700 HC  ///////////////

/*
////////////// GESTION TIMING SAISIE MONTEE CH GEOTHERMIE  ///////////////
void timing_saisie_montee() {
  if (ch_q_variable_maison == 1) {
    if (tttt == 1) {
      time3 = millis();
      tttt = 0;
    }
    current_time3 = millis();
    delta_time3 = current_time3 - time3;
    if (delta_time3 >= time_montee) {
      //saisie_data400();
      tttt = 1;
    }
  }
}
////////////// FIN GESTION TIMING SAISIE MONTEE CH GEOTHERMIE  ///////////////
*/

////////////// GESTION SUPERVISION ///////////////
void saisie_data() {
   calcul_th_entree_stock();
   calcul_th_ecs();
   calcul_th_capteur();
   calcul_th_grenier_bas();
   calcul_th_grenier_haut();
   calcul_th_stock_bas();
   calcul_th_stock_mibas();
   calcul_th_stock_mihaut();
   calcul_th_stock_haut();
   calcul_th_piscine();
   calcul_th_entree_ecs();
   calcul_th_sortie_ecs();
```

```
 calcul_th_sortie_stock();
if (digitalRead (ve_piscine) == HIGH) {
  ve2_piscine = 0;
}
else {
  ve2_piscine = 1;
}
if (digitalRead (vs_piscine) == HIGH) {
  vs2_piscine = 0;
}
else {
  vs2_piscine = 1;
}
if (digitalRead (ve_geothermie) == HIGH) {
  ve2_geothermie = 0;
}
else {
  ve2_geothermie = 1;
}
if (digitalRead (vs_geothermie) == HIGH) {
  vs2_geothermie = 0;
}
else {
  vs2_geothermie = 1;
}
if (digitalRead (vs_echangeur) == HIGH) {
  vs2_echangeur = 0;
}
else {
  vs2_echangeur = 1;
}
if (digitalRead (ve_echangeur) == HIGH) {
  ve2_echangeur = 0;
}
else {
  ve2_echangeur = 1;
}
if (digitalRead (ve_chauffage) == HIGH) {
  ve2_chauffage = 0;
}
else {
  ve2_chauffage = 1;
}
if (digitalRead (vs_chauffage) == HIGH) {
  vs2_chauffage = 0;
}
else {
  vs2_chauffage = 1;
}
if (digitalRead (vs_3v) == HIGH) {
  vs2_3v = 0;
}
else {
  vs2_3v = 1;
```

```
  }
  if (digitalRead (ve_3v) == HIGH) {
    ve2_3v = 0;
  }
  else {
    //ve2_3v = 1;
    ve2_3v = 10;
  }
  if (digitalRead (v_retour_stock) == HIGH) {
    v2_retour_stock = 0;
  }
  else {
    v2_retour_stock = 1;
  }
  if (digitalRead (v_debit_capteur) == HIGH) {
    v2_debit_capteur = 0;
  }
  else {
    v2_debit_capteur = 1;
  }
  envoi_data();
}
////////////// FIN GESTION SUPERVISION ///////////////

////////////// GESTION SUPERVISION 2 ///////////////
void saisie_data2() {
  calcul_th_entree_stock();
  calcul_th_ecs();
  calcul_th_capteur();
  calcul_th_grenier_bas();
  calcul_th_grenier_haut();
  calcul_th_stock_bas();
  calcul_th_stock_mibas();
  calcul_th_stock_mihaut();
  calcul_th_stock_haut();
  calcul_th_piscine();
  calcul_th_entree_ecs();
  calcul_th_sortie_ecs();
  calcul_th_sortie_stock();
  if (digitalRead (ve_piscine) == HIGH) {
    ve2_piscine = 0;
  }
  else {
    ve2_piscine = 1;
  }
  if (digitalRead (vs_piscine) == HIGH) {
    vs2_piscine = 0;
  }
  else {
    vs2_piscine = 1;
  }
  if (digitalRead (ve_geothermie) == HIGH) {
    ve2_geothermie = 0;
  }
```

```
else {
  ve2_geothermie = 1;
}
if (digitalRead (vs_geothermie) == HIGH) {
  vs2_geothermie = 0;
}
else {
  vs2_geothermie = 1;
}
if (digitalRead (vs_echangeur) == HIGH) {
  vs2_echangeur = 0;
}
else {
  vs2_echangeur = 1;
}
if (digitalRead (ve_echangeur) == HIGH) {
  ve2_echangeur = 0;
}
else {
  ve2_echangeur = 1;
}
if (digitalRead (ve_chauffage) == HIGH) {
  ve2_chauffage = 0;
}
else {
  ve2_chauffage = 1;
}
if (digitalRead (vs_chauffage) == HIGH) {
  vs2_chauffage = 0;
}
else {
  vs2_chauffage = 1;
}
if (digitalRead (vs_3v) == HIGH) {
  vs2_3v = 0;
}
else {
  vs2_3v = 1;
}
if (digitalRead (ve_3v) == HIGH) {
  ve2_3v = 0;
}
else {
  ve2_3v = 1;
}
if (digitalRead (v_retour_stock) == HIGH) {
  v2_retour_stock = 0;
}
else {
  v2_retour_stock = 1;
}
if (digitalRead (v_debit_capteur) == HIGH) {
  v2_debit_capteur = 0;
}
```

```
  else {
    v2_debit_capteur = 2;
  }
  envoi_data();
}
////////////// FIN GESTION SUPERVISION 2 ///////////////

/*
////////////// GESTION SUPERVISION 3 ///////////////
void saisie_data3() {
  if (digitalRead (v_debit_capteur) == HIGH) {
    v2_debit_capteur = 3;
  }
  else {
    v2_debit_capteur = 0;
  }
   Serial.print("DATA,TIME,");
   Serial.print(",,,,,,,,,,,,,,,,");  //a valider
    Serial.println(v2_debit_capteur);
    delayWithMillis(delai1000);
}
////////////// FIN GESTION SUPERVISION 3 ///////////////
*/

////////////// GESTION SUPERVISION 3 ///////////////
void saisie_data3() {
   calcul_th_entree_stock();
   calcul_th_ecs();
   calcul_th_capteur();
   calcul_th_grenier_bas();
   calcul_th_grenier_haut();
   calcul_th_stock_bas();
   calcul_th_stock_mibas();
   calcul_th_stock_mihaut();
   calcul_th_stock_haut();
   calcul_th_piscine();
   calcul_th_entree_ecs();
   calcul_th_sortie_ecs();
   calcul_th_sortie_stock();
  if (digitalRead (ve_piscine) == HIGH) {
    ve2_piscine = 0;
  }
  else {
    ve2_piscine = 1;
  }
  if (digitalRead (vs_piscine) == HIGH) {
    vs2_piscine = 0;
  }
  else {
    vs2_piscine = 1;
  }
  if (digitalRead (ve_geothermie) == HIGH) {
    ve2_geothermie = 0;
  }
```

```
else {
  ve2_geothermie = 1;
}
if (digitalRead (vs_geothermie) == HIGH) {
  vs2_geothermie = 0;
}
else {
  vs2_geothermie = 1;
}
if (digitalRead (vs_echangeur) == HIGH) {
  vs2_echangeur = 0;
}
else {
  vs2_echangeur = 1;
}
if (digitalRead (ve_echangeur) == HIGH) {
  ve2_echangeur = 0;
}
else {
  ve2_echangeur = 1;
}
if (digitalRead (ve_chauffage) == HIGH) {
  ve2_chauffage = 0;
}
else {
  ve2_chauffage = 1;
}
if (digitalRead (vs_chauffage) == HIGH) {
  vs2_chauffage = 0;
}
else {
  vs2_chauffage = 1;
}
if (digitalRead (vs_3v) == HIGH) {
  vs2_3v = 0;
}
else {
  vs2_3v = 1;
}
if (digitalRead (ve_3v) == HIGH) {
  ve2_3v = 0;
}
else {
  ve2_3v = 1;
}
if (digitalRead (v_retour_stock) == HIGH) {
  v2_retour_stock = 0;
}
else {
  v2_retour_stock = 1;
}
if (digitalRead (v_debit_capteur) == HIGH) {
  v2_debit_capteur = 3;
}
```

```
  else {
    v2_debit_capteur = 0;
  }
  envoi_data();
}
////////////// FIN GESTION SUPERVISION 3 ///////////////

////////////// GESTION SUPERVISION 4 ///////////////
void saisie_data4() {
  calcul_th_entree_stock();
  calcul_th_ecs();
  calcul_th_capteur();
  calcul_th_grenier_bas();
  calcul_th_grenier_haut();
  calcul_th_stock_bas();
  calcul_th_stock_mibas();
  calcul_th_stock_mihaut();
  calcul_th_stock_haut();
  calcul_th_piscine();
  calcul_th_entree_ecs();
  calcul_th_sortie_ecs();
  calcul_th_sortie_stock();
  if (digitalRead (ve_piscine) == HIGH) {
    ve2_piscine = 0;
  }
  else {
    ve2_piscine = 1;
  }
  //if ((tttt == 1) && digitalRead(v_variable) == LOW) {
  if ((tttt == 1) && v_variable == 1) {
    vs2_piscine = 41;
  }
  else {
    if (tttt != 1 && digitalRead (vs_piscine) == HIGH) {
      vs2_piscine = 0;
    }
    else {
      vs2_piscine = 1;
    }
  }
  /*
  if (digitalRead (vs_piscine) == HIGH) {
    vs2_piscine = 0;
  }
  else {
    vs2_piscine = 1;
  }
  */
  if (digitalRead (ve_geothermie) == HIGH) {
    ve2_geothermie = 0;
  }
  else {
    ve2_geothermie = 1;
  }
```

```
if (digitalRead (vs_geothermie) == HIGH) {
  vs2_geothermie = 0;
}
else {
  vs2_geothermie = 1;
}
if (digitalRead (vs_echangeur) == HIGH) {
  vs2_echangeur = 0;
}
else {
  vs2_echangeur = 1;
}
if (digitalRead (ve_echangeur) == HIGH) {
  ve2_echangeur = 0;
}
else {
  ve2_echangeur = 1;
}
if (digitalRead (ve_chauffage) == HIGH) {
  ve2_chauffage = 0;
}
else {
  ve2_chauffage = 1;
}
if (digitalRead (vs_chauffage) == HIGH) {
  vs2_chauffage = 0;
}
else {
  vs2_chauffage = 4;
}
if (digitalRead (vs_3v) == HIGH) {
  vs2_3v = 0;
}
else {
  vs2_3v = 1;
}
if (digitalRead (ve_3v) == HIGH) {
  ve2_3v = 0;
}
else {
  ve2_3v = 1;
}
if (digitalRead (v_retour_stock) == HIGH) {
  v2_retour_stock = 0;
}
else {
  v2_retour_stock = 1;
}
if (digitalRead (v_debit_capteur) == HIGH) {
  v2_debit_capteur = 0;
}
else {
  v2_debit_capteur = 1;
}
```

```
   envoi_data();
}
//////////// FIN GESTION SUPERVISION 4 ///////////////

//////////// GESTION SUPERVISION 5 ///////////////
void saisie_data5() {
   calcul_th_entree_stock();
   calcul_th_ecs();
   calcul_th_capteur();
   calcul_th_grenier_bas();
   calcul_th_grenier_haut();
   calcul_th_stock_bas();
   calcul_th_stock_mibas();
   calcul_th_stock_mihaut();
   calcul_th_stock_haut();
   calcul_th_piscine();
   calcul_th_entree_ecs();
   calcul_th_sortie_ecs();
   calcul_th_sortie_stock();
  if (digitalRead (ve_piscine) == HIGH) {
    ve2_piscine = 0;
  }
  else {
    ve2_piscine = 1;
  }
  //if ((tttt == 1) && digitalRead(v_variable) == LOW) {
  if ((tttt == 1) && v_variable == 1) {
    vs2_piscine = 41;
  }
  else {
    if (tttt != 1 && digitalRead (vs_piscine) == HIGH) {
      vs2_piscine = 0;
    }
    else {
      vs2_piscine = 1;
    }
  }
  /*
  if (digitalRead (vs_piscine) == HIGH) {
    vs2_piscine = 0;
  }
  else {
    vs2_piscine = 1;
  }
  */
  if (digitalRead (ve_geothermie) == HIGH) {
    ve2_geothermie = 0;
  }
  else {
    ve2_geothermie = 1;
  }
  if (digitalRead (vs_geothermie) == HIGH) {
    vs2_geothermie = 0;
  }
```

```
  else {
    vs2_geothermie = 1;
  }
  if (digitalRead (vs_echangeur) == HIGH) {
    vs2_echangeur = 0;
  }
  else {
    vs2_echangeur = 1;
  }
  if (digitalRead (ve_echangeur) == HIGH) {
    ve2_echangeur = 0;
  }
  else {
    ve2_echangeur = 1;
  }
  if (digitalRead (ve_chauffage) == HIGH) {
    ve2_chauffage = 0;
  }
  else {
    ve2_chauffage = 1;
  }
  if (digitalRead (vs_chauffage) == HIGH) {
    vs2_chauffage = 0;
  }
  else {
    vs2_chauffage = 5;
  }
  if (digitalRead (vs_3v) == HIGH) {
    vs2_3v = 0;
  }
  else {
    vs2_3v = 1;
  }
  if (digitalRead (ve_3v) == HIGH) {
    ve2_3v = 0;
  }
  else {
    ve2_3v = 1;
  }
  if (digitalRead (v_retour_stock) == HIGH) {
    v2_retour_stock = 0;
  }
  else {
    v2_retour_stock = 1;
  }
  if (digitalRead (v_debit_capteur) == HIGH) {
    v2_debit_capteur = 0;
  }
  else {
    v2_debit_capteur = 1;
  }
   envoi_data();
}
////////////// FIN GESTION SUPERVISION 5 ///////////////
```

```
////////////  GESTION  SUPERVISION  6  ///////////////
void saisie_data6() {
   calcul_th_entree_stock();
   calcul_th_ecs();
   calcul_th_capteur();
   calcul_th_grenier_bas();
   calcul_th_grenier_haut();
   calcul_th_stock_bas();
   calcul_th_stock_mibas();
   calcul_th_stock_mihaut();
   calcul_th_stock_haut();
   calcul_th_piscine();
   calcul_th_entree_ecs();
   calcul_th_sortie_ecs();
   calcul_th_sortie_stock();
  if (digitalRead (ve_piscine) == HIGH) {
    ve2_piscine = 0;
  }
  else {
    ve2_piscine = 1;
  }
  //if ((tttt == 1) && digitalRead(v_variable) == LOW) {
  if ((tttt == 1) && v_variable == 1) {
    vs2_piscine = 41;
  }
  else {
    if (tttt != 1 && digitalRead (vs_piscine) == HIGH) {
      vs2_piscine = 0;
    }
    else {
      vs2_piscine = 1;
    }
  }
  /*
  if (digitalRead (vs_piscine) == HIGH) {
    vs2_piscine = 0;
  }
  else {
    vs2_piscine = 1;
  }
  */
  if (digitalRead (ve_geothermie) == HIGH) {
    ve2_geothermie = 0;
  }
  else {
    ve2_geothermie = 1;
  }
  if (digitalRead (vs_geothermie) == HIGH) {
    vs2_geothermie = 0;
  }
  else {
    vs2_geothermie = 1;
  }
```

```
  if (digitalRead (vs_echangeur) == HIGH) {
    vs2_echangeur = 0;
  }
  else {
    vs2_echangeur = 1;
  }
  if (digitalRead (ve_echangeur) == HIGH) {
    ve2_echangeur = 0;
  }
  else {
    ve2_echangeur = 1;
  }
  if (digitalRead (ve_chauffage) == HIGH) {
    ve2_chauffage = 0;
  }
  else {
    ve2_chauffage = 1;
  }
  if (digitalRead (vs_chauffage) == HIGH) {
    vs2_chauffage = 6;
  }
  else {
    vs2_chauffage = 0;
  }
  if (digitalRead (vs_3v) == HIGH) {
    vs2_3v = 0;
  }
  else {
    vs2_3v = 1;
  }
  if (digitalRead (ve_3v) == HIGH) {
    ve2_3v = 0;
  }
  else {
    ve2_3v = 1;
  }
  if (digitalRead (v_retour_stock) == HIGH) {
    v2_retour_stock = 0;
  }
  else {
    v2_retour_stock = 1;
  }
  if (digitalRead (v_debit_capteur) == HIGH) {
    v2_debit_capteur = 0;
  }
  else {
    v2_debit_capteur = 1;
  }
   envoi_data();
}
////////////// FIN GESTION SUPERVISION 6 ///////////////

////////////// GESTION SUPERVISION 7 ///////////////
void saisie_data7() {
```

```
 calcul_th_entree_stock();
 calcul_th_ecs();
 calcul_th_capteur();
 calcul_th_grenier_bas();
 calcul_th_grenier_haut();
 calcul_th_stock_bas();
 calcul_th_stock_mibas();
 calcul_th_stock_mihaut();
 calcul_th_stock_haut();
 calcul_th_piscine();
 calcul_th_entree_ecs();
 calcul_th_sortie_ecs();
 calcul_th_sortie_stock();
if (digitalRead (ve_piscine) == HIGH) {
  ve2_piscine = 0;
}
else {
  ve2_piscine = 1;
}
//if ((tttt == 1) && digitalRead(v_variable) == LOW) {
if ((tttt == 1) && v_variable == 1) {
  vs2_piscine = 41;
}
else {
  if (tttt != 1 && digitalRead (vs_piscine) == HIGH) {
    vs2_piscine = 0;
  }
  else {
    vs2_piscine = 1;
  }
}
/*
if (digitalRead (vs_piscine) == HIGH) {
  vs2_piscine = 0;
}
else {
  vs2_piscine = 1;
}
*/
if (digitalRead (ve_geothermie) == HIGH) {
  ve2_geothermie = 0;
}
else {
  ve2_geothermie = 1;
}
if (digitalRead (vs_geothermie) == HIGH) {
  vs2_geothermie = 0;
}
else {
  vs2_geothermie = 1;
}
if (digitalRead (vs_echangeur) == HIGH) {
  vs2_echangeur = 0;
}
```

```
  else {
    vs2_echangeur = 1;
  }
  if (digitalRead (ve_echangeur) == HIGH) {
    ve2_echangeur = 0;
  }
  else {
    ve2_echangeur = 1;
  }
  if (digitalRead (ve_chauffage) == HIGH) {
    ve2_chauffage = 0;
  }
  else {
    ve2_chauffage = 1;
  }
  if (digitalRead (vs_chauffage) == HIGH) {
    vs2_chauffage = 7; //////7 !!!!!
  }
  else {
    vs2_chauffage = 0; ///////0 !!!!!!
  }
  if (digitalRead (vs_3v) == HIGH) {
    vs2_3v = 0;
  }
  else {
    vs2_3v = 1;
  }
  if (digitalRead (ve_3v) == HIGH) {
    ve2_3v = 0;
  }
  else {
    ve2_3v = 1;
  }
  if (digitalRead (v_retour_stock) == HIGH) {
    v2_retour_stock = 0;
  }
  else {
    v2_retour_stock = 1;
  }
  if (digitalRead (v_debit_capteur) == HIGH) {
    v2_debit_capteur = 0;
  }
  else {
    v2_debit_capteur = 1;
  }
  envoi_data();
}
////////////// FIN GESTION SUPERVISION 7 ///////////////

////////////// GESTION SUPERVISION 41 ///////////////
void saisie_data41() {
  calcul_th_entree_stock();
  calcul_th_ecs();
  calcul_th_capteur();
```

```
 calcul_th_grenier_bas();
 calcul_th_grenier_haut();
 calcul_th_stock_bas();
 calcul_th_stock_mibas();
 calcul_th_stock_mihaut();
 calcul_th_stock_haut();
 calcul_th_piscine();
 calcul_th_entree_ecs();
 calcul_th_sortie_ecs();
 calcul_th_sortie_stock();
if (digitalRead (ve_piscine) == HIGH) {
  ve2_piscine = 0;
}
else {
  ve2_piscine = 1;
}
//if ((tttt == 1) && digitalRead(v_variable) == LOW) {
if ((tttt == 1) && v_variable == 1) {
  vs2_piscine = 41;
}
else {
  if (tttt != 1 && digitalRead (vs_piscine) == HIGH) {
    vs2_piscine = 0;
  }
  else {
    vs2_piscine = 1;
  }
}
/*
if (digitalRead (vs_piscine) == HIGH) {
  vs2_piscine = 0;
}
else {
  vs2_piscine = 1;
}
*/
if (digitalRead (ve_geothermie) == HIGH) {
  ve2_geothermie = 0;
}
else {
  ve2_geothermie = 1;
}
if (digitalRead (vs_geothermie) == HIGH) {
  vs2_geothermie = 0;
}
else {
  vs2_geothermie = 1;
}
if (digitalRead (vs_echangeur) == HIGH) {
  vs2_echangeur = 0;
}
else {
  vs2_echangeur = 1;
}
```

```
  if (digitalRead (ve_echangeur) == HIGH) {
    ve2_echangeur = 0;
  }
  else {
    ve2_echangeur = 1;
  }
  if (digitalRead (ve_chauffage) == HIGH) {
    ve2_chauffage = 0;
  }
  else {
    ve2_chauffage = 1;
  }
  if (digitalRead (vs_chauffage) == HIGH) {
    vs2_chauffage = 0;
  }
  else {
    vs2_chauffage = 4;
  }
  if (digitalRead (vs_3v) == HIGH) {
    vs2_3v = 0;
  }
  else {
    vs2_3v = 1;
  }
  if (digitalRead (ve_3v) == HIGH) {
    ve2_3v = 0;
  }
  else {
    //ve2_3v = 1;
    ve2_3v = 10;
  }
  if (digitalRead (v_retour_stock) == HIGH) {
    v2_retour_stock = 0;
  }
  else {
    v2_retour_stock = 1;
  }
  if (digitalRead (v_debit_capteur) == HIGH) {
    v2_debit_capteur = 0;
  }
  else {
    v2_debit_capteur = 1;
  }
  envoi_data();
}
////////////// FIN GESTION SUPERVISION 41 ///////////////

////////////// GESTION SUPERVISION 51 ///////////////
void saisie_data51() {
  calcul_th_entree_stock();
  calcul_th_ecs();
  calcul_th_capteur();
  calcul_th_grenier_bas();
  calcul_th_grenier_haut();
```

```
 calcul_th_stock_bas();
 calcul_th_stock_mibas();
 calcul_th_stock_mihaut();
 calcul_th_stock_haut();
 calcul_th_piscine();
 calcul_th_entree_ecs();
 calcul_th_sortie_ecs();
 calcul_th_sortie_stock();
if (digitalRead (ve_piscine) == HIGH) {
  ve2_piscine = 0;
}
else {
  ve2_piscine = 1;
}
//if ((tttt == 1) && digitalRead(v_variable) == LOW) {
if ((tttt == 1) && v_variable == 1) {
  vs2_piscine = 41;
}
else {
  if (tttt != 1 && digitalRead (vs_piscine) == HIGH) {
    vs2_piscine = 0;
  }
  else {
    vs2_piscine = 1;
  }
}
/*
if (digitalRead (vs_piscine) == HIGH) {
  vs2_piscine = 0;
}
else {
  vs2_piscine = 1;
}
*/
if (digitalRead (ve_geothermie) == HIGH) {
  ve2_geothermie = 0;
}
else {
  ve2_geothermie = 1;
}
if (digitalRead (vs_geothermie) == HIGH) {
  vs2_geothermie = 0;
}
else {
  vs2_geothermie = 1;
}
if (digitalRead (vs_echangeur) == HIGH) {
  vs2_echangeur = 0;
}
else {
  vs2_echangeur = 1;
}
if (digitalRead (ve_echangeur) == HIGH) {
  ve2_echangeur = 0;
```

```
  }
  else {
    ve2_echangeur = 1;
  }
  if (digitalRead (ve_chauffage) == HIGH) {
    ve2_chauffage = 0;
  }
  else {
    ve2_chauffage = 1;
  }
  if (digitalRead (vs_chauffage) == HIGH) {
    vs2_chauffage = 0;
  }
  else {
    vs2_chauffage = 5;
  }
  if (digitalRead (vs_3v) == HIGH) {
    vs2_3v = 0;
  }
  else {
    vs2_3v = 1;
  }
  if (digitalRead (ve_3v) == HIGH) {
    ve2_3v = 0;
  }
  else {
    //ve2_3v = 1;
    ve2_3v = 10;
  }
  if (digitalRead (v_retour_stock) == HIGH) {
    v2_retour_stock = 0;
  }
  else {
    v2_retour_stock = 1;
  }
  if (digitalRead (v_debit_capteur) == HIGH) {
    v2_debit_capteur = 0;
  }
  else {
    v2_debit_capteur = 1;
  }
  envoi_data();
}
////////////// FIN GESTION SUPERVISION 51 ///////////////

////////////// GESTION SUPERVISION 61 ///////////////
void saisie_data61() {
  calcul_th_entree_stock();
  calcul_th_ecs();
  calcul_th_capteur();
  calcul_th_grenier_bas();
  calcul_th_grenier_haut();
  calcul_th_stock_bas();
  calcul_th_stock_mibas();
```

```
 calcul_th_stock_mihaut();
 calcul_th_stock_haut();
 calcul_th_piscine();
 calcul_th_entree_ecs();
 calcul_th_sortie_ecs();
 calcul_th_sortie_stock();
if (digitalRead (ve_piscine) == HIGH) {
  ve2_piscine = 0;
}
else {
  ve2_piscine = 1;
}
//if ((tttt == 1) && digitalRead(v_variable) == LOW) {
if ((tttt == 1) && v_variable == 1) {
  vs2_piscine = 41;
}
else {
  if (tttt != 1 && digitalRead (vs_piscine) == HIGH) {
    vs2_piscine = 0;
  }
  else {
    vs2_piscine = 1;
  }
}
/*
if (digitalRead (vs_piscine) == HIGH) {
  vs2_piscine = 0;
}
else {
  vs2_piscine = 1;
}
*/
if (digitalRead (ve_geothermie) == HIGH) {
  ve2_geothermie = 0;
}
else {
  ve2_geothermie = 1;
}
if (digitalRead (vs_geothermie) == HIGH) {
  vs2_geothermie = 0;
}
else {
  vs2_geothermie = 1;
}
if (digitalRead (vs_echangeur) == HIGH) {
  vs2_echangeur = 0;
}
else {
  vs2_echangeur = 1;
}
if (digitalRead (ve_echangeur) == HIGH) {
  ve2_echangeur = 0;
}
else {
```

```
    ve2_echangeur = 1;
  }
  if (digitalRead (ve_chauffage) == HIGH) {
    ve2_chauffage = 0;
  }
  else {
    ve2_chauffage = 1;
  }
  if (digitalRead (vs_chauffage) == HIGH) {
    vs2_chauffage = 6;
  }
  else {
    vs2_chauffage = 0;
  }
  if (digitalRead (vs_3v) == HIGH) {
    vs2_3v = 0;
  }
  else {
    vs2_3v = 1;
  }
  if (digitalRead (ve_3v) == HIGH) {
    ve2_3v = 0;
  }
  else {
    //ve2_3v = 1;
    ve2_3v = 10;
  }
  if (digitalRead (v_retour_stock) == HIGH) {
    v2_retour_stock = 0;
  }
  else {
    v2_retour_stock = 1;
  }
  if (digitalRead (v_debit_capteur) == HIGH) {
    v2_debit_capteur = 0;
  }
  else {
    v2_debit_capteur = 1;
  }
  envoi_data();
}
////////////// FIN GESTION SUPERVISION 61 ///////////////

////////////// GESTION SUPERVISION 71 ///////////////
void saisie_data71() {
  calcul_th_entree_stock();
  calcul_th_ecs();
  calcul_th_capteur();
  calcul_th_grenier_bas();
  calcul_th_grenier_haut();
  calcul_th_stock_bas();
  calcul_th_stock_mibas();
  calcul_th_stock_mihaut();
  calcul_th_stock_haut();
```

```
 calcul_th_piscine();
 calcul_th_entree_ecs();
 calcul_th_sortie_ecs();
 calcul_th_sortie_stock();
if (digitalRead (ve_piscine) == HIGH) {
  ve2_piscine = 0;
}
else {
  ve2_piscine = 1;
}
//if ((tttt == 1) && digitalRead(v_variable) == LOW) {
if ((tttt == 1) && v_variable == 1) {
  vs2_piscine = 41;
}
else {
  if (tttt != 1 && digitalRead (vs_piscine) == HIGH) {
    vs2_piscine = 0;
  }
  else {
    vs2_piscine = 1;
  }
}
/*
if (digitalRead (vs_piscine) == HIGH) {
  vs2_piscine = 0;
}
else {
  vs2_piscine = 1;
}
*/
if (digitalRead (ve_geothermie) == HIGH) {
  ve2_geothermie = 0;
}
else {
  ve2_geothermie = 1;
}
if (digitalRead (vs_geothermie) == HIGH) {
  vs2_geothermie = 0;
}
else {
  vs2_geothermie = 1;
}
if (digitalRead (vs_echangeur) == HIGH) {
  vs2_echangeur = 0;
}
else {
  vs2_echangeur = 1;
}
if (digitalRead (ve_echangeur) == HIGH) {
  ve2_echangeur = 0;
}
else {
  ve2_echangeur = 1;
}
```

```
  if (digitalRead (ve_chauffage) == HIGH) {
    ve2_chauffage = 0;
  }
  else {
    ve2_chauffage = 1;
  }
  if (digitalRead (vs_chauffage) == HIGH) {
    vs2_chauffage = 7;
  }
  else {
    vs2_chauffage = 0;
  }
  if (digitalRead (vs_3v) == HIGH) {
    vs2_3v = 0;
  }
  else {
    vs2_3v = 1;
  }
  if (digitalRead (ve_3v) == HIGH) {
    ve2_3v = 0;
  }
  else {
    //ve2_3v = 1;
    ve2_3v = 10;
  }
  if (digitalRead (v_retour_stock) == HIGH) {
    v2_retour_stock = 0;
  }
  else {
    v2_retour_stock = 1;
  }
  if (digitalRead (v_debit_capteur) == HIGH) {
    v2_debit_capteur = 0;
  }
  else {
    v2_debit_capteur = 1;
  }
   envoi_data();
}
////////////// FIN GESTION SUPERVISION 71 ///////////////

////////////// GESTION SUPERVISION 42 ///////////////
void saisie_data42() {
   calcul_th_entree_stock();
   calcul_th_ecs();
   calcul_th_capteur();
   calcul_th_grenier_bas();
   calcul_th_grenier_haut();
   calcul_th_stock_bas();
   calcul_th_stock_mibas();
   calcul_th_stock_mihaut();
   calcul_th_stock_haut();
   calcul_th_piscine();
   calcul_th_entree_ecs();
```

```
 calcul_th_sortie_ecs();
 calcul_th_sortie_stock();
if (digitalRead (ve_piscine) == HIGH) {
  ve2_piscine = 0;
}
else {
  ve2_piscine = 1;
}
//if ((tttt == 1) && digitalRead(v_variable) == LOW) {
if ((tttt == 1) && v_variable == 1) {
  vs2_piscine = 41;
}
else {
  if (tttt != 1 && digitalRead (vs_piscine) == HIGH) {
    vs2_piscine = 0;
  }
  else {
    vs2_piscine = 1;
  }
}
/*
if (digitalRead (vs_piscine) == HIGH) {
  vs2_piscine = 0;
}
else {
  vs2_piscine = 1;
}
*/
if (digitalRead (ve_geothermie) == HIGH) {
  ve2_geothermie = 0;
}
else {
  ve2_geothermie = 1;
}
if (digitalRead (vs_geothermie) == HIGH) {
  vs2_geothermie = 0;
}
else {
  vs2_geothermie = 1;
}
if (digitalRead (vs_echangeur) == HIGH) {
  vs2_echangeur = 0;
}
else {
  vs2_echangeur = 1;
}
if (digitalRead (ve_echangeur) == HIGH) {
  ve2_echangeur = 0;
}
else {
  ve2_echangeur = 1;
}
if (digitalRead (ve_chauffage) == HIGH) {
  ve2_chauffage = 0;
```

```
  }
  else {
    ve2_chauffage = 1;
  }
  if (digitalRead (vs_chauffage) == HIGH) {
    vs2_chauffage = 0;
  }
  else {
    vs2_chauffage = 4;
  }
  if (digitalRead (vs_3v) == HIGH) {
    vs2_3v = 0;
  }
  else {
    vs2_3v = 1;
  }
  if (digitalRead (ve_3v) == HIGH) {
    ve2_3v = 0;
  }
  else {
    ve2_3v = 1;
  }
  if (digitalRead (v_retour_stock) == HIGH) {
    v2_retour_stock = 0;
  }
  else {
    v2_retour_stock = 1;
  }
  if (digitalRead (v_debit_capteur) == HIGH) {
    v2_debit_capteur = 0;
  }
  else {
    v2_debit_capteur = 2;
  }
  envoi_data();
}
////////////// FIN GESTION SUPERVISION 42 ///////////////

////////////// GESTION SUPERVISION 52 ///////////////
void saisie_data52() {
  calcul_th_entree_stock();
  calcul_th_ecs();
  calcul_th_capteur();
  calcul_th_grenier_bas();
  calcul_th_grenier_haut();
  calcul_th_stock_bas();
  calcul_th_stock_mibas();
  calcul_th_stock_mihaut();
  calcul_th_stock_haut();
  calcul_th_piscine();
  calcul_th_entree_ecs();
  calcul_th_sortie_ecs();
  calcul_th_sortie_stock();
  if (digitalRead (ve_piscine) == HIGH) {
```

```
  ve2_piscine = 0;
}
else {
  ve2_piscine = 1;
}
//if ((tttt == 1) && digitalRead(v_variable) == LOW) {
if ((tttt == 1) && v_variable == 1) {
  vs2_piscine = 41;
}
else {
  if (tttt != 1 && digitalRead (vs_piscine) == HIGH) {
    vs2_piscine = 0;
  }
  else {
    vs2_piscine = 1;
  }
}
/*
if (digitalRead (vs_piscine) == HIGH) {
  vs2_piscine = 0;
}
else {
  vs2_piscine = 1;
}
*/
if (digitalRead (ve_geothermie) == HIGH) {
  ve2_geothermie = 0;
}
else {
  ve2_geothermie = 1;
}
if (digitalRead (vs_geothermie) == HIGH) {
  vs2_geothermie = 0;
}
else {
  vs2_geothermie = 1;
}
if (digitalRead (vs_echangeur) == HIGH) {
  vs2_echangeur = 0;
}
else {
  vs2_echangeur = 1;
}
if (digitalRead (ve_echangeur) == HIGH) {
  ve2_echangeur = 0;
}
else {
  ve2_echangeur = 1;
}
if (digitalRead (ve_chauffage) == HIGH) {
  ve2_chauffage = 0;
}
else {
  ve2_chauffage = 1;
```

```
  }
  if (digitalRead (vs_chauffage) == HIGH) {
    vs2_chauffage = 0;
  }
  else {
    vs2_chauffage = 5;
  }
  if (digitalRead (vs_3v) == HIGH) {
    vs2_3v = 0;
  }
  else {
    vs2_3v = 1;
  }
  if (digitalRead (ve_3v) == HIGH) {
    ve2_3v = 0;
  }
  else {
    ve2_3v = 1;
  }
  if (digitalRead (v_retour_stock) == HIGH) {
    v2_retour_stock = 0;
  }
  else {
    v2_retour_stock = 1;
  }
  if (digitalRead (v_debit_capteur) == HIGH) {
    v2_debit_capteur = 0;
  }
  else {
    v2_debit_capteur = 2;
  }
   envoi_data();
}
////////////// FIN GESTION SUPERVISION 52 ///////////////

////////////// GESTION SUPERVISION 62 ///////////////
void saisie_data62() {
   calcul_th_entree_stock();
   calcul_th_ecs();
   calcul_th_capteur();
   calcul_th_grenier_bas();
   calcul_th_grenier_haut();
   calcul_th_stock_bas();
   calcul_th_stock_mibas();
   calcul_th_stock_mihaut();
   calcul_th_stock_haut();
   calcul_th_piscine();
   calcul_th_entree_ecs();
   calcul_th_sortie_ecs();
   calcul_th_sortie_stock();
  if (digitalRead (ve_piscine) == HIGH) {
    ve2_piscine = 0;
  }
  else {
```

```
  ve2_piscine = 1;
}
//if ((tttt == 1) && digitalRead(v_variable) == LOW) {
if ((tttt == 1) && v_variable == 1) {
  vs2_piscine = 41;
}
else {
  if (tttt != 1 && digitalRead (vs_piscine) == HIGH) {
    vs2_piscine = 0;
  }
  else {
    vs2_piscine = 1;
  }
}
/*
if (digitalRead (vs_piscine) == HIGH) {
  vs2_piscine = 0;
}
else {
  vs2_piscine = 1;
}
*/
if (digitalRead (ve_geothermie) == HIGH) {
  ve2_geothermie = 0;
}
else {
  ve2_geothermie = 1;
}
if (digitalRead (vs_geothermie) == HIGH) {
  vs2_geothermie = 0;
}
else {
  vs2_geothermie = 1;
}
if (digitalRead (vs_echangeur) == HIGH) {
  vs2_echangeur = 0;
}
else {
  vs2_echangeur = 1;
}
if (digitalRead (ve_echangeur) == HIGH) {
  ve2_echangeur = 0;
}
else {
  ve2_echangeur = 1;
}
if (digitalRead (ve_chauffage) == HIGH) {
  ve2_chauffage = 0;
}
else {
  ve2_chauffage = 1;
}
if (digitalRead (vs_chauffage) == HIGH) {
  vs2_chauffage = 6;
```

```
  }
  else {
    vs2_chauffage = 0;
  }
  if (digitalRead (vs_3v) == HIGH) {
    vs2_3v = 0;
  }
  else {
    vs2_3v = 1;
  }
  if (digitalRead (ve_3v) == HIGH) {
    ve2_3v = 0;
  }
  else {
    ve2_3v = 1;
  }
  if (digitalRead (v_retour_stock) == HIGH) {
    v2_retour_stock = 0;
  }
  else {
    v2_retour_stock = 1;
  }
  if (digitalRead (v_debit_capteur) == HIGH) {
    v2_debit_capteur = 0;
  }
  else {
    v2_debit_capteur = 2;
  }
  envoi_data();
}
////////////// FIN GESTION SUPERVISION 62 ///////////////

////////////// GESTION SUPERVISION 72 ///////////////
void saisie_data72() {
  calcul_th_entree_stock();
  calcul_th_ecs();
  calcul_th_capteur();
  calcul_th_grenier_bas();
  calcul_th_grenier_haut();
  calcul_th_stock_bas();
  calcul_th_stock_mibas();
  calcul_th_stock_mihaut();
  calcul_th_stock_haut();
  calcul_th_piscine();
  calcul_th_entree_ecs();
  calcul_th_sortie_ecs();
  calcul_th_sortie_stock();
  if (digitalRead (ve_piscine) == HIGH) {
    ve2_piscine = 0;
  }
  else {
    ve2_piscine = 1;
  }
  //if ((tttt == 1) && digitalRead(v_variable) == LOW) {
```

```
if ((tttt == 1) && v_variable == 1) {
  vs2_piscine = 41;
}
else {
  if (tttt != 1 && digitalRead (vs_piscine) == HIGH) {
    vs2_piscine = 0;
  }
  else {
    vs2_piscine = 1;
  }
}
/*
if (digitalRead (vs_piscine) == HIGH) {
  vs2_piscine = 0;
}
else {
  vs2_piscine = 1;
}
*/
if (digitalRead (ve_geothermie) == HIGH) {
  ve2_geothermie = 0;
}
else {
  ve2_geothermie = 1;
}
if (digitalRead (vs_geothermie) == HIGH) {
  vs2_geothermie = 0;
}
else {
  vs2_geothermie = 1;
}
if (digitalRead (vs_echangeur) == HIGH) {
  vs2_echangeur = 0;
}
else {
  vs2_echangeur = 1;
}
if (digitalRead (ve_echangeur) == HIGH) {
  ve2_echangeur = 0;
}
else {
  ve2_echangeur = 1;
}
if (digitalRead (ve_chauffage) == HIGH) {
  ve2_chauffage = 0;
}
else {
  ve2_chauffage = 1;
}
if (digitalRead (vs_chauffage) == HIGH) {
  vs2_chauffage = 7;
}
else {
  vs2_chauffage = 0;
```

```
  }
  if (digitalRead (vs_3v) == HIGH) {
    vs2_3v = 0;
  }
  else {
    vs2_3v = 1;
  }
  if (digitalRead (ve_3v) == HIGH) {
    ve2_3v = 0;
  }
  else {
    ve2_3v = 1;
  }
  if (digitalRead (v_retour_stock) == HIGH) {
    v2_retour_stock = 0;
  }
  else {
    v2_retour_stock = 1;
  }
  if (digitalRead (v_debit_capteur) == HIGH) {
    v2_debit_capteur = 0;
  }
  else {
    v2_debit_capteur = 2;
  }
  envoi_data();
}
////////////// FIN GESTION SUPERVISION 72 ///////////////

////////////// GESTION SUPERVISION 400 ///////////////
void saisie_data400() {
  calcul_th_entree_stock();
  calcul_th_ecs();
  calcul_th_capteur();
  calcul_th_grenier_bas();
  calcul_th_grenier_haut();
  calcul_th_stock_bas();
  calcul_th_stock_mibas();
  calcul_th_stock_mihaut();
  calcul_th_stock_haut();
  calcul_th_piscine();
  calcul_th_entree_ecs();
  calcul_th_sortie_ecs();
  calcul_th_sortie_stock();
  if (digitalRead (ve_piscine) == HIGH) {
    ve2_piscine = 0;
  }
  else {
    ve2_piscine = 1;
  }
  //if ((tttt == 1) && digitalRead(v_variable) == LOW) {
  if ((tttt == 1) && v_variable == 1) {
    vs2_piscine = 41;
  }
```

```
else {
  if (tttt != 1 && digitalRead (vs_piscine) == HIGH) {
    vs2_piscine = 0;
  }
  else {
    vs2_piscine = 1;
  }
}
/*
if (digitalRead (vs_piscine) == HIGH) {
  vs2_piscine = 0;
}
else {
  vs2_piscine = 1;
}
*/
if (digitalRead (ve_geothermie) == HIGH) {
  ve2_geothermie = 0;
}
else {
  ve2_geothermie = 1;
}
if (digitalRead (vs_geothermie) == HIGH) {
  vs2_geothermie = 0;
}
else {
  vs2_geothermie = 1;
}
if (digitalRead (vs_echangeur) == HIGH) {
  vs2_echangeur = 0;
}
else {
  vs2_echangeur = 1;
}
if (digitalRead (ve_echangeur) == HIGH) {
  ve2_echangeur = 0;
}
else {
  ve2_echangeur = 1;
}
if (digitalRead (ve_chauffage) == HIGH) {
  ve2_chauffage = 0;
}
else {
  ve2_chauffage = 1;
}
if (digitalRead (vs_chauffage) == HIGH) {
  vs2_chauffage = 0;
}
else {
  vs2_chauffage = 400;
}
if (digitalRead (vs_3v) == HIGH) {
  vs2_3v = 0;
```

```
  }
  else {
    vs2_3v = 1;
  }
  if (digitalRead (ve_3v) == HIGH) {
    ve2_3v = 0;
  }
  else {
    ve2_3v = 1;
  }
  if (digitalRead (v_retour_stock) == HIGH) {
    v2_retour_stock = 0;
  }
  else {
    v2_retour_stock = 1;
  }
  if (digitalRead (v_debit_capteur) == HIGH) {
    v2_debit_capteur = 0;
  }
  else {
    v2_debit_capteur = 1;
  }
  envoi_data();
}
////////////// FIN GESTION SUPERVISION 400 ///////////////

////////////// GESTION SUPERVISION 500 ///////////////
void saisie_data500() {
  calcul_th_entree_stock();
  calcul_th_ecs();
  calcul_th_capteur();
  calcul_th_grenier_bas();
  calcul_th_grenier_haut();
  calcul_th_stock_bas();
  calcul_th_stock_mibas();
  calcul_th_stock_mihaut();
  calcul_th_stock_haut();
  calcul_th_piscine();
  calcul_th_entree_ecs();
  calcul_th_sortie_ecs();
  calcul_th_sortie_stock();
  if (digitalRead (ve_piscine) == HIGH) {
    ve2_piscine = 0;
  }
  else {
    ve2_piscine = 1;
  }
  //if ((tttt == 1) && digitalRead(v_variable) == LOW) {
  if ((tttt == 1) && v_variable == 1) {
    vs2_piscine = 41;
  }
  else {
    if (tttt != 1 && digitalRead (vs_piscine) == HIGH) {
      vs2_piscine = 0;
```

```
  }
  else {
    vs2_piscine = 1;
  }
}
/*
if (digitalRead (vs_piscine) == HIGH) {
  vs2_piscine = 0;
}
else {
  vs2_piscine = 1;
}
*/
if (digitalRead (ve_geothermie) == HIGH) {
  ve2_geothermie = 0;
}
else {
  ve2_geothermie = 1;
}
if (digitalRead (vs_geothermie) == HIGH) {
  vs2_geothermie = 0;
}
else {
  vs2_geothermie = 1;
}
if (digitalRead (vs_echangeur) == HIGH) {
  vs2_echangeur = 0;
}
else {
  vs2_echangeur = 1;
}
if (digitalRead (ve_echangeur) == HIGH) {
  ve2_echangeur = 0;
}
else {
  ve2_echangeur = 1;
}
if (digitalRead (ve_chauffage) == HIGH) {
  ve2_chauffage = 0;
}
else {
  ve2_chauffage = 1;
}
if (digitalRead (vs_chauffage) == HIGH) {
  vs2_chauffage = 0;
}
else {
  vs2_chauffage = 500;
}
if (digitalRead (vs_3v) == HIGH) {
  vs2_3v = 0;
}
else {
  vs2_3v = 1;
```

```
  }
  if (digitalRead (ve_3v) == HIGH) {
    ve2_3v = 0;
  }
  else {
    ve2_3v = 1;
  }
  if (digitalRead (v_retour_stock) == HIGH) {
    v2_retour_stock = 0;
  }
  else {
    v2_retour_stock = 1;
  }
  if (digitalRead (v_debit_capteur) == HIGH) {
    v2_debit_capteur = 0;
  }
  else {
    v2_debit_capteur = 1;
  }
  envoi_data();
}
////////////// FIN GESTION SUPERVISION 500 ///////////////

////////////// GESTION SUPERVISION 600 ///////////////
void saisie_data600() {
  calcul_th_entree_stock();
  calcul_th_ecs();
  calcul_th_capteur();
  calcul_th_grenier_bas();
  calcul_th_grenier_haut();
  calcul_th_stock_bas();
  calcul_th_stock_mibas();
  calcul_th_stock_mihaut();
  calcul_th_stock_haut();
  calcul_th_piscine();
  calcul_th_entree_ecs();
  calcul_th_sortie_ecs();
  calcul_th_sortie_stock();
  if (digitalRead (ve_piscine) == HIGH) {
    ve2_piscine = 0;
  }
  else {
    ve2_piscine = 1;
  }
  //if ((tttt == 1) && digitalRead(v_variable) == LOW) {
  if ((tttt == 1) && v_variable == 1) {
    vs2_piscine = 41;
  }
  else {
    if (tttt != 1 && digitalRead (vs_piscine) == HIGH) {
      vs2_piscine = 0;
    }
    else {
      vs2_piscine = 1;
```

```
  }
}
/*
if (digitalRead (vs_piscine) == HIGH) {
  vs2_piscine = 0;
}
else {
  vs2_piscine = 1;
}
*/
if (digitalRead (ve_geothermie) == HIGH) {
  ve2_geothermie = 0;
}
else {
  ve2_geothermie = 1;
}
if (digitalRead (vs_geothermie) == HIGH) {
  vs2_geothermie = 0;
}
else {
  vs2_geothermie = 1;
}
if (digitalRead (vs_echangeur) == HIGH) {
  vs2_echangeur = 0;
}
else {
  vs2_echangeur = 1;
}
if (digitalRead (ve_echangeur) == HIGH) {
  ve2_echangeur = 0;
}
else {
  ve2_echangeur = 1;
}
if (digitalRead (ve_chauffage) == HIGH) {
  ve2_chauffage = 0;
}
else {
  ve2_chauffage = 1;
}
if (digitalRead (vs_chauffage) == HIGH) {
  vs2_chauffage = 600;
}
else {
  vs2_chauffage = 0;
}
if (digitalRead (vs_3v) == HIGH) {
  vs2_3v = 0;
}
else {
  vs2_3v = 1;
}
if (digitalRead (ve_3v) == HIGH) {
  ve2_3v = 0;
```

```
  }
  else {
    ve2_3v = 1;
  }
  if (digitalRead (v_retour_stock) == HIGH) {
    v2_retour_stock = 0;
  }
  else {
    v2_retour_stock = 1;
  }
  if (digitalRead (v_debit_capteur) == HIGH) {
    v2_debit_capteur = 0;
  }
  else {
    v2_debit_capteur = 1;
  }
  envoi_data();
}
////////////// FIN GESTION SUPERVISION 600 ///////////////

////////////// GESTION SUPERVISION 700 ///////////////
void saisie_data700() {
  calcul_th_entree_stock();
  calcul_th_ecs();
  calcul_th_capteur();
  calcul_th_grenier_bas();
  calcul_th_grenier_haut();
  calcul_th_stock_bas();
  calcul_th_stock_mibas();
  calcul_th_stock_mihaut();
  calcul_th_stock_haut();
  calcul_th_piscine();
  calcul_th_entree_ecs();
  calcul_th_sortie_ecs();
  calcul_th_sortie_stock();
  if (digitalRead (ve_piscine) == HIGH) {
    ve2_piscine = 0;
  }
  else {
    ve2_piscine = 1;
  }
  //if ((tttt == 1) && digitalRead(v_variable) == LOW) {
  if ((tttt == 1) && v_variable == 1) {
    vs2_piscine = 41;
  }
  else {
    if (tttt != 1 && digitalRead (vs_piscine) == HIGH) {
      vs2_piscine = 0;
    }
    else {
      vs2_piscine = 1;
    }
  }
  /*
```

```
if (digitalRead (vs_piscine) == HIGH) {
  vs2_piscine = 0;
}
else {
  vs2_piscine = 1;
}
*/
if (digitalRead (ve_geothermie) == HIGH) {
  ve2_geothermie = 0;
}
else {
  ve2_geothermie = 1;
}
if (digitalRead (vs_geothermie) == HIGH) {
  vs2_geothermie = 0;
}
else {
  vs2_geothermie = 1;
}
if (digitalRead (vs_echangeur) == HIGH) {
  vs2_echangeur = 0;
}
else {
  vs2_echangeur = 1;
}
if (digitalRead (ve_echangeur) == HIGH) {
  ve2_echangeur = 0;
}
else {
  ve2_echangeur = 1;
}
if (digitalRead (ve_chauffage) == HIGH) {
  ve2_chauffage = 0;
}
else {
  ve2_chauffage = 1;
}
if (digitalRead (vs_chauffage) == HIGH) {
  vs2_chauffage = 700;
}
else {
  vs2_chauffage = 0;
}
if (digitalRead (vs_3v) == HIGH) {
  vs2_3v = 0;
}
else {
  vs2_3v = 1;
}
if (digitalRead (ve_3v) == HIGH) {
  ve2_3v = 0;
}
else {
  ve2_3v = 1;
```

```
  }
  if (digitalRead (v_retour_stock) == HIGH) {
    v2_retour_stock = 0;
  }
  else {
    v2_retour_stock = 1;
  }
  if (digitalRead (v_debit_capteur) == HIGH) {
    v2_debit_capteur = 0;
  }
  else {
    v2_debit_capteur = 1;
  }
  envoi_data();
}
////////////// FIN GESTION SUPERVISION 700 ///////////////

////////////// ENVOI DATA ////////////////////////////
void envoi_data() {
  Serial.print("DATA,TIME," );
  Serial.print(th_entree_ecs); //TH1
  Serial.print(",");
  Serial.print(ve2_piscine);
  Serial.print(",");
  Serial.print(th_sortie_ecs); //TH2
  Serial.print(",");
  Serial.print(vs2_piscine);
  Serial.print(",");
  Serial.print(th_capteur); //TH3
  Serial.print(",");
  Serial.print(ve2_geothermie);
  Serial.print(",");
  Serial.print(th_stock_haut); //TH4
  Serial.print(",");
  Serial.print(vs2_geothermie);
  Serial.print(",");
  Serial.print(th_stock_bas); //TH5
  Serial.print(",");
  Serial.print(ve2_chauffage);
  Serial.print(",");
  Serial.print(th_sortie_stock); //TH6
  Serial.print(",");
  Serial.print(vs2_chauffage);
  Serial.print(",");
  Serial.print(th_entree_stock); //TH7
  Serial.print(",");
  Serial.print(ve2_echangeur);
  Serial.print(",");
  Serial.print(th_stock_mihaut); //TH8
  Serial.print(",");
  Serial.print(vs2_echangeur);
  Serial.print(",");
  Serial.print(th_stock_mibas); //TH9
  Serial.print(",");
```

```
  Serial.print(v2_debit_capteur);
  Serial.print(",");
  Serial.print(th_ecs);  //TH10
  Serial.print(",");
  Serial.print(ve2_3v);
  Serial.print(",");
  Serial.print(th_piscine);  //TH11
  Serial.print(",");
  Serial.print(vs2_3v);
  Serial.print(",");
  Serial.print(th_grenier_bas);  //TH12
  Serial.print(",");
  Serial.print(v2_retour_stock);
  Serial.print(",");
  Serial.println(th_grenier_haut);  //TH13
  delay(1000);
  //delayWithMillis(delai1000);
}
/////////////  FIN  ENVOI  DATA  ////////////////////////////

/////////////  ENVOI  DATA  CIRCULATEURS  ////////////////////////////
void  envoi_data_circulateur()  {
  if  (digitalRead  (C1_capteur_solaire)  ==  HIGH)  {
    C1_capteur_solaire_s  =  0;
  }
  else  {
    C1_capteur_solaire_s  =  1;
  }
  if  (digitalRead  (C2_amorce_capteur_solaire)  ==  HIGH)  {
    C2_amorce_capteur_solaire_s  =  0;
  }
  else  {
    C2_amorce_capteur_solaire_s  =  1;
  }
  if  (digitalRead  (C3_chauffage_solaire)  ==  HIGH)  {
    C3_chauffage_solaire_s  =  0;
  }
  else  {
    C3_chauffage_solaire_s  =  1;
  }
  if  (digitalRead  (C4_captage_geothermie)  ==  HIGH)  {
    C4_captage_geothermie_s  =  0;
  }
  else  {
    C4_captage_geothermie_s  =  1;
  }
  if  (digitalRead  (C5_chappe)  ==  HIGH)  {
    C5_chappe_s  =  0;
  }
  else  {
    C5_chappe_s  =  1;
  }
  Serial.print("DATA,TIME," );
  Serial.print(C1_capteur_solaire_s);
```

```
  Serial.print(",");
  Serial.print(C2_amorce_capteur_solaire_s);
  Serial.print(",");
  Serial.print(C3_chauffage_solaire_s);
  Serial.print(",");
  Serial.print(C4_captage_geothermie_s);
  Serial.print(",");
  Serial.println(C5_chappe_s);
  delay(1000);
  //delayWithMillis(delai1000);
}
////////////// FIN ENVOI DATA CIRCULATEURS   ////////////////////////////

////////////// GESTION DELAI ///////////////
void  delayWithMillis(unsigned long t) {
  unsigned long stopTime = millis() + t;
  while ( millis() < stopTime ) {
  }
}
////////////// FIN GESTION DELAI ///////////////

////////////// AFFICHAGE ETAT TEMP ECS & STOCK ///////////////
void affichage_temp_ecs_stock()  {
   calcul_th_ecs();
   calcul_th_stock_haut();
   calcul_th_stock_mihaut();
  if (eh_ecs == 1) { //ete
    if (th_ecs <= th_ecs_min_affichage) { // gere l'affichage de l'etat chaud / froid LEDs ECS
      digitalWrite(led_bleue_ECS_froid,  HIGH);
      digitalWrite(led_rouge_ECS_chaud,  LOW);
    }
    if ((th_ecs > th_ecs_min_affichage) && (th_ecs <= th_ecs_max_affichage)) {
      digitalWrite(led_bleue_ECS_froid,  HIGH);
      digitalWrite(led_rouge_ECS_chaud,  HIGH);
    }
    if (th_ecs > th_ecs_max_affichage) {
      digitalWrite(led_bleue_ECS_froid,  LOW);
      digitalWrite(led_rouge_ECS_chaud,  HIGH);
    }
  }
  if (eh_chauff == 1) { //ete
    if (th_stock_mihaut <= seuil_stop_chauffage_stock) { // gere l'affichage de l'etat chaud / froid LEDs stock
      digitalWrite(led_bleue_stock_froid,  HIGH);
      digitalWrite(led_rouge_stock_chaud,  LOW);
    }
    if ((th_stock_mihaut <= seuil_stop_chauffage_stock) && (th_stock_haut > seuil_stop_chauffage_stock)) {
      digitalWrite(led_bleue_stock_froid,  HIGH);
      digitalWrite(led_rouge_stock_chaud,  HIGH);
      delay (500);
      digitalWrite(led_rouge_stock_chaud,  LOW);
      delay (500);
      digitalWrite(led_rouge_stock_chaud,  HIGH);
      delay (500);
      digitalWrite(led_rouge_stock_chaud,  LOW);
```

```
    }
    if ((th_stock_mihaut > seuil_stop_chauffage_stock) && (th_stock_mihaut <= seuil_marche_chauffage_stock)) {
      digitalWrite(led_bleue_stock_froid, HIGH);
      digitalWrite(led_rouge_stock_chaud, HIGH);
    }
    if ((th_stock_mihaut > seuil_stop_chauffage_stock) && (th_stock_mihaut <= seuil_marche_chauffage_stock) && (th_stock_haut >= seuil_marche_chauffage_stock)
      digitalWrite(led_rouge_stock_chaud, HIGH);
      digitalWrite(led_bleue_stock_froid, HIGH);
      delay (500);
      digitalWrite(led_bleue_stock_froid, LOW);
      delay (500);
      digitalWrite(led_bleue_stock_froid, HIGH);
      delay (500);
      digitalWrite(led_bleue_stock_froid, LOW);
      delay (500);
      digitalWrite(led_bleue_stock_froid, HIGH);
    }
    if (th_stock_mihaut > seuil_marche_chauffage_stock) {
      digitalWrite(led_bleue_stock_froid, LOW);
      digitalWrite(led_rouge_stock_chaud, HIGH);
    }
  }
  if (eh_ecs == 0) { //hiver
    if (th_ecs <= th_ecs_hiver_min_affichage) { // gere l'affichage de l'etat chaud / froid LEDs ECS
      digitalWrite(led_bleue_ECS_froid, HIGH);
      digitalWrite(led_rouge_ECS_chaud, LOW);
    }
    if ((th_ecs > th_ecs_hiver_min_affichage) && (th_ecs <= th_ecs_hiver_max_affichage)) {
      digitalWrite(led_bleue_ECS_froid, HIGH);
      digitalWrite(led_rouge_ECS_chaud, HIGH);
    }
    if (th_ecs > th_ecs_hiver_max_affichage) {
      digitalWrite(led_bleue_ECS_froid, LOW);
      digitalWrite(led_rouge_ECS_chaud, HIGH);
    }
  }
  if (eh_chauff == 0) { //hiver
    if (th_stock_mihaut <= seuil_stop_chauffage_stock_hiver) { // gere l'affichage de l'etat chaud / froid LEDs stock
      digitalWrite(led_bleue_stock_froid, HIGH);
      digitalWrite(led_rouge_stock_chaud, LOW);
    }
    if ((th_stock_mihaut <= seuil_stop_chauffage_stock_hiver) && (th_stock_haut > seuil_stop_chauffage_stock_hiver)) {
      digitalWrite(led_bleue_stock_froid, HIGH);
      digitalWrite(led_rouge_stock_chaud, HIGH);
      delay (500);
      digitalWrite(led_rouge_stock_chaud, LOW);
      delay (500);
      digitalWrite(led_rouge_stock_chaud, HIGH);
      delay (500);
      digitalWrite(led_rouge_stock_chaud, LOW);
    }
    if ((th_stock_mihaut > seuil_stop_chauffage_stock_hiver) && (th_stock_mihaut <= seuil_marche_chauffage_stock_hiver)) {
      digitalWrite(led_bleue_stock_froid, HIGH);
      digitalWrite(led_rouge_stock_chaud, HIGH);
```

```
    }
    if ((th_stock_mihaut > seuil_stop_chauffage_stock_hiver) && (th_stock_mihaut <= seuil_marche_chauffage_stock_hiver) && (th_stock_haut >= seuil_marche_chau
      digitalWrite(led_rouge_stock_chaud, HIGH);
      digitalWrite(led_bleue_stock_froid, HIGH);
      delay (500);
      digitalWrite(led_bleue_stock_froid, LOW);
      delay (500);
      digitalWrite(led_bleue_stock_froid, HIGH);
      delay (500);
      digitalWrite(led_bleue_stock_froid, LOW);
      delay (500);
      digitalWrite(led_bleue_stock_froid, HIGH);
    }
    if (th_stock_mihaut > seuil_marche_chauffage_stock_hiver) {
      digitalWrite(led_bleue_stock_froid, LOW);
      digitalWrite(led_rouge_stock_chaud, HIGH);
    }
  }
}
////////////// FIN AFFICHAGE ETAT TEMP ECS & STOCK ///////////////

////////////// CHOIX SUPERVISION ///////////////
void choix_supervision() {
  Serial.write("choix_supervision]" ); //demande a uno l'etat du BP
  delay(100);
  ordre_uno = Serial.readStringUntil (']'); //lit la reponse de uno
  //if (ordre_uno == "BP_supervision_0" && test_supervision == 1) {
  if (ordre_uno == "BP_supervision_0" ) {
    s = 0;
    t = 0;
    //test_supervision = 0;
  }
  //else if (ordre_uno == "BP_supervision_1"  && test_supervision == 0) {
  else if (ordre_uno == "BP_supervision_1" ) {
    s = 1;
    t = 1;
    //test_supervision = 1;
  }
  else {
  }
}
////////////// FIN CHOIX SUPERVISION ///////////////

////////////// CHOIX ECS HIVER ETE ///////////////
void choix_ecs_hiver_ete() {
  Serial.write("choix_ecs_hiver_ete]" ); //demande a uno l'etat du BP
  delay(100);
  ordre_uno = Serial.readStringUntil (']'); //lit la reponse de uno
  if (ordre_uno == "BP_ecs_ete_0" ) {
    eh_ecs = 0; //choix seuil ECS hiver //(1=ete /0=hiver)
  }
  if (ordre_uno == "BP_ecs_ete_1" ) {
    eh_ecs = 1; //choix seuil ECS ete //(1=ete /0=hiver)
  }
```

```
}
////////////// FIN CHOIX ECS HIVER ETE ///////////////

////////////// CHOIX CHAUFF HIVER ETE ///////////////
void choix_chauff_hiver_ete() {
  Serial.write("choix_chauff_hiver_ete]" ); //demande a uno l'etat du BP
  delay(100);
  ordre_uno = Serial.readStringUntil (']'); //lit la reponse de uno
  if (ordre_uno == "BP_chauff_ete_0" ) {
    eh_chauff = 0; //choix seuil chauffage hiver //(1=ete /0=hiver)
  }
  if (ordre_uno == "BP_chauff_ete_1" ) {
    eh_chauff = 1; //choix seuil chauffage ete //(1=ete /0=hiver)
  }
}
////////////// FIN CHOIX CHAUFF HIVER ETE ///////////////

////////////// CHOIX CHAUFFER STOCK GEOTHERMIE ///////////////
void choix_chauff_stock_geo() {
  Serial.write("choix_chauff_stock_geo]" ); //demande a uno l'etat du BP
  delay(100);
  ordre_uno = Serial.readStringUntil (']'); //lit la reponse de uno
  if (ordre_uno == "BP_chauff_stock_geo_0" ) {
    chauff_stock_geo = 0;
  }
  if (ordre_uno == "BP_chauff_stock_geo_1" ) {
    chauff_stock_geo = 1;
  }
}
////////////// FIN CHOIX CHAUFFER STOCK GEOTHERMIE ///////////////

////////////// CHOIX CHAUFFER MAISON Q VARIABLE ///////////////
void choix_ch_q_variable_maison() {
  Serial.write("choix_chauff_maison_Q_variable]" ); //demande a uno l'etat du BP
  delay(100);
  ordre_uno = Serial.readStringUntil (']'); //lit la reponse de uno
  if (ordre_uno == "BP_chauff_maison_Q_variable_0" ) {
    ch_q_variable_maison = 0;
  }
  if (ordre_uno == "BP_chauff_maison_Q_variable_1" ) {
    ch_q_variable_maison = 1;
  }
}
////////////// FIN CHOIX CHAUFFER MAISON Q VARIABLE ///////////////

////////////// CHOIX CHAUFFER STOCK ET MAISON SIMULTANNE ///////////////
void choix_ch_simultane_maison() {
  Serial.write("choix_chauff_stock_maison_simul]" ); //demande a uno l'etat du BP
  delay(100);
  ordre_uno = Serial.readStringUntil (']'); //lit la reponse de uno
  if (ordre_uno == "BP_chauff_stock_maison_simul_0" ) {
    ch_simultane_maison = 0;
  }
  if (ordre_uno == "BP_chauff_stock_maison_simul_1" ) {
```

```
    ch_simultane_maison = 1;
  }
}
////////////// FIN HOIX CHAUFFER STOCK ET MAISON SIMULTANNE ///////////////

////////////// CHOIX MAINTIEN TEMP PISCINE ///////////////
void choix_maintien_temp_pisc() {
  Serial.write("choix_maintien_temp_pisc]" ); //demande a uno l'etat du BP
  delay(100);
  ordre_uno = Serial.readStringUntil (']'); //lit la reponse de uno
  if (ordre_uno == "BP_maintien_temp_pisc_0" ) {
    ch_pisc_maintien = 0; //choix seuil ECS hiver
  }
  if (ordre_uno == "BP_maintien_temp_pisc_1" ) {
    ch_pisc_maintien = 1; //choix seuil ECS ete
  }
}
////////////// FIN CHOIX MAINTIEN TEMP PISCINE ///////////////

////////////// CHOIX CHAUFFER PISCINE GEOTHERMIE EN HC ///////////////
void choix_chauff_pisc_geo_HC() {
  if (digitalRead (piscine_geothermie) == 1) {
    ch_pisc_geo_HC = 1; //choix chauffage piscine en geothermie qu'en HC
  }
  if (digitalRead (piscine_geothermie) == 0) {
    ch_pisc_geo_HC = 0; //choix chauffage piscine en geothermie en HC et HP
  }
}
////////////// FIN CHOIX CHAUFFER PISCINE GEOTHERMIE EN HC ///////////////

////////////// VALIDATION ACTION MANUELLE ///////////////
void valid_manu() {
  digitalWrite (led_orange_etape_init_solaire,  HIGH);
  digitalWrite (led_orange_etape_init_chauffe,  HIGH);
  digitalWrite (led_orange_etape_init_ch_st_geo,  HIGH);
  digitalWrite (led_rouge_ECS_chaud,  HIGH);
  digitalWrite (led_bleue_ECS_froid,  HIGH);
  digitalWrite (led_rouge_stock_chaud,  HIGH);
  digitalWrite (led_bleue_stock_froid,  HIGH);
  digitalWrite (led_rouge_chauffer_stock,  HIGH);
  digitalWrite (led_rouge_chauffer_ECS,  HIGH);
  digitalWrite (led_verte_chauffage_stock,  HIGH);
  digitalWrite (led_verte_piscine_stock,  HIGH);
  digitalWrite (led_bleue_chauffage_geothermie,  HIGH);
  digitalWrite (led_bleue_piscine_geothermie,  HIGH);
  digitalWrite (led_bleue_chauffer_stock_geo,  HIGH);
  delay (500);
  digitalWrite (led_orange_etape_init_solaire,  LOW);
  digitalWrite (led_orange_etape_init_chauffe,  LOW);
  digitalWrite (led_orange_etape_init_ch_st_geo,  LOW);
  digitalWrite (led_rouge_ECS_chaud,  LOW);
  digitalWrite (led_bleue_ECS_froid,  LOW);
  digitalWrite (led_rouge_stock_chaud,  LOW);
  digitalWrite (led_bleue_stock_froid,  LOW);
```

```
  digitalWrite(led_rouge_chauffer_stock,  LOW);
  digitalWrite(led_rouge_chauffer_ECS,  LOW);
  digitalWrite(led_verte_chauffage_stock,  LOW);
  digitalWrite(led_verte_piscine_stock,  LOW);
  digitalWrite(led_bleue_chauffage_geothermie,  LOW);
  digitalWrite(led_bleue_piscine_geothermie,  LOW);
  digitalWrite(led_bleue_chauffer_stock_geo,  LOW);
  //delay(500);
}
////////////// FIN VALIDATION ACTION MANUELLE ///////////////

////////////// PRECHAUFFAGE TUYAUX GRENIER /////////////////
void prechauffage_tuyau_grenier() {
  occupe = 1; //variable occupation arduino durant remplissage ou vidange capteur
  digitalWrite(vs_3v, HIGH);
  digitalWrite(ve_3v, HIGH);
  digitalWrite(v_retour_stock, HIGH);
  digitalWrite(v_bloc_capteur, HIGH); //NF (vanne ouverte)
  digitalWrite(v_debit_capteur, HIGH);
  //delayWithMillis(delai_manip_vanne);
  for (int i = 1 ; i <= 3 ; i++)
  {
    digitalWrite(C1_capteur_solaire,  LOW);
    digitalWrite(C2_amorce_capteur_solaire,  LOW);
     delayWithMillis(delai_prechauff_grenier); // 7sec
    digitalWrite(C1_capteur_solaire,  HIGH);
    digitalWrite(C2_amorce_capteur_solaire,  HIGH);
     delayWithMillis(delai_manip_vanne); // 30 sec
  }
  occupe = 0; //variable occupation arduino durant remplissage ou vidange capteur
}
////////////// FIN PRECHAUFFAGE TUYAUX GRENIER ///////////////

////////////// REMPLIR CAPTEUR /////////////////  low flow a 5 l/min/reseau (37.5 l/m²/h)
void remplir_capteur() {
  occupe = 1; //variable occupation arduino durant remplissage ou vidange capteur
  digitalWrite(vs_3v, LOW); //position ECS (retablir pression suite refroidissement durant nuit)
  delay(delai_baisser_pression);
  digitalWrite(vs_3v, HIGH); //position stock
  //delay(delai_manip_vanne);
  digitalWrite(ve_3v, HIGH); //position stock
  digitalWrite(v_retour_stock, HIGH);
  digitalWrite(v_bloc_capteur, HIGH); //NF (vanne ouverte)
  digitalWrite(v_debit_capteur, HIGH);
   delayWithMillis(delai_manip_vanne);
  digitalWrite(C1_capteur_solaire,  LOW);
  //envoi_data_circulateur();
   delayWithMillis(delai_remplir_capteur);
  //delayWithMillis(delai_remplir_capteur);
  //delayWithMillis(delai_remplir_capteur);
  //delayWithMillis(delai_remplir_capteur);
  digitalWrite(C2_amorce_capteur_solaire,  LOW);
  //envoi_data_circulateur();
   delayWithMillis(delai_remplir_capteur);
```

```
    delayWithMillis(delai_remplir_capteur);
    delayWithMillis(delai_remplir_capteur);
    delayWithMillis(delai_remplir_capteur);
  digitalWrite (C2_amorce_capteur_solaire,  HIGH);
  digitalWrite (v_debit_capteur,  LOW);
    delayWithMillis(delai_manip_vanne);
  //delayWithMillis(delai_remplir_capteur);
  //envoi_data_circulateur();
  occupe = 0; //variable occupation arduino durant remplissage ou vidange capteur
  //delayWithMillis(500);
}
////////////// FIN REMPLIR CAPTEUR ///////////////

////////////// PURGE SOLAIRE REMPLISSAGE STOCK ////////////////  cycle de purge circuit solaire apres remplissage stock
void purge_solaire() {
  occupe = 1; //variable occupation arduino durant remplissage ou vidange capteur
  digitalWrite (vs_3v, HIGH); //position stock
  digitalWrite (ve_3v, HIGH); //position stock
  digitalWrite (v_retour_stock,  HIGH);
  digitalWrite (v_bloc_capteur,  HIGH); //NF (vanne ouverte)
  digitalWrite (v_debit_capteur,  HIGH);
    delayWithMillis(delai_manip_vanne);
  digitalWrite (C1_capteur_solaire,  LOW);
  //envoi_data_circulateur();
    delayWithMillis(delai_remplir_capteur);
  //delayWithMillis(delai_remplir_capteur);
  //delayWithMillis(delai_remplir_capteur);
  //delayWithMillis(delai_remplir_capteur);
  digitalWrite (C2_amorce_capteur_solaire,  LOW);
  //envoi_data_circulateur();
    delayWithMillis(delai_remplir_capteur);
    delayWithMillis(delai_remplir_capteur);
    delayWithMillis(delai_remplir_capteur);
    delayWithMillis(delai_remplir_capteur);
  digitalWrite (C2_amorce_capteur_solaire,  HIGH);
  digitalWrite (v_debit_capteur,  LOW);
    delayWithMillis(delai_manip_vanne);
  //delayWithMillis(delai_remplir_capteur);
  //envoi_data_circulateur();
  occupe = 0; //variable occupation arduino durant remplissage ou vidange capteur
  //delayWithMillis(500);
}
////////////// FIN PURGE SOLAIRE REMPLISSAGE STOCK ///////////////

////////////// VIDER CAPTEUR ///////////////
void vider_capteur() {
  occupe = 1; //variable occupation arduino durant remplissage ou vidange capteur
  digitalWrite (vs_3v, HIGH);
  digitalWrite (ve_3v, HIGH);
  digitalWrite (v_retour_stock,  HIGH);
  digitalWrite (v_bloc_capteur,  HIGH); //NF (vanne ouverte)
  digitalWrite (v_debit_capteur,  LOW);
    delayWithMillis(delai_manip_vanne);
  digitalWrite (C1_capteur_solaire,  HIGH);
```

```
  digitalWrite (C2_amorce_capteur_solaire,  HIGH);
  //envoi_data_circulateur();
    delayWithMillis(delai_vider_capteur);
    delayWithMillis(delai_vider_capteur);
    delayWithMillis(delai_vider_capteur);
  digitalWrite (v_debit_capteur,  HIGH);
  //envoi_data_circulateur();
  occupe = 0; //variable occupation arduino durant remplissage ou vidange capteur
  //delayWithMillis(500);
}
////////////// FIN VIDER CAPTEUR ///////////////

////////////// CONFIG VANNES ECS ///////////////
void config_vannes_ecs() {
  occupe = 1;
  digitalWrite (v_debit_capteur,  HIGH);
  //digitalWrite(C2_amorce_capteur_solaire, LOW);
    delayWithMillis(delai_remplir_capteur);
  //delayWithMillis(delai_config_vannes_ecs);
  digitalWrite (ve_3v, LOW);
  //delayWithMillis(delai_config_vannes_ecs);
   delayWithMillis(delai8000);
  //digitalWrite(C2_amorce_capteur_solaire, HIGH);
  digitalWrite (vs_3v, LOW);
    delayWithMillis(delai_config_vannes_ecs);
  //envoi_data_circulateur();
  occupe = 0;
  //digitalWrite(C2_amorce_capteur_solaire, HIGH);
}
////////////// FIN CONFIG VANNES ECS ///////////////

////////////// CONFIG VANNES STOCK ///////////////
void config_vannes_stock() {
  occupe = 1;
  //digitalWrite(C2_amorce_capteur_solaire, HIGH);
  digitalWrite (vs_3v, HIGH);
  //delayWithMillis(delai_config_vannes_ecs);
   delayWithMillis(delai8000);
  digitalWrite (ve_3v, HIGH);
    delayWithMillis(delai_config_vannes_stock);
  digitalWrite (v_debit_capteur,  LOW);
  //envoi_data_circulateur();
  occupe = 0;
}
////////////// FIN CONFIG VANNES STOCK ///////////////

////////////// CONFIG STOP PANNEAUX PLEINS ///////////////
void config_stop_panneau_plein() {
  occupe = 1;
  digitalWrite (v_debit_capteur,  HIGH);
  //digitalWrite(C2_amorce_capteur_solaire, LOW);
    delayWithMillis(delai_remplir_capteur);
  //delayWithMillis(delai_config_vannes_ecs);
  digitalWrite (ve_3v, LOW);
```

```
    delayWithMillis(delai_config_vannes_ecs);
  digitalWrite(C2_amorce_capteur_solaire,  HIGH);
  digitalWrite(C1_capteur_solaire,  HIGH);
  //envoi_data_circulateur();
  occupe = 0;
}
////////////// FIN CONFIG STOP PANNEAUX PLEINS ///////////////

////////////// CONFIG STOP ECS PANNEAUX PLEINS ///////////////
void config_stop_ecs_panneau_plein()  {
  occupe = 1;
  digitalWrite(C2_amorce_capteur_solaire,  HIGH);
  digitalWrite(C1_capteur_solaire,  HIGH);
  //envoi_data_circulateur();
  occupe = 0;
}
////////////// FIN CONFIG STOP ECS PANNEAUX PLEINS ///////////////

////////////// CONFIG REPRISE PANNEAUX PLEINS ///////////////
void config_reprise_panneau_plein()  {
  occupe = 1;
  digitalWrite(ve_3v, HIGH);
  //digitalWrite(C2_amorce_capteur_solaire, LOW);
  delay(1000);
  digitalWrite(C1_capteur_solaire,  LOW);
    delayWithMillis(delai_manip_vanne);
  //digitalWrite(C2_amorce_capteur_solaire, HIGH);
  digitalWrite(v_debit_capteur,  LOW);
  //envoi_data_circulateur();
  occupe = 0;
}
////////////// FIN CONFIG REPRISE PANNEAUX PLEINS ///////////////

////////////// CONFIG REPRISE ECS PANNEAUX PLEINS ///////////////
void config_reprise_ecs_panneau_plein()  {
  occupe = 1;
  digitalWrite(C1_capteur_solaire,  LOW);
  //envoi_data_circulateur();
  occupe = 0;
}
////////////// FIN CONFIG REPRISE ECS PANNEAUX PLEINS ///////////////

////////////// CONFIG VANNES CHAUFFAGE GEOTHERMIE ///////////////
void config_vannes_chauffage_geothermie()  {
  occupe = 1;
  digitalWrite(ve_chauffage,  LOW);
  digitalWrite(ve_piscine,  HIGH);
  digitalWrite(ve_geothermie,  LOW);
  digitalWrite(ve_echangeur,  HIGH);
  digitalWrite(vs_chauffage,  LOW);
  digitalWrite(vs_geothermie,  LOW);
  digitalWrite(vs_piscine,  HIGH);
  digitalWrite(vs_echangeur,  HIGH);
    delayWithMillis(delai_config_vannes_chauffage);
```

```
  occupe = 0;
  //    & temporisation interne a la geothermie de 10 min environ
}
////////////// FIN CONFIG VANNES CHAUFFAGE GEOTHERMIE ///////////////

////////////// CONFIG VANNES CHAUFFAGE SOLAIRE ///////////////
void config_vannes_chauffage_solaire()  {
  occupe = 1;
  digitalWrite(ve_chauffage, LOW);
  digitalWrite(ve_piscine, HIGH);
  digitalWrite(ve_geothermie, HIGH);
  digitalWrite(ve_echangeur, LOW);
  digitalWrite(vs_chauffage, LOW);
  digitalWrite(vs_geothermie, HIGH);
  digitalWrite(vs_piscine, HIGH);
  digitalWrite(vs_echangeur, LOW);
    delayWithMillis(delai_config_vannes_chauffage_solaire);
  occupe = 0;
}
////////////// FIN CONFIG VANNES CHAUFFAGE SOLAIRE ///////////////

////////////// CONFIG VANNES PISCINE GEOTHERMIE ///////////////
void config_vannes_piscine_geothermie()  {
  occupe = 1;
  digitalWrite(ve_chauffage, HIGH);
  digitalWrite(ve_piscine, LOW);
  digitalWrite(ve_geothermie, LOW);
  digitalWrite(ve_echangeur, HIGH);
  digitalWrite(vs_chauffage, HIGH);
  digitalWrite(vs_geothermie, LOW);
  digitalWrite(vs_piscine, LOW);
  digitalWrite(vs_echangeur, HIGH);
    delayWithMillis(delai_config_vannes_piscine);
  occupe = 0;
}
////////////// FIN CONFIG VANNES PISCINE GEOTHERMIE ///////////////

////////////// CONFIG VANNES PISCINE SOLAIRE ///////////////
void config_vannes_piscine_solaire()  {
  occupe = 1;
  digitalWrite(ve_chauffage, HIGH);
  digitalWrite(ve_piscine, LOW);
  digitalWrite(ve_geothermie, HIGH);
  digitalWrite(ve_echangeur, LOW);
  digitalWrite(vs_chauffage, HIGH);
  digitalWrite(vs_geothermie, HIGH);
  digitalWrite(vs_piscine, LOW);
  digitalWrite(vs_echangeur, LOW);
    delayWithMillis(delai_config_vannes_piscine_solaire);
  occupe = 0;
}
////////////// FIN CONFIG VANNES PISCINE SOLAIRE ///////////////

////////////// CONFIG VANNES CHAUFFER STOCK GEOTHERMIE ///////////////  ++++++++++++++++++++++++++++++++++++
```

```
void  config_vannes_chauffer_stock_geothermie()  {
  occupe = 1;
  digitalWrite(ve_3v, HIGH); //position stock
  digitalWrite(vs_3v, HIGH); //position stock
  digitalWrite(v_retour_stock, LOW); ////////////// A CONFIRMER
  digitalWrite(v_bloc_capteur, LOW); //NO (vanne fermee)
  digitalWrite(ve_chauffage, HIGH);
  digitalWrite(ve_piscine, HIGH);
  digitalWrite(ve_geothermie, LOW);
  digitalWrite(ve_echangeur, LOW);
  digitalWrite(vs_chauffage, HIGH);
  digitalWrite(vs_geothermie, HIGH);
  digitalWrite(vs_piscine, HIGH);
  digitalWrite(vs_echangeur, HIGH);
  //digitalWrite(v_shunt_mitigeur_ch, LOW);
    delayWithMillis(delai_config_vannes_stock_geothermie);
  occupe = 0;
}
////////////// FIN CONFIG VANNES CHAUFFER STOCK GEOTHERMIE ///////////////

////////////// CONFIG VANNES CHAUFFER STOCK SOLAIRE ///////////////
void  config_vannes_chauffer_stock_solaire()  {
  occupe = 1;
  digitalWrite(ve_3v, HIGH); //position stock
  digitalWrite(vs_3v, HIGH); //position stock
  digitalWrite(v_retour_stock, HIGH); ////////////// A CONFIRMER
  digitalWrite(v_bloc_capteur, HIGH); //NF (vanne ouverte)
  digitalWrite(ve_chauffage, HIGH);
  digitalWrite(ve_piscine, HIGH);
  digitalWrite(ve_geothermie, HIGH);
  digitalWrite(ve_echangeur, HIGH);
  digitalWrite(vs_chauffage, HIGH);
  digitalWrite(vs_geothermie, HIGH);
  digitalWrite(vs_piscine, HIGH);
  digitalWrite(vs_echangeur, HIGH);
  //digitalWrite(v_shunt_mitigeur_ch, HIGH);
    delayWithMillis(delai_config_vannes_stock_solaire);
  occupe = 0;
}
////////////// FIN CONFIG VANNES CHAUFFER STOCK SOLAIRE ///////////////  ++++++++++++++++++++++++++++++++++++++++++++

////////////// VS_PISCINE OUVRIR VARIABLE  ////////////////////////
void  vs_piscine_ouvrir_variable()  {
  occupe = 1;
  //digitalWrite(v_variable, HIGH); //NF en TOR (pilotage normal en tout ou rien)
  Serial.write("vs_piscine_variable_high]" ); //NF en TOR (vs_piscine_variable = HIGH) (pilotage normal en tout ou rien)
  Serial.println("");
  digitalWrite(vs_piscine, LOW); //ouvrir
    delayWithMillis(delai_vs_piscine_ouvrir_variable);
  //delay(7000);
  //digitalWrite(v_variable, LOW); //NO en variable //LOW
  Serial.write("vs_piscine_variable_low]" ); //NO en variable (vs_piscine_variable = LOW) (pilotage variable)
  Serial.println("");
  //delay(1000);
```

```
  digitalWrite(vs_piscine, HIGH); //stop en position variable //HIGH
  v_variable = 1;
  occupe = 0;
}
////////////// FIN VS_PISCINE OUVRIR VARIABLE   ////////////////////////

////////////// VANNES_PISCINE FERMER TOR   ////////////////////////
void vannes_piscine_fermer_tor() {
  occupe = 1;
  //digitalWrite(v_variable, HIGH); //NF en TOR (pilotage normal en tout ou rien)
  Serial.write("vs_piscine_variable_high]" ); //NF en TOR (vs_piscine_variable = HIGH) (pilotage normal en tout ou rien)
  Serial.println("");
  digitalWrite(vs_piscine, HIGH); //fermer
  digitalWrite(ve_piscine, HIGH); //fermer
  v_variable = 0;
   delayWithMillis(delai_manip_vanne);
  occupe = 0;
}
////////////// FIN VANNES_PISCINE FERMER TOR    ////////////////////////

////////////// CALCUL TH ECS   ////////////////////// TH10 ///////// PT1000
void calcul_th_ecs() {
  occupe = 1;
  if (digitalRead(C1_capteur_solaire) == 0) {  //0
    //majo_etalon_th_ecs = 2.0;
     majo_ecs = majo_etalon_th_ecs;
  }
  if (digitalRead(C1_capteur_solaire) == 1) {
    // majo_etalon_th_ecs = 0.0;
    majo_ecs = 0.0;
  }
  th_ecs_tot = 0.0;
  for (int i = 1 ; i <= 5 ; i++)
  {
     th_ecs_tot = th_ecs_tot + analogRead(sonde_ecs);
    delay(100);
  }
  //th_ecs = ((th_ecs_tot / 5) * 1.2 ) - 620.0 + etalon_th_ecs + majo_etalon_th_ecs;
  th_ecs = ((th_ecs_tot / 5) * 1.2 ) - 620.0 + etalon_th_ecs + majo_ecs;
  occupe = 0;
  //delayWithMillis(delai1000);
}
////////////// FIN CALCUL TH ECS   ////////////////////////

////////////// CALCUL TH CAPTEUR   ////////////////////////   TH3 ///////// PT1000
void calcul_th_capteur() {
  occupe = 1;

  if (digitalRead(C1_capteur_solaire) == 0) { //0
     majo_capteur = majo_etalon_th_capteur;
  }
  if (digitalRead(C1_capteur_solaire) == 1) {
    majo_capteur = 0.0;
  }
```

```
  th_capteur_tot = 0.0;
  for (int i = 1 ; i <= 5 ; i++)
  {
     th_capteur_tot = th_capteur_tot + analogRead(sonde_capteur);
    delay(100);
  }
  th_capteur = ((th_capteur_tot / 5) * 1.2 ) - 620.0 + etalon_th_capteur + majo_capteur;
  occupe = 0;
  //delayWithMillis(delai1000);
}
////////////// FIN CALCUL TH CAPTEUR   ///////////////////////

////////////// CALCUL TH GRENIER BAS   ///////////////////////   TH12 ////////// PT1000
void calcul_th_grenier_bas()  {
  occupe = 1;
  th_grenier_bas_tot = 0.0;
  for (int i = 1 ; i <= 5 ; i++)
  {
     th_grenier_bas_tot = th_grenier_bas_tot + analogRead(sonde_grenier_bas);
    delay(100);
  }
  th_grenier_bas = ((th_grenier_bas_tot / 5) * 1.2 ) - 620.0 + etalon_th_grenier_bas;
  occupe = 0;
  //delayWithMillis(delai1000);
}
////////////// FIN CALCUL TH GRENIER BAS   ///////////////////////

////////////// CALCUL TH GRENIER HAUT   ///////////////////////   TH13 ////////// PT1000
void calcul_th_grenier_haut()  {
  occupe = 1;
  th_grenier_haut_tot = 0.0;
  for (int i = 1 ; i <= 5 ; i++)
  {
     th_grenier_haut_tot = th_grenier_haut_tot + analogRead(sonde_grenier_haut);
    delay(100);
  }
  th_grenier_haut = ((th_grenier_haut_tot / 5) * 1.2 ) - 620.0 + etalon_th_grenier_haut;
  occupe = 0;
  //delayWithMillis(delai1000);
}
////////////// FIN CALCUL TH GRENIER HAUT   ///////////////////////

////////////// CALCUL TH STOCK BAS   ///////////////////////   TH5
void calcul_th_stock_bas()  {
  occupe = 1;
  th_stock_bas_tot = 0.0;
  for (int i = 1 ; i <= 5 ; i++)
  {
     th_stock_bas_tot = th_stock_bas_tot + analogRead(sonde_stock_bas);
    delay(100);
  }
```

```
  if (th_stock_bas_tot <= 3460) { // de 100deg à 40deg.....3460 = analogread * 5
     th_stock_bas = ((th_stock_bas_tot / 5) * -0.1297 ) + 130.37 + etalon_th_stock_bas;
  }
  else if (th_stock_bas_tot <= 3745) { // de 40deg à 30.8deg
     th_stock_bas = ((th_stock_bas_tot / 5) * -0.1692 ) + 157.55 + etalon_th_stock_bas;
  }
  else if (th_stock_bas_tot <= 3855) { // de 30.8deg à 26deg
     th_stock_bas = ((th_stock_bas_tot / 5) * -0.2182 ) + 194.22 + etalon_th_stock_bas;
  }
  else if (th_stock_bas_tot <= 3970) { // de 26deg à 20deg
     th_stock_bas = ((th_stock_bas_tot / 5) * -0.2609 ) + 227.13 + etalon_th_stock_bas;
  }
  else if (th_stock_bas_tot <= 4070) { // de 20deg à 13deg
     th_stock_bas = ((th_stock_bas_tot / 5) * -0.35 ) + 297.9 + etalon_th_stock_bas;
  }
  else if (th_stock_bas_tot <= 4205) { // de 13deg à 0deg
     th_stock_bas = ((th_stock_bas_tot / 5) * -0.337 ) + 287.35 + etalon_th_stock_bas;
  }
  else if (th_stock_bas_tot > 4205) { // de 13deg à 0deg
     th_stock_bas = ((th_stock_bas_tot / 5) * -0.337 ) + 287.35 + etalon_th_stock_bas;
  }
  occupe = 0;
  //delayWithMillis(delai1000);
}
////////////// FIN CALCUL TH STOCK BAS  ///////////////////////

////////////// CALCUL TH STOCK MI BAS  ///////////////////////    TH9
void calcul_th_stock_mibas() {
  occupe = 1;
  th_stock_mibas_tot = 0.0;
  for (int i = 1 ; i <= 5 ; i++)
  {
     th_stock_mibas_tot = th_stock_mibas_tot + analogRead(sonde_stock_mibas);
    delay(100);
  }
  if (th_stock_mibas_tot <= 3460) { // de 100deg à 40deg.....3460 = analogread * 5
     th_stock_mibas = ((th_stock_mibas_tot / 5) * -0.1297 ) + 130.37 + etalon_th_stock_mibas;
  }
  else if (th_stock_mibas_tot <= 3745) { // de 40deg à 30.8deg
     th_stock_mibas = ((th_stock_mibas_tot / 5) * -0.1692 ) + 157.55 + etalon_th_stock_mibas;
  }
  else if (th_stock_mibas_tot <= 3855) { // de 30.8deg à 26deg
     th_stock_mibas = ((th_stock_mibas_tot / 5) * -0.2182 ) + 194.22 + etalon_th_stock_mibas;
  }
  else if (th_stock_mibas_tot <= 3970) { // de 26deg à 20deg
     th_stock_mibas = ((th_stock_mibas_tot / 5) * -0.2609 ) + 227.13 + etalon_th_stock_mibas;
  }
  else if (th_stock_mibas_tot <= 4070) { // de 20deg à 13deg
     th_stock_mibas = ((th_stock_mibas_tot / 5) * -0.35 ) + 297.9 + etalon_th_stock_mibas;
  }
  else if (th_stock_mibas_tot <= 4205) { // de 13deg à 0deg
     th_stock_mibas = ((th_stock_mibas_tot / 5) * -0.337 ) + 287.35 + etalon_th_stock_mibas;
  }
  else if (th_stock_mibas_tot > 4205) { // de 13deg à 0deg
```

```
    th_stock_mibas = ((th_stock_mibas_tot / 5) * -0.337 ) + 287.35 + etalon_th_stock_mibas;
  }
  occupe = 0;
  //delayWithMillis(delai1000);
}
////////////// FIN CALCUL TH STOCK MI BAS  ///////////////////////

////////////// CALCUL TH STOCK MI HAUT  ///////////////////////    TH8
void calcul_th_stock_mihaut() {
  occupe = 1;
  th_stock_mihaut_tot = 0.0;
  for (int i = 1 ; i <= 5 ; i++)
  {
    th_stock_mihaut_tot = th_stock_mihaut_tot + analogRead(sonde_stock_mihaut);
    delay(100);
  }
  if (th_stock_mihaut_tot <= 3460) { // de 100deg à 40deg.....3460 = analogread * 5
    th_stock_mihaut = ((th_stock_mihaut_tot / 5) * -0.1297 ) + 130.37 + etalon_th_stock_mihaut;
  }
  else if (th_stock_mihaut_tot <= 3745) { // de 40deg à 30.8deg
    th_stock_mihaut = ((th_stock_mihaut_tot / 5) * -0.1692 ) + 157.55 + etalon_th_stock_mihaut;
  }
  else if (th_stock_mihaut_tot <= 3855) { // de 30.8deg à 26deg
    th_stock_mihaut = ((th_stock_mihaut_tot / 5) * -0.2182 ) + 194.22 + etalon_th_stock_mihaut;
  }
  else if (th_stock_mihaut_tot <= 3970) { // de 26deg à 20deg
    th_stock_mihaut = ((th_stock_mihaut_tot / 5) * -0.2609 ) + 227.13 + etalon_th_stock_mihaut;
  }
  else if (th_stock_mihaut_tot <= 4070) { // de 20deg à 13deg
    th_stock_mihaut = ((th_stock_mihaut_tot / 5) * -0.35 ) + 297.9 + etalon_th_stock_mihaut;
  }
  else if (th_stock_mihaut_tot <= 4205) { // de 13deg à 0deg
    th_stock_mihaut = ((th_stock_mihaut_tot / 5) * -0.337 ) + 287.35 + etalon_th_stock_mihaut;
  }
  else if (th_stock_mihaut_tot > 4205) { // de 13deg à 0deg
    th_stock_mihaut = ((th_stock_mihaut_tot / 5) * -0.337 ) + 287.35 + etalon_th_stock_mihaut;
  }
  occupe = 0;
  //delayWithMillis(delai1000);
}
////////////// FIN CALCUL TH STOCK MI HAUT  ///////////////////////

////////////// CALCUL TH STOCK HAUT  ///////////////////////    TH4
void calcul_th_stock_haut() {
  occupe = 1;
  th_stock_haut_tot = 0.0;
  for (int i = 1 ; i <= 5 ; i++)
  {
    th_stock_haut_tot = th_stock_haut_tot + analogRead(sonde_stock_haut);
    delay(100);
  }
  if (th_stock_haut_tot <= 3460) { // de 100deg à 40deg.....3460 = analogread * 5
    th_stock_haut = ((th_stock_haut_tot / 5) * -0.1297 ) + 130.37 + etalon_th_stock_haut;
  }
```

```
  else if (th_stock_haut_tot <= 3745) { // de 40deg à 30.8deg
     th_stock_haut = ((th_stock_haut_tot / 5) * -0.1692 ) + 157.55 + etalon_th_stock_haut;
  }
  else if (th_stock_haut_tot <= 3855) { // de 30.8deg à 26deg
     th_stock_haut = ((th_stock_haut_tot / 5) * -0.2182 ) + 194.22 + etalon_th_stock_haut;
  }
  else if (th_stock_haut_tot <= 3970) { // de 26deg à 20deg
     th_stock_haut = ((th_stock_haut_tot / 5) * -0.2609 ) + 227.13 + etalon_th_stock_haut;
  }
  else if (th_stock_haut_tot <= 4070) { // de 20deg à 13deg
     th_stock_haut = ((th_stock_haut_tot / 5) * -0.35 ) + 297.9 + etalon_th_stock_haut;
  }
  else if (th_stock_haut_tot <= 4205) { // de 13deg à 0deg
     th_stock_haut = ((th_stock_haut_tot / 5) * -0.337 ) + 287.35 + etalon_th_stock_haut;
  }
  else if (th_stock_haut_tot > 4205) { // de 13deg à 0deg
     th_stock_haut = ((th_stock_haut_tot / 5) * -0.337 ) + 287.35 + etalon_th_stock_haut;
  }
  occupe = 0;
  //delayWithMillis(delai1000);
}
////////////// FIN CALCUL TH STOCK HAUT  ///////////////////////

/*
////////////// CALCUL TH CHAUFFAGE  ///////////////////////
 void calcul_th_chauffage() {
 analogReference(INTERNAL1V1); //Permet de fixer la plage de codage de temperature à 1,1 volt
  mesure_th_chauffage  =  analogRead(sonde_chauffage);
  delay(100);
 th_chauffage = (mesure_th_chauffage * 110.0) / 1024.0 ; //Conversion en température (en degré Celsius)
 analogReference(DEFAULT); //Permet de fixer la plage de codage de temperature à 5 volt
  delayWithMillis(delai300);
 }
 ////////////// FIN CALCUL TH CHAUFFAGE  ///////////////////////
 */

////////////// CALCUL TH PISCINE  ///////////////////////    TH11
void calcul_th_piscine() {
  occupe = 1;
  th_piscine_tot = 0.0;
  for (int i = 1 ; i <= 5 ; i++)
  {
     th_piscine_tot = th_piscine_tot + analogRead(sonde_piscine);
    delay(100);
  }
  if (th_piscine_tot <= 3460) { // de 100deg à 40deg.....3460 = analogread * 5
     th_piscine = ((th_piscine_tot / 5) * -0.1297 ) + 130.37 + etalon_th_piscine;
  }
  else if (th_piscine_tot <= 3745) { // de 40deg à 30.8deg
     th_piscine = ((th_piscine_tot / 5) * -0.1692 ) + 157.55 + etalon_th_piscine;
  }
  else if (th_piscine_tot <= 3855) { // de 30.8deg à 26deg
     th_piscine = ((th_piscine_tot / 5) * -0.2182 ) + 194.22 + etalon_th_piscine;
  }
```

```
  else if (th_piscine_tot <= 3970) { // de 26deg à 20deg
     th_piscine = ((th_piscine_tot / 5) * -0.2609 ) + 227.13 + etalon_th_piscine;
  }
  else if (th_piscine_tot <= 4070) { // de 20deg à 13deg
     th_piscine = ((th_piscine_tot / 5) * -0.35 ) + 297.9 + etalon_th_piscine;
  }
  else if (th_piscine_tot <= 4205) { // de 13deg à 0deg
     th_piscine = ((th_piscine_tot / 5) * -0.337 ) + 287.35 + etalon_th_piscine;
  }
  else if (th_piscine_tot > 4205) { // de 13deg à 0deg
     th_piscine = ((th_piscine_tot / 5) * -0.337 ) + 287.35 + etalon_th_piscine;
  }
  occupe = 0;
  //delayWithMillis(delai1000);
}
////////////// FIN CALCUL TH PISCINE  ////////////////////////

////////////// CALCUL TH ENTREE ECS  ////////////////////////    TH1
void calcul_th_entree_ecs() {
  occupe = 1;
  th_entree_ecs_tot = 0.0;
  for (int i = 1 ; i <= 5 ; i++)
  {
     th_entree_ecs_tot = th_entree_ecs_tot + analogRead(sonde_entree_ecs);
    delay(100);
  }
  if (th_entree_ecs_tot <= 3460) { // de 100deg à 40deg.....3460 = analogread * 5
     th_entree_ecs = ((th_entree_ecs_tot / 5) * -0.1297 ) + 130.37 + etalon_th_entree_ecs;
  }
  else if (th_entree_ecs_tot <= 3745) { // de 40deg à 30.8deg
     th_entree_ecs = ((th_entree_ecs_tot / 5) * -0.1692 ) + 157.55 + etalon_th_entree_ecs;
  }
  else if (th_entree_ecs_tot <= 3855) { // de 30.8deg à 26deg
     th_entree_ecs = ((th_entree_ecs_tot / 5) * -0.2182 ) + 194.22 + etalon_th_entree_ecs;
  }
  else if (th_entree_ecs_tot <= 3970) { // de 26deg à 20deg
     th_entree_ecs = ((th_entree_ecs_tot / 5) * -0.2609 ) + 227.13 + etalon_th_entree_ecs;
  }
  else if (th_entree_ecs_tot <= 4070) { // de 20deg à 13deg
     th_entree_ecs = ((th_entree_ecs_tot / 5) * -0.35 ) + 297.9 + etalon_th_entree_ecs;
  }
  else if (th_entree_ecs_tot <= 4205) { // de 13deg à 0deg
     th_entree_ecs = ((th_entree_ecs_tot / 5) * -0.337 ) + 287.35 + etalon_th_entree_ecs;
  }
  else if (th_entree_ecs_tot > 4205) { // de 13deg à 0deg
     th_entree_ecs = ((th_entree_ecs_tot / 5) * -0.337 ) + 287.35 + etalon_th_entree_ecs;
  }
  occupe = 0;
  //delayWithMillis(delai1000);
}
////////////// FIN CALCUL TH ENTRE ECS  ////////////////////////

////////////// CALCUL TH SORTIE ECS  ////////////////////////    TH2
void calcul_th_sortie_ecs() {
```

```
  occupe = 1;
  th_sortie_ecs_tot = 0.0;
  for (int i = 1 ; i <= 5 ; i++)
  {
     th_sortie_ecs_tot = th_sortie_ecs_tot + analogRead(sonde_sortie_ecs);
    delay(100);
  }
  if (th_sortie_ecs_tot <= 3460) { // de 100deg à 40deg.....3460 = analogread * 5
     th_sortie_ecs = ((th_sortie_ecs_tot / 5) * -0.1297 ) + 130.37 + etalon_th_sortie_ecs;
  }
  else if (th_sortie_ecs_tot <= 3745) { // de 40deg à 30.8deg
     th_sortie_ecs = ((th_sortie_ecs_tot / 5) * -0.1692 ) + 157.55 + etalon_th_sortie_ecs;
  }
  else if (th_sortie_ecs_tot <= 3855) { // de 30.8deg à 26deg
     th_sortie_ecs = ((th_sortie_ecs_tot / 5) * -0.2182 ) + 194.22 + etalon_th_sortie_ecs;
  }
  else if (th_sortie_ecs_tot <= 3970) { // de 26deg à 20deg
     th_sortie_ecs = ((th_sortie_ecs_tot / 5) * -0.2609 ) + 227.13 + etalon_th_sortie_ecs;
  }
  else if (th_sortie_ecs_tot <= 4070) { // de 20deg à 13deg
     th_sortie_ecs = ((th_sortie_ecs_tot / 5) * -0.35 ) + 297.9 + etalon_th_sortie_ecs;
  }
  else if (th_sortie_ecs_tot <= 4205) { // de 13deg à 0deg
     th_sortie_ecs = ((th_sortie_ecs_tot / 5) * -0.337 ) + 287.35 + etalon_th_sortie_ecs;
  }
  else if (th_sortie_ecs_tot > 4205) { // de 13deg à 0deg
     th_sortie_ecs = ((th_sortie_ecs_tot / 5) * -0.337 ) + 287.35 + etalon_th_sortie_ecs;
  }
  occupe = 0;
  //delayWithMillis(delai1000);
}
////////////// FIN CALCUL TH SORTIE ECS   ///////////////////////

////////////// CALCUL TH SORTIE STOCK   ///////////////////////    TH6
void calcul_th_sortie_stock()  {
  occupe = 1;
  th_sortie_stock_tot = 0.0;
  for (int i = 1 ; i <= 5 ; i++)
  {
     th_sortie_stock_tot = th_sortie_stock_tot + analogRead(sonde_sortie_stock);
    delay(100);
  }
  if (th_sortie_stock_tot <= 3460) { // de 100deg à 40deg.....3460 = analogread * 5
     th_sortie_stock = ((th_sortie_stock_tot / 5) * -0.1297 ) + 130.37 ;
  }
  else if (th_sortie_stock_tot <= 3745) { // de 40deg à 30.8deg
     th_sortie_stock = ((th_sortie_stock_tot / 5) * -0.1692 ) + 157.55 ;
  }
  else if (th_sortie_stock_tot <= 3855) { // de 30.8deg à 26deg
     th_sortie_stock = ((th_sortie_stock_tot / 5) * -0.2182 ) + 194.22 ;
  }
  else if (th_sortie_stock_tot <= 3970) { // de 26deg à 20deg
     th_sortie_stock = ((th_sortie_stock_tot / 5) * -0.2609 ) + 227.13 ;
  }
```

```
  else if (th_sortie_stock_tot <= 4070) { // de 20deg à 13deg
    th_sortie_stock = ((th_sortie_stock_tot / 5) * -0.35 ) + 297.9 ;
  }
  else if (th_sortie_stock_tot <= 4205) { // de 13deg à 0deg
    th_sortie_stock = ((th_sortie_stock_tot / 5) * -0.337 ) + 287.35 ;
  }
  else if (th_sortie_stock_tot > 4205) { // de 13deg à 0deg
    th_sortie_stock = ((th_sortie_stock_tot / 5) * -0.337 ) + 287.35 ;
    //delayWithMillis(delai1000);
  }
  occupe = 0;
}
////////////// FIN CALCUL TH CAPTEUR   ///////////////////////

////////////// CALCUL TH ENTREE STOCK   ///////////////////////    TH7
void calcul_th_entree_stock() {
  occupe = 1;
  th_entree_stock_tot = 0.0;
  for (int i = 1 ; i <= 5 ; i++)
  {
    th_entree_stock_tot = th_entree_stock_tot + analogRead(sonde_entree_stock);
    delay(100);
  }
  if (th_entree_stock_tot <= 3460) { // de 100deg à 40deg.....3460 = analogread * 5
    th_entree_stock = ((th_entree_stock_tot / 5) * -0.1297 ) + 130.37 ;
  }
  else if (th_entree_stock_tot <= 3745) { // de 40deg à 30.8deg
    th_entree_stock = ((th_entree_stock_tot / 5) * -0.1692 ) + 157.55 ;
  }
  else if (th_entree_stock_tot <= 3855) { // de 30.8deg à 26deg
    th_entree_stock = ((th_entree_stock_tot / 5) * -0.2182 ) + 194.22 ;
  }
  else if (th_entree_stock_tot <= 3970) { // de 26deg à 20deg
    th_entree_stock = ((th_entree_stock_tot / 5) * -0.2609 ) + 227.13 ;
  }
  else if (th_entree_stock_tot <= 4070) { // de 20deg à 13deg
    th_entree_stock = ((th_entree_stock_tot / 5) * -0.35 ) + 297.9 ;
  }
  else if (th_entree_stock_tot <= 4205) { // de 13deg à 0deg
    th_entree_stock = ((th_entree_stock_tot / 5) * -0.337 ) + 287.35 ;
  }
  else if (th_entree_stock_tot > 4205) { // de 13deg à 0deg
    th_entree_stock = ((th_entree_ecs_tot / 5) * -0.337 ) + 287.35 ;
  }
  occupe = 0;
  //delayWithMillis(delai1000);
}
////////////// FIN CALCUL TH ENTREE STOCK   ///////////////////////
/*
////////////// CALCUL TH EXT   ///////////////////////
void calcul_th_ext() {
  occupe = 1;
  calcul_th_capteur();
  th_ext = (coef_th_capteur_th_ext * th_capteur) + ajustement_ext;
```

```
  occupe = 0;
}
////////////// FIN CALCUL TH EXT  ///////////////////////
*/
```