***ΕΡΓΑΣΤΗΡΙΟ ΠΡΟΗΓΜΕΝΟΙ ΜΙΚΡΟΕΠΕΞΕΡΓΑΣΤΕΣ***

***ΜΑΓΚΛΑΡΑΣ ΘΕΜΙΣΤΟΚΛΗΣ-ΠΑΝΑΓΙΩΤΗΣ ΑΜ: 1047182***

***1.ΑΠΑΝΤΗΣΕΙΣ - ΚΩΔΙΚΑΣ***

// o AM : 1047182 Magklaras-Themistoklis-Panagiotis

unsigned int nam[] = {1,0,4,7,1,8,2};

// ftiaxno tin enum metavliti pou mou apothikeuei tis katastaseis

enum state = {state0, state1, state2};

//arxikopoio stin katastasi 0

int currentState = state0;

// ftiaxno treis metavlites pou metrane xrono

static long time0;

static long time1;

static long time2;

// arxikopoio ton counter pou metraei poses fores anavosvinei to k2 led

static int counter\_k2 = 0;

// ftiaxno duo array me ta pins gia na mporo meta na xrisimopoiiso tis for

unsigned int k1pins[] = {0,2,4,7,8};

unsigned int k2pins[] = {1};

///////////////////// ARXIKOPOIISI//////////////////////////////////////////////////

void setup() {

//K1 leds

pinMode(0,OUTPUT);

pinMode(2,OUTPUT);

pinMode(4,OUTPUT);

pinMode(7,OUTPUT);

pinMode(8,OUTPUT);

//K2 leds

pinMode(1,OUTPUT);

// theto tis eksodous 3,5 os buttons

pinMode(3,INPUT\_PULLUP); //btn0

pinMode(5,INPUT\_PULLUP); //btn1

// Interrupt functions - ISR NO ARGUMENTS-NO RETURN!

attachInterrupt(digitalPinToInterrupt(3), ISR\_btn0, FALLING);

attachInterrupt(digitalPinToInterrupt(5), ISR\_btn1, FALLING);

// Arxikopoio ton xrono gia na mporo na orizo tis suxnotites

time0 = millis();

time1 = millis();

time2 = millis();

}

///////////////////////MAIN FUNCTION-LOOP//////////////////////////////////

void loop() {

//////////////////////////////////////KATASTASI 0///////////////////////////////

if (currentState == state0) {

// Loop gia to proto K1 LED – Anavosvinei me tupiki suxnotita 4HZ

if (millis() - time0 >= 1000 / 4) {

digitalWrite(k1pins[0], !digitalRead(k1pins[0]));

}

// Reset time0

time0 = millis();

}

// Loop gia ta upoloipa K1 LEDs – Menoun stathera ON

// i for ksekinaei apo int =1 kai oxi 0 giati

//to proto K1 pin thelo na anavosvinei kai oxi na einai annameno

for (int i=1; i<sizeof(k1pins); i++) {

digitalWrite(k1pins[i],HIGH)

}

// kodikas gia to k2 LED – stathera anammeno kai auto

digitalWrite(1,HIGH);

// edo teliose o kodikas tis midenikis katastasis - opou pleon mono to k1 pin // anavosvinei me suxnontita 4HZ kai ta upoloipa pins paramenoun stathera

//o elegxos gia ton an exei ksenisei o xoros tou fotorythmikou ginetai stin sunartisi

//interrupts opou allazo se state1 – kai me mia if stin loop elegxo an vriskomai stin //katastasi auti dld exei ksenisei o xoros kai exei patithei kapoio koumpi

//////////////////////////////////KATASTASI 1///////////////////////////////////

if(currentState == state1){

// tora ola ta k1 pins(gia auto int i=0) thelo na anavosvinoun me suxnotita diplasia tis // 4HZ

if (millis() – time1 >= 1000 / 4 \* 2) {

for (int i=0; i<sizeof(k1pins); i++) {

digitalWrite(k1pins[i], !digitalRead(k1pins[i]));

}

// Reset time1

time1 = millis();

}

}

}

////////////////////////////////KATASTASI 2////////////////////////////

if(currentState == state2){

// exo orisei mia metavliti static counter gia to k2 led etsi oste kathe for a pou //anavosvinei na metraei +1 kai molis ftasei sto 4 na anavosvinei mia fora ta k1

if ((counter\_k2 % 4) !=0 && millis() – time2 >= 1000 / 4 \* 2){

digitalWrite(1,!digitalRead(1));

counter\_k2 ++;

}

else {

for (int i=0; i<sizeof(k1pins); i++) {

digitalWrite(k1pins[i], !digitalRead(k1pins[i]));

}

//reset time2

time2 =0;

}

}

}

//oi sunartiseis pou xrisimopoiisa stin loop einai oi parakato

// Svino to k2 led – katastasi 1

void(reset\_k2){

digitalWrite (1,LOW);

)

// sunartisis pou trexoun otan patithei eite to btn0 / eite to btn1

// otan patithei to btn0-pernao stin katastasi 1 kai ta k2 leds svinoun- eno o kodikas gia ta //k1 einai mesa stin antistoixi if gia tin katastasi 1

void(ISR\_btn0){

currentState = state1;

reset\_k2();

}

// otan patithei to btn1- pernao stin katastasi 2

void(ISR\_btn1){

currentState = state2;

}

/////////////////////////////emulation to AT91 code////////////////////////////

void digitalWrite(int pin, int value) {

switch (value) {

case HIGH:

pioa->SODR = pioa->SODR | (1 << pin)

case LOW:

pioa->CODR = pioa->CODR | (1 << pin)

break;

}

***2.ΑΠΑΝΤΗΣΕΙΣ ΘΕΩΡΙΑΣ***

***1. Η συχνότητα του συστήματος είναι η τυπική συχνότητα με την οποία λειτουργεί και είναι 4 HZ***

***2. Στις θέσεις 0-4-7-8-2 είναι τα Κ1 και στην 1 είναι το Κ2***

***3. Εφόσον το Κ2 αναβοσβήνει με 8hz μετά από 5 δευτερόλεπτα θα έχει αναβοσβήσει 5\*8 – 40/4 = 30 φορές***

***Και το Κ1 θα έχει αναβοσβήσει 40/4 = 10 φορές***