#include <io.h>

#include <string.h>

#include <mega32.h>

#include <delay.h>

#include <lcd.h>

#include <stdlib.h>

#asm

.equ \_\_lcd\_port = 0x1B;

#endasm

// Define step sequences for two stepper motor phases

flash unsigned char step1\_val[]={0x01 ,0x03, 0x02, 0x06, 0x04,0x0c,0x08 ,0x09};

flash unsigned char step2\_val[]={0x09,0x08 ,0x0c, 0x04, 0x06, 0x02 ,0x03,0x01};

unsigned char xPosition = 0;

unsigned char correctAnswers = 0;

int step=0 , i=0;

interrupt [EXT\_INT0] void ext\_int0\_isr(void) {

if (PIND.2 == 0) // key pressed

{

if (xPosition < 16) { // Button pressed on the first row of the keypad

correctAnswers++;

if (step > 0) { // Decrease step if not already at the minimum

step -= 2; // Decrement step to reverse direction of the stepper motor

}

}

else{

step++;

}

}

}

interrupt [EXT\_INT2] void ext\_int2\_isr(void) {

if (PINB.2 == 0) {

if (xPosition >= 16){ // Button pressed on the second row of the keypad

correctAnswers++;

if (step > 0) { // Decrease step if not already at the minimum

step -= 2;

}

}

else{

step++; // Increment step to advance the stepper motor

}

}

}

void main(void)

{

DDRA=255;

DDRC=0x0F;

DDRD.2=0;

DDRB.2=0;

srand(42);

lcd\_init(16);

// Display initial messages on the LCD

lcd\_gotoxy(0, 0);

lcd\_puts("Fateme Mosavinjd");

delay\_ms(100);

lcd\_clear();

lcd\_gotoxy(0, 0);

lcd\_puts("Are you ready?");

delay\_ms(100);

lcd\_clear();

lcd\_gotoxy(1, 1);

lcd\_putsf("3");

delay\_ms(100);

lcd\_clear();

lcd\_gotoxy(1, 1);

lcd\_putsf("2");

delay\_ms(100);

lcd\_clear();

lcd\_gotoxy(1, 1);

lcd\_putsf("1");

delay\_ms(100);

lcd\_clear();

GICR |=1<<INT0; // Enable external interrupt 0

GICR |=1<<INT2; // Enable external interrupt 2

#asm ("sei") // Enable global interrupts

while(1){

unsigned char y = rand() % 2; // Generate a random row (0 or 1)

xPosition = rand() % 32; // Generate a random column position (0 to 31)

// Determine the row based on the column position

if (xPosition < 16) {

y = 0;

} else {

y = 1;

}

// Display "X" at the randomly generated position on the LCD

lcd\_gotoxy(xPosition % 16, y);

lcd\_puts("X");

delay\_ms(110);

lcd\_clear();

// Drive the stepper motor with the selected step sequence

for(i=0; i<=25; i++) {

PORTC = step2\_val[step];

}

delay\_ms(1);

if (step == 0) {

for(i=0; i<=25; i++) {

PORTC = step1\_val[step];

}

delay\_ms(1);

}

step++;

if (step >= 7) {

step = 0; // Reset step to 0 when it reaches the maximum value

}

}

}