//ファイル名main.c

#include <stdio.h>

#include <stdlib.h>

#include <xc.h>

#include "interface.h"

#pragma config FOSC=INTOSCIO //内部クロック、RA6,7 は IO

#pragma config WDTE=OFF

#pragma config PWRTE=OFF

#pragma config MCLRE=OFF

#pragma config BOREN=OFF

#pragma config LVP=OFF

#pragma config CPD=ON

#pragma config CP=ON

void Initialize(){

GreenOFF

YellowOFF

RedOFF

BlueOFF

RightMotorA = RightMotorB = 0;

LeftMotorA = LeftMotorB = 0;

}

void StartupSequence(){

//Turn on each LED one by one

YellowON

wait(500);

YellowOFF

GreenON

wait(500);

GreenOFF

RedON

wait(500);

RedOFF

BlueON

wait(500)

BlueOFF

soundBuzzer(523, 200, 50);

soundBuzzer(659, 200, 100);

}

void SetRightMotor(int direction, int state){

if(state == 0){

RightMotorA = 0;

RightMotorB = 0;

return;

}

if(direction == 1 && state == 1){

RightMotorA = 1;

RightMotorB = 0;

return;

} else if(direction == 0 && state == 1){

RightMotorA = 0;

RightMotorB = 1;

return;

}

}

void SetLeftMotor(int direction, int state){

if(state == 0){

LeftMotorA = 0;

LeftMotorB = 0;

return;

}

if(direction == 1 && state == 1){

LeftMotorA = 0;

LeftMotorB = 1;

return;

} else if(direction == 0 && state == 1){

LeftMotorA = 0;

LeftMotorB = 1;

return;

}

}

int main(int argc, char\*\* argv) {

// Initialize all values

OSCF=1;

CMCON=0b00000111;//portA の 0～3 はデジタル入力

PORTA=0b00000000;//portA の初期化（全て LOW)

TRISA=0b00111111;//portA の 0～5 を入力

PORTB=0b00000000;//出力ピンの初期化（全て LOW）

TRISB=0b00000000;//全て出力に割り当てる

STARTUP:

Initialize();

StartupSequence();

while(1){

BlueON

if(!Button1){

BlueOFF

soundBuzzer(523, 200, 50);

break;

}

}

while(1){

GreenON

if(!Button1 && !Button2){

GreenOFF

RedON

soundBuzzer(392, 2000, 100);

break;

}

if(!Button2) goto STARTUP;

//If both sensors detect white, simply go forward

if(!LightSensorLeft && !LightSensorRight){

YellowON

BlueON

for(int i = 0; i < 10; i++){

LeftMotorB = 1;

RightMotorA = 1;

RightMotorB = 0;

soundBuzzer(440, 8, 0);

LeftMotorB = RightMotorA = 0;

\_\_delay\_ms(2);

// (3 + 7) \* 10 = 100ms

}

//Change these if the sensor positioning doesnt correlate to motor movement. What if want

//is that if the left sensor detects black, we move right motor

//if right sensor detects black, we move left motor

}else if(LightSensorLeft && !LightSensorRight){

BlueON

for(int i = 0; i < 10; i++){

RightMotorA = 1;

RightMotorB = 0;

soundBuzzer(523, 8, 0);

RightMotorA = 0;

\_\_delay\_ms(2);

// (3 + 7) \* 10 = 100ms

}

}else if(!LightSensorLeft && LightSensorRight){

YellowON

for(int i = 0; i < 10; i++){

LeftMotorA = 0;

LeftMotorB = 1;

soundBuzzer(659, 8, 0);

LeftMotorB = 0;

\_\_delay\_ms(2);

// (3 + 7) \* 10 = 100ms

}

}

GreenOFF

YellowOFF

BlueOFF

RedOFF

}

while(1){

if(!Button2) goto STARTUP;

}

return (EXIT\_SUCCESS);

}

//ファイル名interface.h

#ifndef INTERFACE\_H

#define INTERFACE\_H

#ifdef \_\_cplusplus

extern "C" {

#endif

#ifdef \_\_cplusplus

}

#endif

#endif /\* INTERFACE\_H \*/

#define \_XTAL\_FREQ 4000000

//Define possible notes to be used with the buzzer

#define noteD 294

#define noteFSharp 369

#define noteG 392

#define noteA 440

#define noteB 494

#define noteE 330

#define noteCSharp 554

#define GreenON {PORTBbits.RB4=0;}

#define GreenOFF {PORTBbits.RB4=1;}

#define YellowON {PORTBbits.RB5=0;}

#define YellowOFF {PORTBbits.RB5=1;}

#define RedON {PORTBbits.RB6=0;}

#define RedOFF {PORTBbits.RB6=1;}

#define BlueON {PORTBbits.RB7=0;}

#define BlueOFF {PORTBbits.RB7=1;}

#define RightMotorA PORTBbits.RB2

#define RightMotorB PORTBbits.RB3

#define LeftMotorA PORTBbits.RB0

#define LeftMotorB PORTBbits.RB1

#define GreenLED PORTBbits.RB4

#define YellowLED PORTBbits.RB5

#define RedLED PORTBbits.RB6

#define BlueLED PORTBbits.RB7

#define LightSensorRight PORTAbits.RA0

#define LightSensorLeft PORTAbits.RA1

#define Button1 PORTAbits.RA2

#define Button2 PORTAbits.RA3

#define Buzzer PORTAbits.RA6

#define bool int

#define true 1

#define false 0

#define wait(time) {\_\_delay\_ms(time);}

#define soundBuzzer(tone,time,mute) {\

for(int t = 0; t < (time - mute) \* 10; t += tone/100\*2){\

PORTAbits.RA6=0;\

\_\_delay\_us(tone);\

PORTAbits.RA6=1;\

\_\_delay\_us(tone);\

}\

\_\_delay\_ms(mute);\

}

#define Forward(ratio,wait) {\

for(int t = 0; t < 10; t++){\

LeftMotorA = 0;\

LeftMotorB = 1;\

RightMotorA = 0;\

RightMotorB = 1;\

\_\_delay\_ms(ratio);\

\

PORTBbits.RB1=0;\

PORTBbits.RB2=0;\

\_\_delay\_ms(wait);\

}\

}