#define THRESHOLD 45 //Value for white line

#define DISTANCE 40 //Value for distance of obstacles

#define MAT 30 //Value for black mat

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* SUBROUTINES \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

sub Sound() //Subroutine for beeping

{

PlayToneEx(988,1000,4,FALSE); // (Frequency, duration, volume, loop)

}

sub Sound2() //Subroutine for beeping, sound 2

{

PlayToneEx(492,1000,4,FALSE);

}

sub Sound3() //Subroutine for beeping, sound 3

{

PlayToneEx(1865,1000,4,FALSE);

}

sub Scoop() //Activates scoop mechanism

{

OnFwd(OUT\_C,70); //Moves forward(Output port, power)

}

sub Reverse() //Moves robot backwards

{

OnRev(OUT\_AB,80); //Moves in reverse(Output port, power)

}

sub Forward() //Moves robot forward

{

OnFwd(OUT\_B,95); //Moves forward(Output port, power)

OnFwd(OUT\_A,99);

}

sub RightTurn() //Turns robot to the right

{

Off(OUT\_A); //Turns motor off(Output port)

OnFwd(OUT\_B,85);

}

sub LeftTurn() //Turns robot to the left

{

Off(OUT\_B);

OnFwd(OUT\_A,85);

}

sub Break() //Stops both wheels

{

Off(OUT\_AB);

}

sub Sleep() //Stops all motors

{

Off(OUT\_ABC);

}

bool LineDetected() //Detection of white tape. If the light sensor reads a higher value than the one

{ //set for THRESHOLD then there has to be white tape under the robot.

bool line = false;

if(Sensor(IN\_3)> THRESHOLD)

{

line = true;

}

else

{

line = false;

}

return line;

}

bool ObstacleDetected() //Detection of obstacles. If the distance read by the ultrasonic sensor is

{ //less than the established as DISTANCE then an obstacle lies ahead of the

bool obstacle = false; //robot's path.

if(SensorUS(IN\_4)< DISTANCE)

{

obstacle = true;

}

else

{

obstacle = false;

}

return obstacle;

}

bool Home() //Brings robot back to black mat. When the light sensor reads a value that is

{ //smaller than the one set as MAT, then there has to be black cloth underneath

bool Mat = false; //the robot.

if(Sensor(IN\_3)< MAT)

{

Mat = true;

}

else

{

Mat = false;

}

return Mat;

}

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* MAIN TASK EXECUTION\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

task main()

{

SetSensorLight(IN\_3);

SetSensorLowspeed(IN\_4);

bool Exploring = true;

long t0, time; //Timer starts to run. We use the internal timer to make the robot work for

t0 = CurrentTick(); // 4.5 minutes.

do

{

time = CurrentTick() - t0;

Scoop();

Forward();

Wait(200);

if(ObstacleDetected())

{

Break();

Wait(500);

Sound();

Wait(500);

Reverse();

Wait(1000);

RightTurn();

Wait(1000);

}

if(LineDetected())

{

Sleep();

Wait(500);

Sound3();

Wait(300);

Reverse();

Wait(1000);

RightTurn();

Wait(1200);

}

if(Home() && time >=270000) // 4.5 minutes

{ //If the time is greater than 4.5 minutes AND the light sensor reads "black", it

Exploring = false; //means that it has found the mat, and it stops moving.

}

}

while(Exploring);

Sleep(); //Motors are turned off and music starts to play.

Wait(1000);

Sound();

Wait(800);

Sound2();

Wait(1000);

Sound3();

Wait(500);

Sound();

Wait(800);

Sound2();

Wait(1000);

Sound3();

Wait(500);

}

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*END OF PROGRAM\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*