CSC368/CSCM68 Embedded System Design – Lab Task 3

1. One sensor we used is the colour sensor. The purpose of the sensor is to detect when the colour changes from the current floor colour to white so it knows that it has reached the white spot and needs to change directions.

   Another sensor we used is the gyro sensor. The purpose of this sensor is to know when the driving base has turned exactly 180 degrees before moving again because once it reaches the white spot, it needs to go in the reverse direction.

2. 

3. The algorithmic idea is that the driving base is intended to go straight and while it is going straight it should continually check if the colour sensor has picked up the white spot. Once it reaches the white spot, the driving base needs to stop and continually rotate until the gyro sensor picks up the next occurrence of 180 degrees from the gyro sensor so it is able to go in the reverse of the direction it was originally going. It needs to complete all of these steps 10 times.

4.

```
ev3 = new EV3Brick()
leftMotor = new Motor(Port.B)
rightMotor = new Motor(Port.B)
lineSensor = new ColorSensor(Port.S1)
gyroSender = new GyroSensor(Port.S3)
speed = 300
rotatation = speed / 2

for i=0 to 9

   leftMotor.run(speed)
   rightMotor.run(speed)

   run = true
   while run
      if lineSensor.color == Color.WHITE then
         leftMotor.hold()
         rightMotor.hold()
         leftMotor.run(rotation)
         rightMoto.run(0 – rotation)
         while gyroSensor.angle() < (180 * (i + 1))
            continue
         endwhile
         leftMotor.hold()
         rightMotor.hold()
         run = false
      endif
  endwhile

next i
```

5.

```
#!/usr/bin/env pybricks-micropython
from pybricks.hubs import EV3Brick
from pybricks.ev3devices import (Motor, TouchSensor, ColorSensor,
                                 InfraredSensor, UltrasonicSensor, GyroSensor)
from pybricks.parameters import Port, Stop, Direction, Button, Color
from pybricks.tools import wait, StopWatch, DataLog
from pybricks.robotics import DriveBase
from pybricks.media.ev3dev import SoundFile, ImageFile

#Variables
ev3 = EV3Brick()
left_motor = Motor(Port.B)
right_motor = Motor(Port.D)
line_sensor = ColorSensor(Port.S1)
gyro_sensor = GyroSensor(Port.S3)
gyro_sensor.reset_angle(0)
speed = 300
rotation = speed / 2

for i in range(0, 10, 1):

    #Moves straight for next turn
    ev3.speaker.say("Turn " + str(i + 1) + ", Gyro Value " + str(gyro_sensor.angle()))
    left_motor.run(speed)
    right_motor.run(speed)

    #Continually looks for the white sport
    run = True
    while (run):
        if (line_sensor.color() == Color.WHITE):

            #Stops when finds white spot
            left_motor.hold()
            right_motor.hold()

            #Rotates 180 degress
            left_motor.run(rotation)
            right_motor.run(0 - rotation)
            while (gyro_sensor.angle() < (180 * (i + 1))):
                continue

            #Stops rotating
            left_motor.hold()
            right_motor.hold()
            run = False

ev3.speaker.say("Mission Success")
```