Department of Electrical and Computer Engineering

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Title: LafBot
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1. Time Spent: 6 Hours
2. Commented code

```c
/*
 * File:   LafBot.c
 * Author: Zainab Hussein
 *
 * Bot used: SN 2
 * Created on March 23, 2017, 9:01 PM
 */
#include "ece212.h"
int main() {
    ece212_lafbot_setup();
    int minSpeed = 0x000F;      //min speed of robot
    int maxSpeed = 0xFFF0;      //max speed of robot on big track
    int outOfBounds = 0x1FF;    //the ADC threshold for determining
                                // whether the robot is on the line

        while (1){
            if(SW3)
                maxSpeed = 0xF000;      //max speed of robot on small track
            /**
                    *when the right sensor detects a value out of bounds, the left
wheel
            * will spin forward at its maxspeed and the right wheel will spin
            * forward at its minSpeed */
            while (analogRead(RIGHT_SENSOR) > outOfBounds) {
            LFORWARD = maxSpeed;
            RFORWARD = minSpeed;
            }
            /**
                    *when the left sensor detects a value out of bounds, the left
wheel
            * will spin forward at its minSpeed and the right wheel will spin
            * forward at its maxSpeed */
            while (analogRead(LEFT_SENSOR) > outOfBounds) {
            RFORWARD = maxSpeed;
            LFORWARD = minSpeed;
            }
            /**when the left sensor and right sensor both detect a value within
            * bound, the left and right wheel will spin forward at their
            * maxSpeeds */
            while (analogRead(LEFT_SENSOR) < outOfBounds
            && analogRead(RIGHT_SENSOR) < outOfBounds) {
            RFORWARD = maxSpeed;
            LFORWARD = maxSpeed;
            }
        }
}
```

3.
Acceptance Testing Plan

Tests to run	Test Implementation	Pass
Follow straight black line	Have robot follow black line 5-8 times	Bot follows black line without deviation
Test for noise tolerance to ensure small deviations in the intensity of the black line	Vary the ADC threshold value by checking the values result in lafbot remaining in/out of bounds	Lafbot never gets stuck on the track
Test for noise tolerance to ensure small deviations in the intensity of the black line	Vary the ADC threshold value by checking the values result in lafbot remaining in/out of bounds	Lafbot remains on black track, not veering outside of track
Lafbot smoothly completes small oval track	Run lafbot 4 times without fail or deviation from course	Lafbot never leaves track or get stuck
Lafbot smoothly completes big oval track	Run lafbot 4 times without fail or deviation from course	Lafbot never leaves track or get stuck
Lafbot smoothly completes special track	Run lafbot 2 times without fail or deviation from course	Lafbot never leaves track or get stuck
Start Lafbot at different locations on the track	Start lafbot at 7 different parts of the big track	Lafbot performs correctly at every starting point

4. The result of the acceptance test plan is indicated to have passed in table above. The time on the big track was 21 seconds. I would say the design passed as a whole. Improvements could be done in better noise tolerance for the lafbot, because even though the lafbot remains on track all through, there is some wiggle at a point in the track before it stabilizes.