RBE1001-D19   Lab #3

Electro-Mechanical Lab I

Name_____ Team_____

Introduction:

In these next two labs, you will be build devices that will allow your BaseBot to autonomously pick up a load and carry it to a specified location. In this first lab, you will build a light sensor and develop the appropriate program that you will use to navigate the course. In the next lab, you will build the arm that can lift and hold the test load, and demonstrate the integration of these elements to complete the task.

Goals:

1. Be able to explain the characteristics and use of a photosensor.
2. Be able to design a circuit that uses a photosensor, threshold adjustment potentiometer, and comparator to create a digital, on/off signal corresponding to the photosensor being located over a black line, or not.
3. Be able to develop a program that will utilize your digital light sensor to provide feedback to enable effective line-following behavior for your **otherwise unmodified** BaseBot.
4. Make progress on your final project robot.

Tasks:

1. Review this outline, appendix, and Lab 3 Video before attending lab.
2. Follow the construction and test instructions in the addendum and place responses on the write-up below.
3. Present an initial design for your final project robot's driveline.

Lab Practicum Part I
Photoresistor measurements.

    a. low light resistance: _____

    b. bright light resistance: _____

Interpret your results.

_____

_____

_____

Lab Practicum Part II

What voltages did you see across your photocell?

    a. White line_____

    b. Black line_____

Describe how the circuit you built works.

_____

_____

_____

_____

_____

_____

_____

_____

_____

Lab Practicum Part III

Does a Digital Input value of 1 indicate the sensor is on or off the line? Why?

_____

_____

_____

_____

_____

_____

_____

_____

_____

What was the fastest time for your robot to make one pass around the course?_____

Instructor/TA initials _____

How could you improve on the hardware or software design to make it go faster?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Discuss your current plan for your final project robot's driveline? (Number of wheels, number driven, wheelbase vs wheeltrack dimensions, types and sizes of wheels, etc.) Include a sketch below.

_____

_____

_____

_____