TER3M1 Culminating Assignment

# THE POSTMAN ALWAYS RINGS TWICE

Mail delivery has gone to the 21st century ! No longer are we going to rely on Newman to deliver the mail. We have ROBOTS to do that now !!! What you must do is create a robot to deliver the mail.

# CONCEPT OF OPERATIONS

The robot will start at the beginning of the maze and will not begin until a button has been pushed to start the run. Once the button has been pressed and released, it will begin to follow the black line on the track. It must follow the line to the end. A single black line across the path indicated a stop. This is where the robot must stop for at least 2 seconds, before continuing. Once it has reached the end (signified by a double black line) the robot must stop completely and move no further. Full points will be awarded to the robot that runs all the way to the end and stops completely. Partial marks will be awarded at the instructors discretion, if any are awarded at all.

# Products to be developed

Since this is your culminating assignment, you must demonstrate your skill in almost everything you have done this semester. You are responsible to showcase your skills and abilities. The following items must be submitted.

1. A full schematic of your operational robot. Schematic must be correct and match the actual wire up. Any schematic that does not match the wire up will receive an incomplete mark.
2. A Logic Flow Chart. Your full logic must be fully and in great detail, be documented. Any flow chart that does not match the actual program will receive an incomplete mark.
3. A printout of the code you created. Your programs must be fully documented and must be as efficiently written as possible. Any code that is ‘borrowed’ must be credited. Any code found to be uncredited and non original (including code that other students helped you with), will result in an incomplete mark.
4. Written Report – See Appendix A
5. An operational mail delivery robot that will deliver the mail and amaze your friends and family.

# Items provided to students.

The students will be provided the following items to use in class.

1. The track to run on. This will be made available first week back from Christmas Holidays for the students to practice and refine their robots on.
2. Access to the school lab in the mornings before the school day begins and after school as announced. The lab will not be available every day after school.
3. All tool, and resources that they currently have in class.

# Expectations

Students are expected to work *individually* on this project. Students are being assessed at all times during this assignment. You are not permitted to work on this at home. You are being given ample time to work and complete this in class. It is permissible to help each other out, but there is a big difference in helping your peers out and doing the work for them. If it is deemed that you are working too closely with others, both students involved will be penalized. That is, the one doing all the work, and the one benefiting from it. Timelines must be adhered to, and products must be delivered in a timely manner.

# NOTE

Even though the full culminating must be handed in before the final runs, students are expected to have fully operational code for their final runs. **Once the code is handed in, no changes may be permitted. Only changes pertaining to timing are allowed. No major changes to the code will be accepted.**

If students are deemed to have violated any of the outlined expectations, or have not fully submitted the required products, it is their responsibility to prove otherwise. Students are responsible for proving that they did all the work themselves, etc. if the instructor has deemed otherwise.

# TIMELINES & MARKING



The due date for all products of the culminating is: FRIDAY, June 8, 2018

The track runs will be: Wednesday June 13 to Friday June 15, 2018

1. Schematic - 15%
2. Logic Flow Chart - 15%
3. Programming Code - 25%
4. Written Report - 40%
5. Robot Run - 05%

# Appendix A

## The Engineering Design Report

**Part 1 – Research**

* Brainstorm ideas for your project. Think about circuits and activities we have done in class, research on the Internet, etc.
* Remember: This is an opportunity for you to demonstrate YOUR knowledge and skills, you may be able to get some help from your teacher, but in the end, you are responsible for choosing a project that you have the ability to complete independently.
* Identify what you are going to build.
* Explain what your device will do, and why it is useful.
* Discuss whether your device or a similar device might have any commercial potential.
* Discuss the knowledge and skill that will be required to complete your chosen project.
* Do you have the experience and skills that will be required for the project?
* Will you need to do further learning to complete the project successfully?

**Part 2 – Planning**

(Before you start building!)

* Create a detailed list of supplies you will require for your project. Be as specific as possible. For electrical components use proper part numbers. Identify items that you will be buying or supplying from home and prices for those items if possible.
* Create a schedule that you plan to follow in order to complete the project on time. Be sure to include time for report writing, acquiring parts, building, testing, and finalizing your project.
* Describe your plans for the program that will control your device. Give a basic description of how the program will interact with your device.
* Create a circuit diagram for your device / interface / etc.. Use proper electrical symbols and format. Properly label the components in your diagram. Add the diagram to your report.
* Start getting your supplies together, and doing any further research required to start your project

**Part 3 – Building / Prototyping**

* Begin the building of your device
* Document the steps you take to build the device. Be as explicit as possible. Consider writing the report as if the reader will be building the device according to your instructions. Check out the site (http://www.instructables.com) for some examples of projects that have been documented step by step
* Include photos of the various stages of your building
* Describe changes that you make to the design of your device as you test it. Things do not always work the way you expect them to, don’t be afraid to make changes when you run into problems.
* Begin work on your program to control the device.
* Describe changes that get made to your program as you write and test it with your device.

**Part 4 – Final Testing and Demo**

* Finish writing your report and documenting the building of your device.
* Test your program and device to ensure they are working correctly.
* Include a final commented version of your program code in the report.
* Prepare a demonstration of your device for the class (This demo will take place as per the scheduled time. Attendance is mandatory for this period)