TEJ3M & TEJ4M Final Project

Your final project should be a culmination of what you have learned in this course. It must involve interfacing (i.e. hardware and software).

You must hook up inputs and outputs to an Arduino and write a program ("sketch") that will use a separate Arduino board with your circuit attached.

Your program should be well structured.

You must write your program using good style, with comments.

If you borrow ideas, circuits or code sections from the Internet or anyone else, you must give credit to the author.

You must submit a final report.

See marking information and project ideas below.

DUE: Tuesday, June 22, 2016.

ASSIGNMENTS CANNOT BE ACCEPTED LATE WITHOUT PRIOR ARRANGEMENT!

REQUIRED ELECTRONICS:

Your circuit must include:

- inputs
- outputs

REQUIRED PROGRAMMING STRUCTURES:

Your program must include at least the following structures:

- loops
- if-statements
- subroutines (optional, but desirable)
- variables
- calculations
- input and output.

STRUCTURED PROGRAMMING:

A well structured program should be broken down into subroutines, different sections and structured command blocks. For example, if you have a menu in your main program, then each menu choice will likely call a different subroutine; if a robot performs different functions when different sensor inputs are received, the different functions should be subroutines. You could use a subroutine to centre text on the screen, a function to round numbers to two decimal places, a function to read distance sensors, etc. Structured command blocks are the blocks created inside loops and inside if..then..else statements.

GIVE CREDIT FOR BORROWED CODE, CIRCUITS, IDEAS:

You may use procedures or sections of programs from the Internet as long as you document (in a comment) the section that is not your work and give credit to the author or web site. Please be aware that I will know what you are capable of and what is written by an experienced programmer!

If you get a project idea or a circuit diagram from the Internet (or elsewhere), you should reference the source in your final report and indicate how you used it/ modified it.

PROGRAMMING STYLE:

Good programming style means good choices of variable and subroutine names (names that mean something to a reader), proper use of structures such as loops and if-statements, proper indentation of loops and if-statements, and comments in your program. Include in comments at the top of your program: your name, the name of the program, the purpose of the program, and the date. For example:

```
/* Sumo robot by: A. Bawa

 This sumo robot program will circle the sumo ring looking for opponents.
 It avoids the white edges and will move towards any detected objects.
 Outputs:
   IR emitters: P2, P8
   Motors: P12, P13
 Inputs:
   IR sensors: P0, P9
   Line sensors:P1, P10

 Last modified: Jan. 11, 2015 */
```

FINAL REPORT:

You must submit a final report that explains what you have done, shows personal reflections on your work and documents how you followed the design process (or project management cycle). Please see the separate document on the Final Project Report.

POSSIBLE PROJECT IDEAS:

Arduino Robot	Arduino Board
A sumo robot (hard)	A security system
A maze solving robot (medium)	A temperature control system
A line following robot (easy)	A traffic light simulation
A robot to play some sort of sport	A handheld game
A remote controlled robot with programmed movements	
A robot project using different sensors	

MARKING SCHEME: (Note: this activity is worth a total of 15% of your final grade)

Interfacing:	40%
Project difficulty:	20%
Project completeness:	15%
Development process:	15%
Program style &structure:	10%

RUBRIC:

	Level 1 (50% - 60%)	Level 2 (60% - 70%)	Level 3 (70% - 85%)	Level 4 (85% - 100%)
Interfacing:	Minimal electronics and programming.	Satisfactory electronics and/or programming.	Uses all required Basic command structures.	Excellent electronics and programming.
Project difficulty:	Very simple idea.	Relatively simple idea.	Moderately complex idea.	Very complex project.
Project completeness:	Project does not work / causes errors.	Project works but is not finished.	Project is finished but lacks final touches.	Project is finished, complete with final touches.
Development process:	Minimal final report and evidence of design process.	Satisfactory final report and some evidence of design process.	Good report with self-reflection and documentation of design process.	Excellent report with insightful reflections and documentation of design process.
Program structure and style:	No subroutines or functions and minimal structured command blocks. Minimal comments, poor variable names, no indentation.	Relatively little use of subroutines, functions and structured command blocks. Some comments, satisfactory variable names, attempted indentation.	Adequately uses subroutines and functions and structured command blocks. Good comments, variable names and indentations.	Excellent use of subroutines, functions and structured command blocks. Excellent use of comments, variable names and indentation.