To: Students, EGR 286-EE

From: Jie Yang

Date: October 25, 2018

Re: Project 3

The requirements for Project 3 are outlined below. These are intended as general guidelines for the teams to develop a project worthy of >10% of the final grade. A brief description of four possible projects are given. Your team may select one of these projects or submit a design of your own choosing.

The important parameters for the project are:

1. Background research to develop ideas and possible designs (required!)
2. Incorporate at least two motors
3. Incorporate at least three sensors for input and/or machine operation
4. Two of the sensors will not be mechanically activated, i.e. a mechanical switch or a potentiometer
5. A minimum of five LEDs must report the machine status
6. The machine must perform some function that could be used in a practicable manner if properly scaled up.
7. The use of an infrared emitter/sensor pair is worth 10 extra points (must function to get the points).

Parts for the device will be supplied if they are available in the class inventory. The teams are free to supply any other parts or items they choose.

The major milestone**s** for the project are:

**Thursday, November 1:** Each group will submit at least five ideas for the project. Each possible design need to be briefly described in several sentences. Due at 11:59 on Saturday, November 3, memo format.

**Thursday, November 8:** The teams will submit a memo outlining their choice for a project. The memo will contain the following:

1. A paragraph building a backstory for the project – who is the customer and what does he want?
2. A formal problem statement
3. A decision matrix demonstrating how this particular project was chosen
4. A Gantt and WBS chart for the project showing all milestones beginning on November 1.

Kits will be issued to teams that have submitted adequate documentation of the project.

**Tuesday, November 13:** The teams will submit a memo with:

1. Background research to determine the state of the art and/or possible ideas, complete project description including all specification and requirements the machine will meet.
2. The requirements and specifications must be developed in detail by the team – what will your device do? (Bulleted format!)
3. The requirements must be “abstract, verifiable, unambiguous and traceable” as discussed in Chapter 3 of the text.
4. A list of constraints
5. A Gantt chart with any revisions necessary
6. A WBS for the project.
7. Include a minimum of two rough sketches. (The sketches must be legible and informative!)

**Tuesday, November 20**: The teams will submit a memo describing the team’s progress. Include an updated Gantt chart and a revised WBS. The memo will include a bill of materials estimated for the project. A short demonstration of the progress the team has made on building and programming is required.

**Tuesday, November 27**: Demonstrate the final machine to the class. Submit a memo with an updated Gantt chart and complete bill of materials the following Tuesday, December 4.

**Tuesday, December 4**: The team will submit a memo detailing progress up to the demo. This will include a Gantt chart updated to reflect any changes in the scheduling along with task accountability information. The original Gantt chart will be presented along the revised chart with detailed annotations of the changes. Don’t forget to include the updated WBS. Also include any schematics and bill of materials for your project.

**Thursday, December 6:** Project report due.

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| **Grading Rubric** | | | |  |  |
| **Functional: mechanical, electrical and programming** | **demo – project progress** | **November 29** | **5%** |  |  |
| **Meets minimum specifications outlined in this document** | **November 27** | **20%** |  |  |
| **Meets additional specifications as outlined by the teams** | **5%** |  |  |
| **Functionality – works as advertised** | **5%** |  |  |
| **Creativity, originality and effort – class vote for a score between 1 and 10** | **10%** |  |  |
|  | **Subtotal** | | **45%** |  |  |
| **Written requirements** | **Project ideas (five)** | **November 1** | **5%** |  |  |
| **Design choice memo** | **November 8** | **10%** |  |  |
| **WBS memo, background, etc.** | **November 13** | **10%** |  |  |
| **Bill of materials, updated Gantt, WBS** | **November 20** | **5%** |  |  |
| **December 4** |  | **5%** |  |  |
| **Report** | **May 3** | **20%** |  |  |
| **Total** | | | **100%** |  |  |

**Note:** All late submissions will receive a maximum of 50% of the possible grade!

The written deliverables will be submitted to Bb Learn. Refer to the actual upload link for the exact due dates and times.

The weighting allocations for each assignment may be changed at a later date.

Option: Launcher

Launch an object (a ping-pong ball?) towards a target

1. Must have an option to aim at different targets
2. The range should be adjustable

Option: Solar tracker

Track a light simulating the sun

1. Track in the relevant angles
2. Incorporate a temperature sensor and display
3. Sensors (switch?) for manual override of positioning
4. Small solar panels are available for this or other projects

Option: Move an object

Build a device that can pick up an object and move it to a new location

1. Object to be picked up to be determined by the team – must be a 3-d object
2. Sensor input to start operation
3. A sensor must determine when/where to place the object
4. The object should be picked up, not just dragged

Option: Vending machine

Build a device that will dispense something

1. Sensor input to start operation
2. A sensor must determine something about the status of the device

Option: Team’s Choice

1. What will this machine do?