**CSCE 150E Matlab Programming Project 1 – Summer 2011**

**Assigned: 7/20/2011; Due: 7/26/2011 at 11:59 PM**

**Objective:**

* Group project development involving Matlab

**Problem Statement:**

An old computer game involves safely landing a spaceship on the moon. The player is provided essential parameters including mass of the ship and the fuel, the energy capacity of the fuel, the pull of gravity, altitude, and velocity. Every 10 seconds the player given an update, then is allowed to specify a revised burn rate. Your task is to implement this game in Matlab.

Imagine that you are all in R&D in an aerospace firm, and have been presented with an RFD. You are to work together to design a lander(s) that are capable of safely landing on a variety of airless moons, asteroids, etc. The effort is cooperative in the sense that what you contribute eventually can help everyone. However, management would like to see multiple options, and this means you will want to form small teams (1 to 3?) of like-minded colleagues to develop your own proposals.

For the hardware design you will need to figure out feasible weights, the range of possible targets (based on their gravity), suitable fuels (based on their energy capacity), burn rate ranges, likely initial velocities and altitudes at which manual control begins, and relevant formulas of motion.

For the astronaut-lander interface which will be programmed in Matlab, you will need to design a loop which every 10 seconds provides updated status of the lander, then accepts a desired burn rate for the next 10 seconds. Code will be needed to let the astronaut initially select the landing site, then to repeatedly recalculate the lander status, and finally announce the success or failure of the mission.

You have a high degree of freedom in the design. Digital displays or graphical displays are fine. The choice of landing sites, fuels, weights, initial velocities, etc. are up to you, and may vary randomly if you wish, with each landing. Enhancements are encouraged, though please verify them with management.

**Collaboration:**

Work together as a class on any or all aspects of the research and design. Ideally take advantage of the talents of each member of the team. Form small teams to finalize each of the multiple design options. It is essential to keep track of who did what and where any useful information was found. Keeping a log is highly recommended.

**What and How to Submit:**

Read the “Program Documentation Guidelines” which will be provided.

By the deadline hand in electronically two files, lander.m (the Matlab script file for the game), and lander.doc (which contains summaries, documentation, and sample runs). In class the day after the deadline, hand in hardcopy versions of both files, stapled together with the documentation file in front.

The Word file document should contain the following, all carefully labeled:

* Cover page with name(s), title, date submitted, etc.
* Documentation of the subject research you did to prepare for the project. Cite sources and explain the formulas.
* A discussion of the features you implemented in the project. Describe how they work and what Matlab options were used to program them.
* An “instruction manual” that a non-programmer can use to run the lander program.
* Cut and paste a sample dialog of the running of the program, including the entry of burn rates and any plots that were generated. (Hint: Use the ‘diary’ command.)
* Cut and paste a sample dialog, as above, but demonstrating how your program responds to extreme and faulty input. (This could be combined with the previous section.)
* Acknowledge all collaborations, detailing what each person contributed individually, and what was done jointly.

**Grading Criteria:**

* Program functions as intended – 25%
* Program logic is well designed – 20%
* Documentation guidelines are followed – 25%
* Handin Documents formatted and arranged as specified – 15%
* Testing is comprehensive – 15%