**CSCE 150E Matlab Programming Project 2 – Summer 2011**

**Assigned: 7/28/2011; Due: 8/3/2011 at 11:59 PM**

**Objective:**

* Group project development involving Matlab

**Problem Statement:**

You have two choices for the second project: simulation of the temperature changes in a cooling fin or implementing the classic battleship game. In either case, you have a great deal of flexibility in the scope and design. You will have the same flexibility in developing and sharing information as in the first project, and the same expectations.

*Battleship:*

See the game online at <http://www.learn4good.com/games/board/battleship.htm>

(which of course has sound and graphics that go beyond what is expected in the project). Your task is to program this game in Matlab. Options to consider include tracking the top ten players by using a data file, allowing different numbers and types of ships, etc.

*Cooling* Fins:

The idea for this (thanks to Kirk Conger) is that you will model temperature changes in a cooling fin of a large, air-cooled engine. Do some research to determine appropriate materials, temperatures, heat transfer rates, and dimensions. The easiest scenario may be of a flat rectangular strip of metal with one edge “clamped” to a constant high temperature that is initially all one temperature, and assuming heat loss only along the edges to the air which is also clamped at a much lower temperature. The time units for updating the temperature pattern should be chosen according to the heat flow rate, and should vary for areas of different materials (and of course the air-metal interface). The method of attack on this should be similar to that shown in class with the game of life – use two arrays, the first for current temperatures, and the second for the revised temperatures. At each stage, the new temperature at a location becomes the average of the eight neighboring locations.

One challenge may be how to handle curved gradients considering the grid is square.

**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, cool\_fin(or battleship).m (the Matlab script file for the program), and cool\_fin(or battleship).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 program.
* Cut and paste a sample dialog of the running of the program 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%