**ENG EK 125 Spring 2018**

**Final Project and Homework 4**

**Project Instructions:**

You must work in groups of 2 or 3 (no more, no fewer!) Project presentations will be on Monday April 30th. This project is due on **May 2nd during the lab hours in PHO 117 from 1:25-4:15.** These hours will be for submissions only. This is to encourage you to get the project done before the due date. You will be graded on the correctness of your solution and on your programming style. This includes vectorizing your code, writing informative comments, etc. Follow the Programming Style Guidelines at the end of each chapter! Also, please note that this is a Final Project in lieu of a Final Exam, so expect minimal help – this is YOURS to do!

You will submit your solution both electronically and in person, and you will do a project demonstration. More details are found below under Project Deliverables.

**Project Description:**

You are to, as a team, create a project and the solution. The project must be a **modular** program that is based on App Designer. It must include at the very least the following:

* Reading and analyzing at least one data set of substantial size (i.e. at least 100,000 data points) or API (e.g., into your own data structure(s))
  + Example Big Data Sets: <http://hadoopilluminated.com/hadoop_illuminated/Public_Bigdata_Sets.html> (Or find any other big data sets you prefer. Amazon AW3 has several high quality big data sets.)
* Writing to a file using **fprintf** (e.g. telemetry data, analytics collected from the data set, user settings, etc.)
* Plot meaningful data points relevant to the problem you are trying to solve
  + This could be a graph representing the data you have analyzed or collected, telemetry data (users per day, length of user session, etc.) Come to office hours and ask a TA for recommendations on this if you are stuck.

**Be creative! Make it interesting! Your project must be arguably useful to society! Embrace the concept of Boston University creating the Societal Engineer ™. You will be in competition with the other project groups in terms of usefulness and creativity. (Note: no games, sports, restaurant data, etc; it really must be useful to society.)**

Extra Credit: implement either the min, max, or mean function in C and call it from MATLAB to perform a calculation on your data.

**Project Deliverables:**

1. Hard Copy of Code
   1. The first page should be a typed **cover page** that includes your names, the name of the submitted folder (containing all files), and a signed statement from each group member stating the program is your original work.
   2. The second page should be where you explain your project at a high level. Give some **background on the problem** you are trying to solve, the group of people for whom the product solves a problem and why you believe this solution solves that problem. Include the sources/links to the datasets / API's you used here.
   3. The third page should include the line numbers and the file names where a particular requirement is fulfilled. **For example: On lines 23-41 of dataLog.m we implemented a function that writes data to a file using fprintf. The data written to the file is a collection of metrics tracking how users engage with our app (i.e. how long they spend in the app, how many times the Go button was pressed, etc.)** Again, this is just an example.
   4. The fourth page should include **instructions on how to run your application**, any other information you'd the graders to know about while grading your project, and also include screenshots of the various aspects of your application running. This could be a series of screenshots showing a sample flow of user interactions in the application. Image 1 may be the starting screen, Image 2 may be the screen after I click some button, Image 3 may be the result of clicking that button... maybe a graph or image or data presented on the screen.
   5. The **remainder of the pages should be the actual code from your project**. Please do not screenshot code. MATLAB has the functionality to print code directly from the files. Just do a Control + P or access through the menu screen. Make sure the file names are included on the pages as well so we have reference.
2. Electronic Submission
   1. Submit electronically to the V drive.  Any problems, contact ENG IT at enghelp@bu.edu.
   2. Make sure that you submit the folder containing **every file** **needed to run the program** electronically, one per group, **with your name(s) as part of the folder name**.
3. Presentation
   1. Prepare a 5-minute presentation to demonstrate how your app works to a panel of EK 125 staff. Below are a few guiding questions for your group:
      1. Why did you choose to do this?
      2. What problem does it solve?
      3. How does it solve this problem?
      4. How does the app work?
   2. You will be graded on the quality of the presentation, which will include clearly answering these questions.
   3. Your code must be tested during the grading process, so, **YOUR CODE MUST RUN**. Please come to the presentation with a computer, prepared to demo the app.
   4. Finally, be prepared to answer questions from the panel about the app.
   5. The presentation is two days before your final due date, so that you will have a chance to revise based on the feedback you receive.

**Homework 4**

Homework 4 is to start getting yourselves organized for the project. It is due in the beginning of your lab section on Monday 4/9. You do not need to submit the homework electronically (but you will for the project).

Create your team of two or three students.

As you begin brainstorming your project, keep in mind the big data set requirement. Instead of trying to come up with problems to solve *from* the big data sets, start by identifying relevant problems that exist in our society today and then browse through the repository of data sets to see if the data could *help* in solving your problem. For example, imagine creating an application that attempts to predict employment trends in the United States within the technology sector. A census or population data set may be useful in producing trends relevant to this problem.

Below is a link to several data set examples, do not think of this as an exhaustive list rather a place to get started. A Google search will produce many big data set repositories that are available (make sure they are Open Sourced though -- you don’t want to end up testifying in front of the Academic Conduct Committee... ;) MIT licenses are a safe bet).

Based on the problem you are trying to solve, write a draft of the project description. Explain to us what you intend to accomplish with this project and why it is meaningful to society. **Explanation and demonstration of why this project benefits society is a critical part of this project grade.** And no, getting your take-out from Nud Pub to you faster is NOT meaningful enough.

Then, begin creating your code using App Designer. Create a wireframe showing your component positioning. It does not need to be fully-functioning yet, but it should demonstrate where the project is headed. You do not need to incorporate any data yet.

Remember, the more time you invest planning the project out now, the easier it will be to complete later on.

Deliverables (hard copies of each)

* Project description with your teammates listed at the top
* A link to your big data set (or API)
* Basic application user interface design