**ENED 1091: Team Project #2**

**Spring 2016**

**Description:**

As engineering and technology students at the University of Cincinnati, you have been asked to develop an educational tool to help improve the quality of math, science, or engineering education. In order to do this, you will be working in teams to design a Graphical User Interface (GUI) using MATLAB that will help to teach one or more fundamental concepts in math, science, or engineering. Your team will need to select a target audience which could be future first-year engineering students or students at the K-12 level. Your concepts should be age appropriate for your target audience and, in the case of K-12 students, should relate to the Ohio state educational standards for that grade level (http://education.ohio.gov/Topics/Ohios-Learning-Standards/). Your project should be engaging and inspire the user to experiment and interact with the GUI in the hopes that they will develop a more complete understanding of the concept(s)

**Requirements:**

In order to demonstrate that you have understood the material covered in this class, several requirements must be met by your program.

1. The GUI must have at least two components that were not used in the FirstGUI tutorial.
2. ***Each member*** of the team is required to write the code for at least one of the callback functions in the GUI you create which includes (at a minimum) one use of the following:

* Conditional structure (IF Else or Switch)
* Looping structure (For or While)
* Array or vector

1. The GUI must actually work.
2. The GUI should be effective in teaching the concept your team has chosen.
3. The GUI should allow for significant user interaction and be engaging for the intended audience.
4. The GUI should be user friendly and easily understandable. If appropriate, you could include an information pushbutton or a help pushbutton to explain what the GUI does or how to use the GUI.
5. The GUI should be creative. You don’t get many points for creativity if you just re-create an earlier lab assignment and throw in a slider.
6. The GUI should look professional. Color can be very effective, but can also be very distracting depending on what you do.

**Some Starter Ideas:**

* Calculus Concepts: derivatives, integrals, Newtown Raphson, Taylor Series, other Series/Sums, etc.
* Programming Concepts: loops, conditional statements, arrays, etc.
* Physics Concepts: motion, resultant force, work, etc.
* Chemistry Concepts: reactions, thermodynamics, etc.
* Concepts you have learned in a discipline specific course you are taking this semester.

**Assessment:**

Your projects will be assessed using the following rubric:

|  |  |
| --- | --- |
| **Aspect** | **Points** |
| Project Plan Submitted | 5 |
| Functionality:   * Is the GUI an effective teaching tool for the chosen concept and intended audience? * Does the program work? | 15 |
| Engagement:   * Is the GUI engaging? * Is the GUI user friendly? | 15 |
| Complexity:   * Does the GUI have at least two components that were not in the tutorial? * Did the team make good choices in selecting the components to demonstrate the concept? | 15 |
| Creativity and Appearance:   * Is the concept for the GUI creative? * Is the appearance of the GUI professional? | 15 |
| Demonstration:   * Did the demonstration work? | 5 |
| Final Report:   * Does the report have all of the required sections? * Is the description well written? | 15 |
| Individual Score:  Each team member will receive an individual score based on the peer evaluations and the T.A. assessment of participation | 15 |
| **Total:** | 100 |

**Schedule and Milestones:**

1. Week of March 28th:
   1. Break up into teams (no more than 3 students) and choose a team leader.
   2. Decide on a topic for your team GUI.
   3. Do a preliminary layout for the GUI using GUIDE.
   4. Review the PowerPoint called Guide to GUIs posted on Blackboard. In particular, look at the sample code for the various components that you have chosen for your GUI (sliders, radio buttons, tables, … ) and make sure that you understand how the code for these components works.
   5. Decide how to split out the coding for the project.
   6. Complete and submit the Project Plan document posted on Blackboard.
2. Week of April 4th
   1. Work on Project. The team leader should send the .m and .fig file to all team members. Team members can then work on various parts of the code. The team leader should be the “keeper of the code” and simply paste in code developed by the other members of the team. Everyone needs to agree on common variable names.
   2. Demonstrate progress on the project to your T.A.
3. Week of April 11th :
   1. Work on Project
   2. Demonstrate progress on project to your T.A.
4. Week of April 18th:
   1. Demonstrate the finished product during recitation to T.A. and instructor.
   2. Write the final report.
   3. Team leader submits the final report and the code (this includes .m file and .fig file and any other files needed to run the GUI) uploaded to Blackboard by team leader. Please put in zipped folder if you have a lot of files.
   4. Peer evaluations submitted by all members of the team (see Team Project #2 Folder for form).

**Final Report Requirements:**

The report will need to contain the following sections, and should be well written.

1. A title for your project.
2. An introduction section which introduces your team and describes in general what the GUI does, the target audience, what concept it covers, and why your team chose this concept.
3. A section describing in detail the chosen concept and how that concept is effectively used/demonstrated within the GUI. If the target audience is K-12 students, link your chosen concept to the appropriate educational standard.
4. A section providing instructions for how to use the GUI.
5. A section describing the individual contributions of each team member to the development of the project.
6. A section describing any challenges that your team faced and what you learned from the project.
7. A conclusion section.
8. Any references you used in developing the topic(s) for your GUI.