**CS 417**

Final Project

**Due Monday 12/05/2016**

**Make sure you have core functionality taken care of early** and if rest of design is modular (as it should be with these patterns) it will be easy to refactor out additional patterns along the way as you learn them.

**Please remember creating good Javadoc documentation for your code is a major part of good software development and is a factor in all work delivered in this class.**

For the final project you have the freedom to create whatever you want. The project is not based on building any specific application or use of components (sensors, output components, camera), but rather the primary source of evaluation will be based on the proper use of design patterns and testing to accomplish your goals. To that point, a key aspect of the project is figuring out the type of addition to your project such that it would benefit from the use of a specific pattern. This also means simply coding a pattern correctly, but not using it in a place that is appropriate for the pattern will not receive full marks.

There is a basic structure I want to see for a couple of key things related to using good software development techniques, but I am leaving the details up to you.

* All submissions will be via GitHub with pull requests from the Development branch to the Master branch tagging me (caw13). The pull request comment should have a list of pattern(s) included and what classes go with that pattern.
* There will be a number of specific implementation sprints where you will be required to incorporate a specific pattern(s). For those of you that aren’t familiar with the “sprint” terminology, the basic idea is at the end of the sprint you have a working set of code no matter how basic the use is of that code (<http://scrummethodology.com/scrum-sprint/>). From this perspective this is where branching in git can help you have a piece of working code while other areas are still under development. So each sprint throughout the rest of the semester should incorporate new design patterns into your implementation. With the understanding that you may change the direction of your final project and your group is free to change your use of the code in a later sprint.
* In addition to the code you must submit a UML diagram for the code delivered
* The schedule of sprint completion due dates are:
  + Sprint 1: Sunday 11/6
  + Sprint 2: Sunday 11/20
  + Sprint 3: Thursday 12/1
  + Sprint 4 (aka Final project submission): Monday 12/5

While there are a few required design patterns to be used, other aspects such as good design to support other principles we have talked about like encapsulation will also factor into the grade. In the sprints I will ask you to include a specific design pattern(s), but where you include it will be completely up to you and your implementation. This is **not** a cookie cutter project in that you are developing to specific application requirements. Rather you will be developing to specific design pattern requirements allowing/forcing you to be creative in designing a project that makes sense to include that pattern. I want you to be creative and look for ways to differentiate your project from the rest of the class.

**Raspberry Pi interaction requirements:**

# Component use (sensors, outputs, camera): You are not required to use any specific component except the Led(s). In fact, you don’t have to use any except the Led. However, I think you will find incorporating many of the components will be a natural fit for incorporating the different patterns we cover. You are free to use any of the network connections (WiFi, Ethernet, Bluetooth) and/or any additional components beyond those provided, but it is not a requirement by any means.

# The project should have a properties file which specifies which port each component you use is connected to on the board (i.e. they could be changed in the properties file without requiring change to your code). Ideally if one of the components is not connected the application continues to function, but the requirement is any component error is handled gracefully.

# Key things you must include/create for the final submission only:

* Short word document describing the format of your properties file and which components you use/require. Also a bullet point list of the patterns included and the relevant classes to the pattern. If your application doesn’t work completely, it is critical that you describe which parts do so I can make sure to give your team as much credit as possible.
* Sample call to start the program
* UML Class diagram for your project
* JUnit test conditions for all design patterns. You do not have to have tests of other aspects of the code and in fact will not be graded on them, but you may find creating them useful for certain functionality with multiple group members

# Extra credit

* [up to 8pts] Creativity in the project being a unique demonstration of the RPi components. The amount of credit will be dependent on your use of additional design patterns and/or frameworks not explicitly required by sprints that you have introduced specifically related to the extra functionality. A short description of this extra credit including design decisions i.e. why each pattern is appropriate should be added to your word document.

**Final presentation 12/5**

For the final oral presentation, your group should describe each of the design patterns you used and why the use was appropriate for that situation. You will also give a demonstration of your project to the class. You are free to create a slide presentation, but it is not required. **If you do not give your presentation 12/5, your project will be deducted 20% even if the pull request is made 1 day late (or more if you are not ready Wednesday)**. For full credit you must be ready to go when called upon and the pull request related to the final submission must be made by end of day 12/5, for a 10% deduction you must present 12/5 and then create your pull request by end of day 12/6.

For the presentation you will be will be required to evaluate the other groups, I will evaluate you, and we will have two guest evaluators. Extra credit will be awarded to the project deemed best overall by your peers, as well as, to the project deemed best overall by the guest evaluators. The evaluation sheets your peers and myself will be using have been posted to Blackboard for your reference.