**Project Description**

**Objectives**

- Experience completing independent / investigative research on a given problem domain to find the appropriate solution necessary. You will be required to learn about the domain of your problem, discover possible solutions, and implement one.
- Apply learned skills in RAD and Object-Oriented Analysis, Design and Implementation
- Implementation skills:
    - Proper styling and commenting of code
    - Use JAVA/ Python/C#, etc. APIs
    - Generate documentation for the development team
- User interface design
    - Incorporate a user-friendly GUI front-end
- Basic Software Engineering, including
    - Implementing a test plan with high coverage using a test framework in a specific programming language that you use in your project
    - Writing documentation for the user
    - Writing basic technical documentation for the design team
    - (Optional) Incorporating software revision control throughout
- Agile Development
    - Meet regularly with client to give feedback on project progress, challenges, etc.
    - Refactor
    - Test-driven development (TDD) through aggressive and frequent unit, integration and validation testing
- Discuss your problem and solution intelligently in a presentation.

The project involves the following steps and in each step there will be **documentation templates** your group will need to complete. The steps are:

**Step 1: Requirements of the project**
Analyze the problem and discuss the functional, performance and any other requirements that your project will satisfy

**Step 2: Specification of the project**
Write the specification of your project based on your requirements using Agile and OO Methods

**Step 3: Design of the project**
Write the design of your project based on your specification using Agile and OO Methods

**Step 4: Implementation**
You are expected to incorporate at least some amount of object oriented (OO) programming in your implementation, you may use OO programming languages such as JAVA, C#, Python (OO), PHP (OO), etc. You may choose C++, but it can be a lot more work to design GUI in C++.
Many of the elements of this course are OO such as UML class diagram, OO design patterns, refactoring in context of OO code. Having OO component to your code shall deepen your skill of OO Software Engineering.
You are expected to use version control system such as GIT.

**Step 5: Testing**
Use the testing methods for unit, integration and validation tests.

**Step 6: Operation (User Manual)**
Write a brief user manual that guides users on how to use your software application.

**Each member in a group is expected to more or less contribute equally (e.g. around 25% in a group of four members) toward the project. This includes equal contribution to each of the phases such as coding, documentation, presentation, etc. Points shall be taken away from a team member's grade if little individual contribution is made toward specific project phase.**

**Project Options**

For your final project, you will select one of the following possible projects to work on. Once you select the project, you are responsible for coming up with all aspects of the software, including functionality, user interface etc.

1. A software that performs on-line reservation tasks for an airline company. Some functions of the software include: reserve, cancel, review, change and generate some type of reports for the managers. The confirmation should be sent to the traveler.

2. A software that performs on-line reservation for a hotel. Some functions of the software include: search for a room type, reserve, cancel, review, change and generate some type of reports for the managers. The confirmation should be sent to the customer.

3. A stock price performance system. Quite a bit of time and effort is spent estimating whether the price of a stock will go up or down, and when it will change from going up to going down, or vice versa. There are a number of resources on the net with historical stock price information. Use some data as input to a simulation model to predict the future price of a stock. If possible, all or part of the simulated system should have a graphical viewing component, allowing the user to "see" the progress of the simulation optionally in real-time. (Requires strong knowledge of statistics and probability)

4. A software that performs simple E-commerce site for a "abc" sales Company. The functions include searching for an item, order, including shipping methods; pay an item using credit card etc. A confirmation of the purchase should be sent to the user's email address.

5. Special Topic: If nothing above appeals to you, get together within your team and make a suggestion to me in writing. The proposal should be no more than 1 page long, and should include sufficient detail to allow me to decide if (1) there is sufficient work here for a team, or (2) it is much too ambitious for use in this class.
   **Submit your special topic by email to me for review by due date stated on Canvas.**

   Note: If none of your group members have experience working with a Database system then you may select a project that does not require storing data, another option could be to store data in a text file. If you do not have experience developing web based applications then develop a desktop application.

   Several of the project deliverables are meant to be submitted by one person in the group. Once one member submits the group's work then they should as a courtesy let their group members know that they have done so, via email or other means. This shall ensure accountability, so your group members are not in suspense about the submission of work.