Overview

Teams will undertake a term project in groups of 6 students. The term project will consist of proposing a software project, which includes developing an application consisting of a database, frontend, and backend processes, as well as documenting the development process. Students will be graded on their use of, and adherence to, software development methodology and tools for the project. The final project grade will consider the progress towards product delivery, the difficulty of the project, as well as the delivery of the materials required for each of the milestones for the project.

All documentation, code, and other materials related to this project will be stored in a GIT repository. It is expected that team members will frequently update the files in the repository. If pair-programming is used, both names of the pair must be included in the commit message to receive credit for participation in the project. Submissions for all milestones must be merged into the repository before the deadline or all members of the team will be penalized for late work.

The purpose of this project is to provide the basis for applying the tools and methods that are explored in the course. Group work is an essential part of computer science, both in academia and industry. This project will increase your skills in communications and teamwork, while providing hands-on use of many different tools.

Team Formation

Teams will be formed using a survey (link posted on Moodle), which takes your work schedule, work habits, experience with various technologies and other demographics into consideration when forming teams. We want to create groups according to similar work schedules and work habits, but maintain diversity across the other demographics.

Milestones

Of course, software projects often have deliverables and delivery schedules associated with the production of code. But successful product delivery depends on many other deliverables in addition to working code. Your group project will be graded based on the delivery of materials at seven milestones. All the milestones are due on Sunday evening at midnight in their respective weeks.

Milestone 1 Proposal – Due Week 5 (Oct 1)

The project proposal is the first document required from the team. All the information listed below must be included and tools should be in place by the due date.

Team Name	Moniker to be used in all presentations and documentation.
Members	List of team members, first & last name.
Description	A short (2-3 paragraphs) description of the project. Provide enough information to explain what value your product will provide to users of your product.
Vision Statement	A simple, one-sentence statement describing the clear and inspirational desired state resulting from your team's efforts to create your product.
Motivation	Describe the background and reasons for developing this product.
Risks	What are the known risks that may prevent your team from completing

	this project on time. Risks could include: the working environment, lack of experience of the team in the area of focus, lack of access to a specific resource, etc.
Risk Mitigation Plan	A detailed plan showing how the team will mitigate each stated risk. Describe how you will succeed given the stated risks.
Version Control	Describe the version control method and repository you will be using for the deliverables created for the project. Github is strongly recommended. Once a repository is determined, you must share access to the repository with your instructor, our TA, grader, and all your project team members.
Development Method	Which software development methodology will your team follow? Describe the methodology and the features/steps you will follow. Common methodologies include waterfall, agile/scrum, iterative, spiral, etc.
Collaboration Tool	Select a collaboration tool for team members to utilize for coordination of their work and communication among team members. Popular tools are Slack and HipChat.

Submission format: This project milestone 1 submission can be included either as the Readme file of the github repository or you can also create a PDF named ProjectMilestone1_<TeamName> included in your github repository. (One person on the team needs to submit a link to your project's github repository on respective submission link in Moodle by due date)

Milestone 2 Project Tools & Agile Methodology Summary – Due Week 7 (Oct 15)

The project tools and agile methodology summary is the second document required from the team. All the information listed below must be included and tools should be in place by 5pm on the due date.

Project Management Tool	Which software product will you use to plan and track the progress of your project? Create a project in the tool you pick. (Popular tools are Trello and Zoho.) Using this tool, capture the requirements for your project. Requirements must include critical features including user requirements and functional requirements. You can create two separate lists for each of these requirements or combine them into one titled as Product Backlog. Discuss and document a project plan for your project. Project plan includes details such as the number of sprints you require to finish the project and tasks (feature development) planned for each sprint.
Plan Cycle within the Project Management Method	Create a three-week sprint or waterfall cycle in your project management tool. Create tasks for the feature development planned in this sprint. Discuss with your team and take ownership of the tasks and have due dates assigned for each of these tasks in the sprint. Initially all these tasks will be in the *ToDo* list and eventually when the owners pick up a task and start working, then the task should be moved by the owner to *InProgress* list and once the task is completed, it should be moved to the *Done* list in your project management tool like Trello.
Agile Methodology	Following agile, conduct a five-minute agile standup meeting where

	everyone stands in a circle and each team member talks for one minute about what he/she has been working on, what he/she will work on and are there any challenges he/she is facing. Following agile, conduct a sprint retrospective meeting, where the entire team discusses about the happenings of the sprint - what went well, what didn't go well, what should be improved upon in the next sprint.

Submission format: This project milestone 2 submission should be a PDF named ProjectMilestone2_<TeamName> included in your github repository. This submission expects a document with the following:

- A screen shot of your project management tool which displays your project dashboard (containing the user and functional requirements, sprint tasks and owners, todo, inprogress and done lists)
- A detailed description of your project plan (see above)
- A summary of your team's agile standup and retrospective meetings (see above)

Milestone 3 Database – Due Week 10 (Nov 5)

The database is the third deliverable required from the team. All the information listed below must be included and the database should be in place by 5pm on the due date.

Database	Select your database software tool. (MySQL is strongly recommended.) Create your database and populate it with ample data necessary to conduct initial program testing. Creating and populating the database should be done using sql scripts. These scripts should be included in your github repository.
Data Model	Create a document that visually depicts the contents and structure of your database. For example, an entity relationship diagram showing all database tables, attributes, primary keys, and relationships between tables.

Submission format: This project milestone 3 submission should be a PDF named ProjectMilestone3_<TeamName> included in your github repository. This document should contain the ER diagram showing your database model as mentioned above and a link to your sql scripts used for creating and populating your database.

Milestone 4 Individual Student Meetings and Project Demo – Week 12 (Nov 19)

The project demo is the fourth deliverable required from the team. The project demo should show at least two application features implemented entirely (from front-end to back-end).

Each member of the project team will participate in a one-on-one interview with the staff (TA, CA, or Instructor) during Week 12. The purpose of the interview is to give each project team member the opportunity to provide feedback on the project's progress, show their project demo to the staff, talk about the lessons learned, what's working well, what's not working so well, etc. Each team member will be asked to assess the level of commitment and contributions made by each of their teammates. Feedback about team member will be summarized and will contribute to each student's grade for the project.

Milestone 5 Unit Testing – Due Week 14 (Dec 3)

The unit test plan is the fifth deliverable required from the team. All the information listed below must be included and the test files should be in place by 5pm on the due date.

User Acceptance Test Plans	Create a document that describes how at least three features within your finished product will be tested. The test plan should include specific test cases (user acceptance test cases) that describe the data and the user activity that will be executed in order to verify proper functionality of the feature.
Automated Test Cases	Provide link to the tool you use to automate testing, or explain how to run the automated test cases or schedule time with the TAs to demonstrate your automated tests. Provide a copy of the output showing the results of the automated test cases running.

Submission format: This project milestone 5 submission should be a file named TESTING.md with the following contents included in your github repository:

- Who: List of people on the team
- Title: of the project
- Vision: from Project Milestone 1 Proposal
- Automated Tests: Explanation and Screenshot (see above)
- User Acceptance Tests: Copy of at least three UAT plans

Milestone 6 Project Presentations – Due Week 16 (Dec 15)

Each team will conduct a live presentation of their project in front of the other students. Presentations will be given during the Week 16 lecture time or during the Week 16 lab recitation times. Teams will sign up in Moodle for their chosen presentation date/time. Your presentation requires all members to be present and standing up front. If an individual on the team is not present for the presentation, then he/she will get a zero for the presentation portion of the project. Each team member must discuss something about the project during the presentation. Each team will target 10 minutes for their presentation (no more; no less please.) You should cover the following items in whatever creative way you wish.

- Title of the project
- Names of each person in the group
- All the tools your group used
    - Name of the tool, logo, and purpose (e.g., Project Tracking, VCS)
    - Your group's rating on how useful/good this tool/methodology was (ranked 1..5 where 5 stars is best and 1 star is useless
    - Methodologies

      (Iterative, Waterfall, agile, TDD, pair programming, peer code reviews, other…)
- Expected tools
    - Project Tracker (Trello or similar)
    - VCS repository (GitHub or similar)
    - Database (MySQL or similar)
    - Testing tool (PyUnit or similar)
    - Auto-documenter (optional. Doxygen or similar)

- Deployment environment

(Optional Additional tools you may have used

- IDE (e.g. Eclipse, Code::Blocks, xCode.)
- Framework (e.g. Laravel, Ruby on Rails, Node.js, Android Studio)
- Hardware (e.g. RaspberryPi, Arduino)

- Challenges you encountered, and how you overcame them and how it may have affected your original project plans.
- Demo your project (recommend a video of your app rather than a "live" demo)

Hints: Because you have a limited amount of time to present, make use of images – remember, a picture is worth a thousand words! Designing good pictures/infographics can really enhance a presentation! You can show a picture of your repository or project tracker, etc. to show how you made use of the tools. Be sure to use a minimum of 20-point font for all text so everyone can read it.

Submission format: This project milestone 6 submission should be a PDF named ProjectMilestone6_<TeamName> included in your github repository by 5pm on the day you present. This document is a PDF version of your slides.

Milestone 7 Final Submission - Due Week 17 (Dec 20)

This milestone will be graded based on the amount of effort, the success of the overall project, and use of tools and methodologies throughout the semester.

You must deploy your project and store your project source code, test cases, and documents in GitHub.

To submit Milestone # 7, create a PDF named ProjectMilestone7_<TeamName>.pdf where Project Title is the name of your project. The pdf document must contain the following in the order provided as a bullet-point list or table (not an essay!):

- Title: of the project
- Who: Names of each person in the group
- Project Tracker: (Trello, or similar tool.)
  - Link to your Project Tracker (for instructor & TAs)
  - Screenshot showing your project in your project tracker
- (Optional) Video: 5 minute or less video demonstrating your project. Your audience is a potential customer or person interested in using your product.

- VCS: Link to your VCS Repository (for instructor & TAs)

  We will check to ensure the following are stored in your VCS repository:
  - Source Code (throughout the semester)
  - Test Cases
  - Auto-documenter documents (optional)

  - Video demo (optional)
  - README.md in GitHub explaining to others what your project is about.
  - Project Milestone 7 document titled as Project Milestone7_<TeamName>.pdf

- Screenshot of each member's contributions throughout the semester from GitHub
- Deployment: link to deployment environment or a written description of how the app was deployed and how one might access/run the app.
- (Optional) Auto-doc: The purpose is to run an auto-documenter on your code base. While Doxygen is very common (and Javadoc is used for Java), you may need (or want) to use another documenter. Make sure you choose a documenter that produces a PDF file or a HTML website.
  - List which program(s) you documented
  - Link to GitHub where the auto-generated docs are

Be sure to

- Ensure that all the TAs all have access to all links for grading
- Tag your repo with "Final Submission" (make sure to push your tag to your repo)
- Include a README in your repo:
- Describe repo organization/structure
- Describe where to find and/or how to build the docs o Describe how to build/run/test/etc code
- If using a Continuous Integration system, provide a link to the CI status page

Submission format: This project milestone 7 submission should be a PDF named ProjectMilestone7_<TeamName> included in your github repository by 5pm on Dec 20.

Milestone 8 Peer Evaluation & Project Reflection – Due Week 17 (Dec 20)

This portion of the project must be completed individually. The first part is to fill out an evaluation of your peers on the project. The second part is to answer some common potential interview questions about working in teams.

Instructions for completing this evaluation using a web app called TEAMMATES will be emailed to you early during Week 17, and your submission will be due by Wednesday of Week 17.

Grading will be based on the quality of your answers and how well you handle team dynamics. Be honest. An interviewer can always tell if you are being genuine. One goal of this exercise is to prep you for interviewing. Typical interview questions:

- Give an example of when you worked in a team and there was conflict or disagreement. How did you handle it? Did you reach a consensus? What would you do differently next time?
- Give an example of when you worked in a team and one member always dominated the meetings and discussions. What did you do to help the rest of the team become more involved? What would you do differently next time?
- Give an example of when you worked in a team and one member refused to do any work. How did you handle the situation? What would you do differently next time?

Grading

Each team will be given a grade that applies to the entire team. Each team will submit the milestones as a team, and the grade given to these milestones will be shared by the team. Then, at the end of the term, each student's grade for the project may be adjusted based on individual interviews (Milestone # 5), peer evaluation feedback (Milestone #8) and github commit history. If interviews and github commits indicate the lack of significant participation from any individual, then that individual may lose points for the overall project. If you do not actively participate throughout this project, you will probably not pass the entire course.

All the project deliverables must be checked into the project github repository according to the schedule provided in the milestones above. The staff (Instructor & TAs) will check repository commits each week to ensure continued progress.

Milestone 1	40 points	Project Proposal
Milestone 2	30 points	Project Tools & Agile Methodology
Milestone 3	40 points	Database Design
Milestone 4	40 points	Individual Student Meetings and Project Demo
Milestone 5	30 points	Unit Testing
Milestone 6	40 points	Project Presentations
Milestone 7	50 points	Final Submission
Milestone 8	10 points	Peer Evaluation and Project Reflection