

Overview

Teams will undertake a semester-long project in groups of 5 or 6 students. The team/group project will consist of proposing a software development project, which includes developing an application consisting of a database, frontend, integration layer 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 software development tools and techniques.

Team Formation

Teams will be formed by your TA 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 eight milestones.

Milestone	Points	Description
Milestone 1	40	Project Proposal
Milestone 2	35	Project Plan
Milestone 3	50	Group meetings with TA
Milestone 4	45	Application Design & Architecture
Milestone 5	25	Test Plans
Milestone 6	40	Presentation
Milestone 7	50	Project Summary
Milestone 8	15	Reflection and Peer Evaluation (individual)
TOTAL	300	

Milestone 1 – Project Proposal

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 Number	Your recitation section number plus a one-digit identifier. Assigned by your TA. This team number MUST appear on ALL milestones/deliverables/submissions posted by your team to your git repo.
Team Name	Can be used in addition to your Team Number for all deliverables and presentations.
Team Members	List of team members, first & last name.
Application Name	To be used in all presentations.
Application Description	A short (2-3 paragraphs) overview description of the application. Provide enough information to explain what functionality and value your product will provide to users of your application.
Vision Statement	A simple, one or two sentence statement describing the clear and inspirational desired state resulting from your team's efforts to create your application. Use the format/template provided in lecture.
Version Control	Identify the three repositories your team has created in git. (One for team meeting logs; one for Milestone submissions, and one for all project code/components.) Verify that you have shared access to the repository with your TA and all your project team members (screen shot.)
Development Method	Describe the software development methodology will your team follow. Describe the methodology and the features/steps you will follow. Common methodologies include waterfall, agile/scrum, iterative. You may choose to follow your own hybrid version of these methodologies as best suits your team.
Communication Plan	Describe in a paragraph or two how your team plans to communicate with each other during the course of the project. You may identify a collaboration tool for team members to utilize for coordination of their work and communication among team members. Such tools are Slack, HipChat, Google Groups, etc.
Proposed Architecture Plan	Propose an architecture for your app. What technologies will you be using on the backend? What technologies on the front end? How will they communicate with each other? Which technologies will be responsible for which functionalities?
Meeting Plan	Identify and describe your team's agreed-upon meeting schedule and mode. Identify the day(s) and time(s), mode, and location your team has agreed upon for regular meetings. "Mode" refers to how you are meeting (face-to-face), group video chat (like Skype), etc.

Submission format: This project milestone 1 submission should be a PDF document named ProjectMilestone1_<TeamNumber> and pushed to the MILESTONES repository in git.

Milestone 2 Project Plan

- Due on Sunday, March 10, 11:59 p.m.
- One submission per team posted to git

The project plan is the second major deliverable document required from your group project team.

All the information listed below must be included in your Project Plan write-up.

Project Features list	<ul style="list-style-type: none">• Document (as a bullet point list) the major FEATURES of your software application.• Each features should have a TITLE followed by a brief DESCRIPTION of that feature.
Requirements	<ul style="list-style-type: none">• Document the key FUNCTIONAL and NON-FUNCTIONAL requirements for a minimum of SIX features. Follow one of the formats/templates provided in class. Your application will likely have many more features, and you should create requirements documents for all the features. But for this milestone, you need only turn in SIX requirements documents.
Project Plan	<ul style="list-style-type: none">• Create a Project Plan in your chosen Project Management tool. May be a GANTT chart, Kanban board, or other suitable format.• The Project Plan should include each Feature that is to be developed.• The Project Plan should indicate the SEQUENCE of Sprints. That is, the plan should show in what order the features will be developed (designed, coded, tested, integrated.)• The Project Plan should show for each feature WHEN (by calendar date) the feature will be worked on.• The Project Plan should show for each feature WHO will be working on the development of the feature.• The Project Plan should result in a completed, working application that is ready to present by April 26.

Milestone 3 - Group Meetings and Project Demo

Meetings will take place during your recitation period during Week Nine, March 11-15.

The project demo is the third deliverable required from each team. The project demo should show at least two application features in-progress of being implemented (from either front-end, back-end, or integration layer). This should be a live, working demo of features developed so far.

Each project team will participate in a 10 minute interview with your TA during this week's recitation section. Each recitation section has four or five teams. The TA will schedule the specific time for each team to meet with the TA. When your team is NOT meeting with the TA, your team should use this time during this week's recitation to work together on your project.

The purpose of the team interview is to give each project team the opportunity to provide feedback on their project's progress, show their project demo to the TA, talk about lessons learned, what's working well, what's not working so well, obstacles, challenges, etc.

Milestone 4 – Application Design and Architecture

- Due on Sunday, March 17, 11:59 p.m.
- One submission per team posted to git

The application architecture design is the fourth deliverable required from the team. All the information listed below should be included and in place by midnight on the due date.

Revised List of Features	This is an updated list of your FEATURES inventory (from Milestone 2). It is normal for feature lists to change during the course of a project. Some features may have been dropped. Some features may have been added. This revised features list should reflect these changes. This revised features list should identify the PRIORITY order of how the features will be developed.
Architecture Diagram	This deliverable is a picture or diagram that shows each architectural component of your application. The diagram should identify how your application's front-end, integration layer, and backend processes will be hosted. This diagram should identify the flow of data from one layer to another. This diagram should identify the protocols being used to/from each component layer.
Front End design	This deliverable is a series of diagrams that show the basic design of your application's front end. Typically, this design is most easily presented in terms of a WIREFRAME. This may be hand drawn, or created using a web page wireframe drawing tool. The front end design should identify each major feature of the application's front end and the
Web Service Design	If your application is using Web Services via APIs, this deliverable should list the Web Service being used along with a description of the Web Service's API including the data being passed to and received from the API.
Back End design	This deliverable provides a summary design of your application's database. The design document should identify each type of data being stored in your database. This may be documented in terms of a schema definition, showing data entities ("files") and attributes ("fields"). This may be documented via an Entity Relationship Diagram showing database tables and columns. The document should identify the specific DBMS technology being used to store your application data (PostgreSQL, MySQL, Firebase, etc.)

Submission format: This project milestone 4 submission should be a PDF named ProjectMilestone4_<TeamName> included in your git repository containing the specific design items listed above.

If you are not using a relational database (we recommend PostgreSQL), your backend documentation must include a brief justification explaining your chosen data architecture, data storage, data retrieval, etc., and clearly explain why the alternative database technology was chosen.

If your app will not have registration/log in capabilities, you must submit a justification report describing the security measures built into your application and how individual users are authenticated and tracked, and clearly explain why the alternative authentication method was chosen.

Staff reserves the right to deny any requested exceptions.

Milestone 5 Test Planning

Due on Sunday, April 7, 11:59 p.m.

The 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 midnight on the due date.

Test Plans	Create a document that describes how at least three features within your finished product will be tested. The test plans 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.
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Submission format: This project milestone 5 submission should be a PDF named ProjectMilestone5_<TeamName> included in your github repository containing the following components:

- Who: List of people on the team
- Title: of the project
- User Acceptance Tests: Copy of at least three UAT plans

Milestone 6 Project Presentations

Due during the Week: Friday, April 26 through Thursday, May 2

Each team will conduct a live presentation of their project in front of other students, TAs and the instructor. Presentations will be given during the Week 15/16 lecture time or during the Week 15/16 lab recitation times.

NOTE: There are NO classes or recitations on Friday, May 3, so students with recitation time on Friday will present on Friday, April 26 (or in lecture periods on Monday April 29 or Wednesday May 1.)

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 Milestone 6 (the presentation requirement of the project.)

Each team member must present some aspect of 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, pair programming, peer code reviews, other...)
- Expected tools
 - Project Tracker (Trello, Asana, or similar)
 - VCS repository (GitHub, GitLab or similar)
 - Database (MySQL, PostgreSQL or similar)
 - Testing tool (PyUnit or similar)
 - Auto-documenter (optional. Doxygen or similar)
 - Deployment environment (LocalHost, Heroku, Google, or similar)
- (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. This must be a live working demo. (We highly recommend practicing this demo beforehand.)

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 git repository by 10 pm on the day you present. This document should be a PDF version of your slides.

Milestone 7 Final Submission

Due on Wednesday, May 8, 11:59 p.m.

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 all relevant project documentation in a Git repository.

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, Asana, 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 git Repository (for your TA)

TAs will check to ensure the following are stored in your VCS repository:

- Source Code (throughout the semester)
 - Test Cases
 - 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 (i.e. "commits") throughout the semester from Git
 - Deployment: link to deployment environment or a written description of how the app was deployed and how one might access/run the app.
 - The app must be live, working, and accessible to your TA.

Be sure to

- 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 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 midnight on the due date.

Milestone 8 Peer Evaluation & Project Reflection

Due on Friday, May 3, 11:59 p.m. (last day of the semester.)

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 will be emailed to you during Week 15, and your submission will be due by Friday of Week 16. You will be instructed to use an online/electronic survey tool to present your peer evaluation.

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 outside job interviews where you can use the experience you gained through this project presented in an interesting and compelling story. 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?