CSC 648/848 Fall 2024
Milestone 1: Use cases, High Level Requirements, Architecture and Competitive Study

09-23-24

Announce: TBD
Due: check instructor's e-mail and CANVAS

Objective:

Based on the high level team project description document titled " CSC 648-848 High Level Description of student team project requirements Fall 24" (posted on Canvas class site) the objective of Milestone 1 (M1) is to start the design of your class team project using modern Agile SE processes and User Centered approach, and in doing that practice use of genAI tools. Specifically, your tasks and objectives in Milestone 1 include:

- Develop personas and high-level use cases;
- From use cases develop high-level functional requirements for the application (Do not prioritize yet)
- List high level architecture, frameworks and tools to be used (generally the same as in M0). If tools changed from M0 list them, but alsoinform Anthony and ask for approval/OK.
- Incorporate AS-IS (no changes allowed) non-functional specifications as defined in high level team project description "How to start…" posted in Canvas
- Understand your competition and develop competitive study summary wrt. to functions/features only (no need for business and market analysis)
- Practice and leverage genAI tools of your choice (ChatGPT, copilot etc.) as it makes sense for your team. Follow class adopted genAI (e.g. ChatGPT) policies. **Use of genAI tools for some tasks of your choosing is mandatory and must be reported as per instructions below (but it is not graded).**
- Learn how to write team reports and SE requirements documents such as Milestone 1 document (one report for the whole team, with participation of all team members)
- Solidify and confirm team roles
- Answer the progress checklist (provided below) – this is the task of team lead
- And last but not least: bring the team together on same objective and ideas about product being developed and implemented – and have them in writing

Note that these are only early and high-level requirements and specs with the idea to get early feedback and iterate before investing in developing more detailed specs and first prototype in Milestone 2. Your design (and implementation) can evolve and change with user feedback (it will be provided by instructors). Hence future designs can deviate from

Milestone 1 and Milestone 2 in the spirit of Agile SW design and development. (This is all as we teach in the class and consistent with Agile SW development best practices).

Initial input for your work is the team project high-level description in file titled " CSC 648-848 High Level Description of student team project requirements Fall 24" (posted on Canvas), class slides, as well as your SW and tool selection for M0. For use cases and functional specs, feel free to also use your own ideas, research similar applications that already exist, talk to your friends, and participate in class discussion (some of general issues related to M1 will be discussed in the class).

After the submission, you will get feedback on your Milestone 1 (from instructor) in all phases of the project and future milestones and you MUST take these into account (or ask questions if necessary).

This is the first **team** milestone. The whole student team submits **one** milestone document for each Milestone 1 – 5. Submission details and M1 document structure are below **and must be precisely followed and submitted on agreed upon deadline.**

You will discuss ongoing work on Milestone 1 during team sessions in each class (among yourselves and with instructors) and you can also send e-mail to instructors with questions.

Expected size of this document is about 10-15 pages, using font and spacing as in this document.

***** Please wrap up M0 before you start on M1 ******

Content and structure for Milestone 1 document for review:

In the document for Milestone 1 (M1) you must have ALL of the following subsections in exact order and titles as below (have a separate numbered section for each) in one PDF file. **Please read the instructions carefully and follow up on all requirements below in terms of what to submit as well as how to format/organize. Make subsection titles bold and format them adequately.**

M1 document format and structure MUST be as below

- **Title page** MUST include (nicely formatted)
  –"SW Engineering CSC648-848 Fall 2024"
  Project/application title and name (you can use the name you chose for your application)
  – Team number
  – Names of students (team lead first) with e-mail of team lead. Please mark those who are team lead, front end, back end leads and github master

  - "Milestone 1"
  - History table (it should in general contain two entries: date submitted and date revised after instructor comments)

- **The rest of the document** has to contain ALL sections as described below, formatted as enumerated separate chapters with titles as below in **bold**

Team leads and document editors: make sure document is well formatted, reads well, is complete, and looks professional. This will be part of your portfolio and will influence the grade. Make sure all team members read final version and give comments before submission and team lead performs final check.

1.**Executive Summary**: Short description of the final product/application and its key advantages, novelty, value (up to 1 page). Make it as an executive summary to be readable to broad and not just technical audience – think also of answering the question of why we should fund this project. We suggest you assign a name to your project for easier reference and good "marketing". This summary should be readable to a general manger/executive that is not a CS specialist and is used to explain and also to advertise/promote your project. Typical outline is: one paragraph on the motivation and importance of the application you are developing, followed by a paragraph on what functions and services your application will be providing and how it helps the users (high level only, no jargon). You also must say what is unique and custom for SFSU in your design. At the end say in one paragraph something about your team (e.g. about your student startup team…). (BTW ChatGPT may help here BUT be careful not to use meaningless fluff written in perfect English, a common error in blindly using ChatGPT or likes)

2.**Personae**: Summarize **key personas** (categories of users) for your application – their general characteristics, goals, skills, pain points related to the application you are developing. Use max 1/3 – ½ of a page per persona – see class notes. Provide one personae for each main category of users, 3-5 total.

3.**High-level Use cases:** Provide 4-5 main **use cases** (one paragraphs for each use case) - see and follow class notes on more detailed format. Focus only on main use cases. Simple text format for use cases is OK and preferable – tell us a story about who and how the application is used. Focus on WHAT users do, their skill level, not on HOW is the SW implemented.

NOTE: avoid specific on HOW functions will be done and text resembling user manual: this is supposed to guide the design of the future product and is NOT a description of how the product will work (you don't know that yet) – see class slides for details. Please assign a descriptive title and number to each use case so it can be tracked.

NOTE: As said before, you must think of some function(s) specific to SFSU that competition does not have. That function(s) **must be described** and covered in at least one use case.

Please number each use case and give it a title reflecting functions it covers and not the actor name.

4.**List of main data items and entities – data glossary/description**- Define main terms and entities in your envisioned system such as t*ypes of users* (in terms of permissions), data structures and "items" or "*entities*" *at high or logical (not implementation) level* (e.g. name, meaning, usage, and NOT the data format). Focus on key terms (main data elements/records used in your app, types of users and their privileges etc. These terms and their names *must be used consistently* from then on in all documents, user interface, in naming SE components and database elements etc. In later milestones you will add more implementation details for each item. This will help define planning and design for the DB and also define name space for classes, DB tables, methods, variables as well as UI elements.

Be sure to also cover entities that relate to your special SFSU custom functions (e.g. class number)

Please consult class slides on this to avoid unnecessary interactions and corrections.

5.**List high level functional requirements** – see class slides for format and style. This refers to high-level functions and services you plan to develop to the best of your knowledge at this point. Drive this by use cases – requirements have to satisfy/implement all use cases. Focus on WHAT and not HOW. Keep the user in mind.

Number each requirement with *unique numeric value* (use 1., 2., 3. Not a, b, c or Roman numerals) and use these numbers consistently from then on. For each functional requirement use 1-3 line description. At this stage do not prioritize the requirements, collect all ideas from the team. We are looking for about 20 or so requirements. The best way to present this is to group them in distinct groups by increasing level of user privileges, from unregistered users, to registered, to admin.

You also must provide at least one requirement that relates to your special and unique SFSU specific functions

6.**List of non-functional requirements** (performance, expected load, security requirements, storage, availability, fault tolerance…). Note that mandatory high level non-functional requirements are given in high level team project document " CSC

648-848 High Level Description of student team project requirements Fall 24" , so we request that you **simply copy them from high level document from Canvas and do not make any changes.** Please observe and adhere to these non-functional requirements in your design and development from now on – you are not allowed to change them unless you get permission (this is how it is done in industry). Please also do not add to this list, there are many reasons why not to do so and will be covered in the class.

7.**Competitive analysis (functions/features only, not business or marketing)**: Find 3-4 competitive products. Present competitors' features vs. your planned ones. First, create a table with key features of competitors vs. yours planed, only very high level, 5-6 entries max (as shown in the class slides). After the table, you must summarize in one paragraph what are the planned advantages or competitive relationship of your planned product to what is already available. In the table clearly mark your product, e.g. shade its column/data. Your SFSU specific functions must also be addressed in competitive analysis and shown in the list of compared functionality (This is how you get management attention and increase chances of project funding).

8.**High-level system architecture and technologies used:** Briefly provide itemized list (no graphics) as below. This list is generally the same as you got approved in M0. If you want it changed mention it in the text so Anthony will approve it as part of M1 review. Please use list format, no need to draw block diagrams.

- List all main SW components and versions (DB, WWW server)
- List deployment cloud servicer you plan to use
- List front end frameworks you will use
- List browsers you plan to support (chose 2 market leading browsers, last two versions from each)
- List any major additional external open source APIs you plan to use (e.g. Google analytics, Google map APIs, APIs/service for creating thumbnails – check Architecture class slides)

9.Use of GenAI tools like ChatGPT and copilot for Milestone 1

As we said, the use of genAI tools of your choice like ChatGPT or copilot i**s** **required**, but you will chose the tasks you plan to apply these tools for. Please consult class slides on GenAI and SE and also check the latest resources (the field moves rapidly). Team leads are also encouraged to talk to other team leads in the class and share their experiences and plans. Note that genAI tools are intended to also help in project planning and requirement analysis, so try it. We are all learning so this will NOT be graded but you must provide the description below (NOTE: This section refers to your use of GenAI specifically for Milestone 1):

- What genAI tool and version you used
- List tasks for which you used genAI tools and for each rate how useful it was, use LOW, MEDIUM, HIGH
- For each task above explain briefly how you used the tool and what benefit it offered.
- Provide some key examples and prompts
- Comment on anything else you found useful

Try to use 1-2 pages for this section. This section is NOT used for grading but for learning and class discussion. You must follow ChatGPT policies and academic honor policies re: plagiarism. It is also OK if you find the genAI not very helpful, just say so, this is part of the learning.

(Later, team leads will share their experience in using GenAI with the class – great way to learn!)

10.**Team and roles**: list student names and e-mails in the table format, mark their roles (team leader, front and back team lead and github master), team member front end, team member back end etc.

11.**Team Lead Checklist**: for each item below team lead must answer with only one of the following: **DONE/OK**; or **ON TRACK** (meaning it will be done on time, and no issues perceived); or **ISSUE** (you have some problems, and then define what is the problem with 1-3 lines)

- So far all team members are fully engaged and attending team sessions when required
- Team found a time slot to meet outside of the class
- Team ready and able to use the chosen back and front end frameworks and those who need to learn are working on learning and practicing
- Team reviewed class slides on requirements and use cases before drafting Milestone 1
- Team reviewed non-functional requirements from "How to start…" document and developed Milestone 1 consistently
- Team lead checked Milestone 1 document for quality, completeness, formatting and compliance with instructions before the submission

- Team lead ensured that all team members read the final M1 and agree/understand it before submission

- Team shared and discussed experience with genAI tools among themselves

- Github organized as discussed in class (e.g. master branch, development branch, folder for milestone documents etc.)

We strongly suggest the following collaborative approach for creation and completion of M1 document (NOTE: creating a team document is similar to creating a code by the team of programmers or writing a joint technical paper). Also, actual editing of document can be done in any tool team chooses like Google Docs, but final versions must be posted on team github.

- Team lead assigns M1 editor (often this can be done by the team lead). We recommend one person in a team gets charged as editor for all milestone documents
- Team lead/M1 editor assign individual chapters to team members
- Students work on their assigned chapters
- M1 editor collect chapters/assignments from each student, edits/corrects then integrates them into a well formatted document (with same font and formats)
- M1 editor posts final candidate full document on team repo so that all team members read full document again for one more review and any feedback before submission – do not forget this step – it is implant for checking as well as to make sure all team members understand the "big picture"
- M1 editor completes the final version as per feedback
- **Team lead must review final document before submission (as in real life)**
- Team lead submits M1 info for review as per submission instructions below. **Submission instructions (below) must be followed precisely and completely or grade penalty will be imposed**

Background reading:

- Milestone 1 (this) document
- Document we posted in Canvas Team section on high-level requirements of team application " " CSC 648-848 High Level Description of student team project requirements Fall 24"
- Class material on requirements and specs
- Class material on ChatGPT in SE
- If questions ask Prof. Petkovic via e-mail or in class

Submission for Milestone 1 (M1) document for review – you must follow the instructions below:

Each team must post Milestone 1 (M1) document on their team Github private repository (similar to managing code) in "Milestones" folder so all team members and instructors can access it. For actual editing and developing the document you can use other methods like Google doc but final version of M1 document (and other milestones documents) must be in github folder called "Milestones"

Each student team submits one Milestone 1 document in PDF format, as follows:

Team leads will send e-mail as below to Petkovic@sfsu.edu :

- **Submission e-mail subject line:** MUST be "CSC 648-848 Fall 2024 Milestone1 Team N" in the subject line (N is the team number 01, 02…).

- **e-mail body is** to contain brief courtesy text and direct link to actual Milestone 1 document PDF file (not the folder) stored in github Milestones folder . Do NOT send Milestone 1 document as attachment

    - **(Milestone 1 file name in Github folder** MUST be CSC648-848 Fall 2024 Milestone1 Team *N.PDF* (*N* is your team number) . We accept only PDF so we can send you feedback as yellow sticky notes)

Submission must be done by the deadline specified and by following submission rules above. Any deadline extension has to be asked for via e-mail to Petkovic@sfsu.edu at least 24 h ahead of the deadline.

Team leads: please CC yourself (and other team members) with submission e-mail – that is a good practice so you know what and when has been submitted AND it ensures your e-mail is not stuck somewhere (in which case you will not get CC e-mail…). **Excuses based on "my e-mail was sent on time but was stuck on the server" will NOT be accepted.**

Instructor's feedback and creating final Milestone document for Final Project delivery

Please do carefully review this document and class slides on relevant material as described before and submit a quality draft. Submitting a draft which is completely

inadequate and incorrect oir incomplete indicating class material and Moonstone 1 document were not consulted with sufficient care will be recoded as negative point for SE Process grade – it wastes instructor's and your time. This, in real life, would cause your boss to conclude that you do not pay attention to assigned tasks and that would not be good for your career (and rightfully so).

Upon submission of M1 you will get feedback from instructors by any of the following: e-mail, markings on your document and in class during team meetings. This feedback must be analyzed and taken into account by your team in order to revise your M1 and this must be used subsequently for the rest of the project. Instructors will comment from the standpoint of CEO, VP of Marketing (who translates customer and marketing requirements) and CTO (Architecture etc.). You may choose not to agree with the comments - this is OK as long as you justify this and are prepared to live with that design and deliver it. In some cases, instructors may insist on some features or decisions. **This feedback is not graded as long as you follow up on it.**

Upon getting instructors' feedback on your questions and submitted document, and after analyzing it, you need to revise your first draft, freeze it (meaning no more changes on this document ever even if future design changes) and use it as a basis for developing Milestone 2 (M2). Store it in "Milestones" folder of github. This frozen document M1 (after you edited in all changes from the instructor feedback) will be submitted as part of final project delivery in Milestone 5 in the last class. Please enter the revision date in summary history table on title page.

Do not start working on M2 before you get feedback on M1 and make sure all team members read frozen M1 document.

Evaluation and grading

In order to encourage iterations and dealing with feedback, we will not grade the first submitted version. We will only grade milestone document after it has been modified wrt. instructors' feedback (see above) and when it is submitted with final project at the end of the class in "Milestone 5 folder" – it will be part of team's *SE Process* grade.

Exceptions to this "non-grading" method are below, and will result in recording of negative points which will be applied to final team *SE Process* grade:

- Milestones improperly submitted (e.g. not following ALL required submission rules). They will also be returned for re-submission
- Milestone documents do not have all required sections
- Milestones submitted late in case delay was not asked for by e-mail from team lead to petkovic@sfsu.edu at least 24 h before the deadline

- Milestone document of such poor quality (beyond simple design and English language issues) indicating that team has not consulted class slides and milestone instructions