CSCI3100: Software Engineering

Assignment 1

January 23, 2025

`Due date: 7 Feb 2025 Total marks: 80`

1 Questions

1. Which software development model best responds to changes in requirements? [1 pt]
    1. Waterfall model
    2. Agile models
    3. All of the above
    4. None of the above
2. In which software development model are activities carried out sequentially rather than iteratively? [1 pt]
    1. Waterfall model
    2. Agile models
    3. All of the above
    4. None of the above
3. Which model is the best model to use in all situations?
    1. None
    2. Adaptive since it has most advantages
    3. Waterfall
4. Select three limitations of the Waterfall model. [1 pt]
    1. Misinterpretations of requirements or design can go undetected until later phases
    2. Responding to changes in requirements is challenging
    3. Integration issues may not be identified until the final phase
    4. It is unsuitable for large projects

5. Which statement accurately describes the requirement specification process? [2 pt]

    1. Requirement specification identifies and defines the problem to be solved
    2. Requirement specification involves resolving the requirements
    3. Requirement specification focuses on designing a solution to the problem
    4. Requirement specification identifies the problem and outlines potential solutions

6. Select three reasons why specifying requirements is challenging. [1 pt]

    1. There are no established guidelines for writing a software requirement specification document
    2. Software is intangible, making it difficult to understand and communicate
    3. Terminology can be interpreted in various ways, depending on the individual or context
    4. Clients or end users may lack clarity about their needs

7. Which statements about requirements and specifications are true? (Choose all that apply) [3 pt]

    1. Requirements and specification are the same word-by-word
    2. Specifications must fulfil the requirements
    3. Requirements are intended for users; specifications are meant for developers
    4. Requirements should be articulated in the user's language; system specifications should be in technical language

8. The following are the requirements and specifications for an online game website. Which of the following can be classified as user requirements? Select two. [2 pt]

    1. Users should be able to check the current status (HP, MP, AP, etc.) of their characters
    2. When users check their status, a connection will be established with the central database to retrieve the information
    3. The connection between the user's client and the central database must be secured by asymmetric encryption
    4. Users should be able to purchase game props from in-game shops

9. Which of the following can be regarded as non-functional requirements? Select all that apply. [2 pt]

    1. System design constraints
    2. Security, performance, and usability and other constraints about software quality
    3. The intended inputs and outputs, such as the operands and result of calculating the sum of two integers

10. A constraint to use only GitHub for the course project is a non-functional requirement. [1 pt]

    1. True

2. False

11. Which of the following are considered non-functional requirements? [3 pt]

    1. Product requirements, such as the use of a specific encryption protocol
    2. Company-imposed organizational requirements, such as a specific coding style
    3. External requirements from outside organizations, such as adherence to a specific development process
    4. All of the above

12. An online banking system, comprising the client interface and the engine for processing client requests, is best modelled by:

    1. Pipe-and-Filter Model
    2. Blackboard Model
    3. Client-Server Model
    4. Event-based Model

13. When designing software architecture, which of the following factors should we consider? Select all that apply. [3 pt]

    1. Performance
    2. Reliability
    3. Testability
    4. Security
    5. Usability

14. Which of the following models is best suited for a system that contains several subsets of functionality used in multiple areas, and that the subsets of functionality can be chained together? [2 pt]

    1. Client-Server
    2. Blackboard
    3. Event-Based
    4. Pipe-and-Filter
    5. Layered

15. Which of the following models is best suited for a system that benefits from separating complexity and processing between local tasks and those that should be handled by a shared remote service? [2 pt]

    1. Pipe-and-filter
    2. Event-based
    3. Client-server
    4. Blackboard
    5. Layered

16. This application, Merlin (https://merlin.allaboutbirds.org/), enables users to identify birds they encounter by utilizing image and sound recognition technologies.

1. Imagine you were the user and also the software developer, conduct an interview with yourself, and list the requirements and specification of the application as complete as possible. Write in an informal style; there is no need to follow the IEEE standard or whatsoever SRS document format. 2 point will be given to one reasonable requirement, and 2 point will be given to one reasonable specification. [16 pt]
2. Suggest a reasonable high-level architecture for this application. Explain your decisions. Diagrams are useful for explanations. [10 pt]

The questions below are based on `git` and the following GitHub repository:

Assignment 1 (https://github.com/tklam/assignment_1_repo)

17. What is the log message of the commit `3a5832d`? [2 pt]
18. What are the differences between the commits `25fcc83` and `3a5832d`

    1. File(s) changed? [2 pt]
    2. Files(s) added? [1 pt]
    3. For each of the file(s) changed, state the line numbers changed with respect to the commit `25fcc83`. [2 pt]

19. How many branches are there in the repo? [1 pt]
20. Work on the branch `doc/author_list`.

    1. Obtain the SHA256 hash of your student ID. For example, if your student ID is `1234567890`, the corresponding SHA256 hash value is:

       `c775e7b757ede630cd0aa1113bd102661ab38829ca52a6422ab782862f268646`

       The hash value can be computed with the following command:

       ```
       echo -n "1234567890" | sha256sum
       ```

       You can also compute the value online: https://emn178.github.io/online-tools/sha256.html

    2. Create a file called "my_secret.txt" containing only the SHA256 hash of your student ID. For example, if your student ID is 1234567890, the file content of "my_secret.txt" is exactly:

       `c775e7b757ede630cd0aa1113bd102661ab38829ca52a6422ab782862f268646`

    3. Add "my_secret.txt" to the repository. Adding the file only marks it "to be committed".
    4. Commit the changes with a concise and meaningful log message.

    What is the commit ID of the latest commit on this branch? [5 pt]

21. Work on the branch `main`

    1. Merge with the branch `feature/add_secrets`. Use the default commit log message.

2. Merge with the branch `doc/author_list`. There is one merge conflict in one file. Resolve the conflict with the following policy: Keep the content of both branches. The content of `feature/add_secrets` should come first (on the first line), followed by the content of `doc/author_list`. Use the default commit log message.

What is the commit ID the latest commit on this branch? [5 pt]

22. Draw the graph of commits made thus far (the whole source control history). You can provide a screenshot of the graph obtained from any git client or IDE. [5 pt]
23. What should be done to a merged branch that is not needed any more? [2 pt]
24. So far, you have been working in your local repository. Now, let's try to work with the remote repository.

    1. Made a "pull request" for the branch `main` to the remote repository Assignment 1 (https://github.com/tklam/assignment_1_repo). This requests the administrator of the remote repository to review your changes on the branch `main` and incorporate them if deemed appropriate. [5 pt]

2 Submission

1. What to submit:
    1. Your answers written in a Word or PDF document
    2. The Veriguide receipt of the document
2. Pack everything in a zip file named ".zip". E.g. if your student ID is `1234567890`, name the zip file as `1234567890.zip`
3. Submit the zip file to Blackboard