Name_____

CPSC:480 Software Engineering Midterm

Do not open exam until instructed to do so!

Each question in section 1 is worth 2 points.

Each question in section 2 is 10 pts (2/item).

Each question in section 3 is 10 pts

One sentence per description is adequate.

100 points total.

Section 1 – Short answer

1. Explain the difference between a git branch and a git fork.

2. Give an example of a non-functional requirement for an IDE application.

3. Explain the difference between perfective and preventive maintenance.

4. Describe one of Lehman's Laws of Software Evolution.

5. Explain the difference between cohesion and coupling of software modules.

6. Describe a feature of the von Neumann model.

7. Describe one function of project management software.

8. Describe a way SWEs work with other areas of a business, **besides marketing.**

9. Describe a reason a software engineer might need to use a virtual machine.

10. Describe one benefit of formal specification and verification.

Section 2 – Software development process

11. Draw the standard waterfall model of software development with 5 phases.

12. Describe the five steps of software requirements engineering besides software requirements *specification*.

13. Describe the five major types of software design.

14. Define the following terms: "Agile process", "Traceability", "DevOps", "Software", "Model-checking"

Section 3 – Modeling and Design

In this section, use the following description and requirements of a software system:

A library uses an archaic catalog system to track the books they have. The catalog contains an alphabetical list of authors, and for each author, a list of titles by that author with information about that title and where customers can find it. This system makes it hard for customers to find what they want and difficult for the library to update their catalog. The librarian believes they can use software to improve this experience, but due to budget constraints, they can only provide a donated arcade machine for customers to access the software.

Their arcade machine has three buttons, and members can swipe their library card to access the machine. Users can select an author from a list, then select a title from that author and see information about that book as well as a preview of the contents. However, the library has two restrictions on access – some titles are marked "18+" vs "all ages", and some titles are "subscription only" vs "all members" - and customers can only select titles if their library card authorizes access to the applicable categories. Finally, the library would like to record, for each user, what books they've looked at, and maintain an overall list of the most viewed books.

All customer interactions with the software must occur through the three buttons "A", "B", and "C", and the contents to display for a selected title include one page of information and the first three pages of the title as a preview. The functional requirements for this software are as follows:

1. As a customer, I want to view a list of available authors, select one, view a list of their available titles, select one, and view the info and preview for the title.
2. As a customer, I want to be able to turn pages forward and back in the preview and be able to close it and return to the menu at any time.
3. As a librarian, I want to ensure that paid subscription material is only accessible to customers with a paid subscription, and that material marked 18+ is not accessible to customers under 18.
4. As a librarian, I want to maintain a list of all titles a customer has viewed in order to provide customer assistance.
5. As a librarian, I want to maintain a list of the most-viewed titles to provide customer recommendations.

15. Develop a class model for this system.

16. Develop a possible behavioral model, depicted as a state diagram.

17a. Develop a scenario model for req #1, depicted as a swimlane diagram.

17b. Develop a list of tasks for implementation of requirement #1.

18. Describe how you could decompose this system into at least two distinct modules. Briefly explain what object types you would have in each module and how they would interact.

Extra Credit

Your teammate forked a branch "test" after commit 07a45e0 and merged it back to "main". However, in this branch "config.txt" was accidentally changed to contain invalid content. Write a sequence of git commands to restore the version of config.txt from before the branch, but keep all other changes from test branch.

Grading

Question	Points	Grade
1. Git	02	
2. Non-Functional Reqs	02	
3. Maintenance	02	
4. Lehman's Laws	02	
5. Separation of Concerns	02	
6. Von Neumann Model	02	
7. PM Software	02	
8. Teams	02	
9. Virtual Machines	02	
10. Formal Methods	02	
11. Phases	10	
12. Requirements	10	
13. Design Types	10	
14. Definitions	10	
15. Class Model	10	
16. Behavioral Model	10	
17a. Scenario Model	05	
17b. Tasks	05	
18. Design	10	
Extra Credit	05	
Total	100	