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| **FINAL EXAMINATION** | |
| Course: **Software Engineering** | |
| Time: **100** minutes | Term: **1** – Academic year: **2021-2022** |
| Total Points: **400**  Lecturer(s): **Vu V. Nguyen** | |
| Student name: | Student ID: |

**MUST READ**

**This is the final exam taken at home via Zoom. You have to login to Zoom to take attendance; turn on camera taking your face and keep it open during the exam.**

**Tôi cam kết không trao đổi, không chia sẻ bài làm của mình với bất kỳ ai trong suốt thời gian làm bài. Nếu bài làm của tôi có những đoạn, những câu giống bài khác, hoặc nguồn khác như trên Internet (ngoại trừ ghi chú từ lớp học) tôi sẽ bị 0 điểm bài thi.**

**I commit not discussing and not sharing my work with anyone during the exam. If I do so or my work has passages and sentences similar to others’ or other sources on the Internet (excluding notes from the class), I will receive 0.0 for the whole exam.**

**I confirm the statement above:**

🞎 I confirm (using 🗹 to confirm)

🞎 I do not confirm (I will receive 0.0 for the whole exam)

**Write your answer immediately after each question.**

1. (60 points) List and describe all artifacts your team has written during the project. In the description, you need to provide the purpose and which roles were responsible for each artifact.

(write your answer here)

1. (30 points) Explain why Waterfall model can be more effective than Scrum if the project’s requirements are stable during the project.
2. (30 points) Explain why Scrum is more effective than RUP if the project’s requirements change rapidly during the project?
3. (30 points) What is the difference between high-level design and low-level design? Give one example output of each.
4. (50 points) Moodle is a Learning Management System (LMS) that provides capabilities for students, instructors, and administrators to manage courses. Suppose that you are responsible for developing a similar but much simpler Web app that allows instructors to post materials (lecture notes, templates, etc.) and assignments and students to view materials and submit assignments. Write **5** functional requirements and **5** non-functional requirements for this application. Make sure you write enough detail for these requirements. The non-functional requirements have to be verifiable.
5. (50 points) Draw a use-case diagram using UML for the project described in Question #5. The diagram has at least **5** use-cases and **3** actors.
6. (30 points) Provide **reasonable** estimates of effort, cost, and staff to develop the project described in Question #5. Assume that this project is expected to complete within 6 months. Hint: ‘reasonable’ here means that you can make any assumptions to come up with the estimates reasonably.
7. (60 points) Architecture question:

* Which of the following architectures (1) and (2) is easier to maintain? Explain.
* Which one is more tightly coupled?
* Propose a software architecture for the application described in Question #5. You need to explain how this architecture works.

A

B

C

A

B

C

1. (2)

1. (60 points) Software V&V:

* Why do software projects need to do regression testing? Show that regression testing is very time-consuming when the project has many iterations.
* Show that doing V&V early is a good approach (e.g., doing requirements review, code review, and testing early is a good approach).

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