****

**GARISSA UNIVERSITY**

**UNIVERSITY EXAMINATION 2019/2020 ACADEMIC YEAR THREE**

**SECOND SEMESTER EXAMINATION**

**SCHOOL OF PURE AND APPLIED SCIENCES**

**FOR THE DEGREE OF BACHELOR OF INFORMATION SCIENCE**

**COURSE CODE: COM 321**

**COURSE TITLE: SOFTWARE DEVELOPMENT**

**EXAMINATION DURATION: 2 HOURS**

**DATE: 16/11/2020 TIME: 3.00-5.00 PM**

**INSTRUCTION TO CANDIDATES**

* **The examination has FIVE (5) questions**
* **Question ONE (1) is COMPULSORY**
* **Choose any other TWO (2) questions from the remaining FOUR (4) questions**
* **Use sketch diagrams to illustrate your answer whenever necessary**
* **Do not carry mobile phones or any other written materials in examination room**
* **Do not write on this paper**

**This paper consists of THREE (3) printed pages *please turn over***

**QUESTION ONE (COMPULSORY)**

1. Explain the following terms
   1. Software development **[2 marks]**
   2. API development **[2 marks]**
   3. Capability Maturity Model Integration (CMMI **[2 marks]**
2. Explain four principles of agile development **[4 marks]**
3. Explain the following UML design tools
   1. Use case **[3 marks]**
   2. Class diagram **[3 marks]**
4. Explain software layered architecture. What is client server architecture **[5 marks]**
5. Explain software development risks. What are the categories and how to manage them [5 marks]
6. Explain four reasons why software development projects fail [4 marks]

**Question 2**

*Pair programming is an agile software development technique in which two programmers work together at one work station. One types in code while the other reviews each line of code as it is typed in. The person typing is called the driver. The person reviewing the code is called the observer. The two programmers switch roles frequently (possibly every 30 minutes or less).* Suppose that you are asked to build a system that allows *Remote Pair Programming*. That is, thesystem should allow the driver and the observer to be in remote locations, but both can view a singledesktop in real-time. The driver should be able to edit code and the observer should be able to “point”to objects on the driver’s desktop. In addition, there should be a video chat facility to allow theprogrammers to communicate. The system should allow the programmers to easily swap roles andrecord rationale in the form of video chats. In addition, the driver should be able to issue the systemto backup old work.

1. Draw a use case diagram to show all the functionality of the system. [6 marks]
2. Describe in detail four non-functional requirements for the system. [4 marks]
3. Describe a software architecture that would be suitable for the system. [6 marks]
4. Identify two design patterns that would be suitable for the system. Briefly explain your answer. [4 marks]

**Question four**

1. Compaire between tradional models and advanced model in software development [8 marks]
2. Assume that you are a project manager of three projects with the following characteristics:

Project 1. A complex real-time system whose requirements can be relatively easily identified and are stable.

Project 2. A web-site for a local library. Requirements are vague and are likely to change in the future.

Project 3. An order processing system with a web-site for a local business. Requirements are vague but stable (i.e. unlikely to change in the near future).

Which models would you choose for each of your projects? Your choices should be properly justified. [12 marks]

**Question five**

In your recent trip to Mombasa using “Madaraka Express” train, you realized there was need for the train management to provide an online booking system. As a software development expert,

* 1. develop system requirements specification document . [7 marks]
  2. Identifying four risks that are likely to occur in the said project and discuss the process you would take to manage the risks in the course of development [7 marks]
  3. Explain why you can adopt combination of plan-based and agile methodologies [6 marks]