

Ain Shams University

Faculty of Computer and Information Sciences

Subject: Software Engineering

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Final-Term Exam

Question 1[20 Marks]

Choose the item that you consider makes the best response to each question:

- 1) The four major activities of the spiral model for software engineering are
 - a. Planning, Risk Analysis, Engineering, Customer Evaluation
 - b. Defining, Prototyping, Testing, Delivery
 - c. Requirements
 - d. Quick Design, Build Prototype, Evaluate Prototype, Refine Prototype
 - e. e. All of These
- 2) Factors to consider when planning a software development effort are
 - a. Performance, Problem , Product, Planning
 - b. People, Problem, Product, Process
 - c. People, Problem, Productivity, Performance
 - d. People, Problem, Product, Portability
 - e. Productivity, Programming, Performance, Pay-Off
- 3) Which of the following could be a deliverable for a software system
 - a. Source Code
 - b. Reference Manual
 - c. Requirements Document
 - d. User's Guide
 - e. All of These
- 4) Symptoms of the software crisis would include
 - a. software delivered behind schedule
 - b. software exceeding cost estimate
 - c. unreliable
 - d. difficult to maintain
 - e. All of These.
- 5) Requirements analysis demands we investigate
 - a. System performance , Test Scheduling, Organizational Structure
 - b. Languages , Platforms, Competition
 - c. System Context , User Populations, User Tasks,
 - d. Verification, Formal Methods, Accuracy
 - e. None of These.
- 6) Which of the following **is not** descriptive of planning?
 - a. Planning is used to find credible ways to produce results with limited resources and limited schedule flexibility.

- b. Planning is finding new personnel resources to support labour intensive development.
 - c. Planning is identifying and accommodating the unforeseen.
 - d. Planning is blending the efforts of many people to produce a product that satisfies the customer's need
 - e. Planning is negotiating compromises in completion dates and resource allocation.
- 7) The architecture components for product engineering are
- a. data, hardware, software, people
 - b. data, documentation, hardware, software
 - c. data, hardware, software, procedures
 - d. documentation, hardware, people, procedures
- 8) Requirements engineering is a generic process that does not vary from one software project to another.
- a. True
 - b. False
- 9) During project inception the intent of the of the tasks are to determine
- a. basic problem understanding
 - b. nature of the solution needed
 - c. people who want a solution
 - d. none of the above
 - e. a, b and c
- 10) The job of the requirements engineer is to categorize all stakeholder information in a way that allows decision makers to choose an internally consistent set of requirements
- a. True
 - b. False

Question2 [15 Marks]

This scenario represents a flights system where each city has at least an airport. Airlines operate flights from and to various airports. A flight has a list of passengers who have booked for this flight, each passenger assigned a seat. Also a flight uses one of the planes owned by the operating airline. Finally a flight is run by a pilot and a co-pilot. For the previous scenario do the following:

- A. Draw a *Sequence* diagram for the following processes:
- 1. "Define a new city" process (i.e.: you should consider no two cities have the same name). **[5 Marks]**
 - 2. "Book a Flight" process (i.e.: you should consider no two booking have the same reference). **[5 Marks]**
- B. Draw a *Use Case* diagram if you know that the passenger book a flight by the travel agent. **[5 Marks]**

Question3 [15 Marks]

Draw the *state diagram* for a telephone line. At star of the call, the telephone line is *idle*. When the phone is removed from the hook, it emits a *dial tone* and can accept the dialing of digits. When a valid number is dialed, the phone tries to *connect to the destination*. If the dialed number is *busy* the *connection fails*. On the other hand if connection succeeds, the *dialed phone rings*. *As soon* the phone is answered, the *conversation begins*. If not, the phone rings until it *disconnects*. If an invalid number

is dialed, a *recorded message* is played. At any time if the phone is hung up, it returns to be *idle*.

Question 4[15 Marks]

You are responsible for the software development of a biometric finger print door lock system. The door lock system has three major components at the system architecture level; the embedded door lock system in close proximity to a door, a network, and a server component that provides an identification database and system service functions, see Figure 1. The door lock system can be decomposed into a lock mechanism containing two sensors and an activator, a biometric finger print reader, and an embedded computer system.

The Suggested Scenario:

When a user presses the finger tip on the embedded finger print reader, the reader generates an interrupt to the embedded computer. The computer checks if the user is known and if it has access to the lock in question using information about users stored in the database. Upon successful access to the lock, the main computer unlocks it, otherwise not.

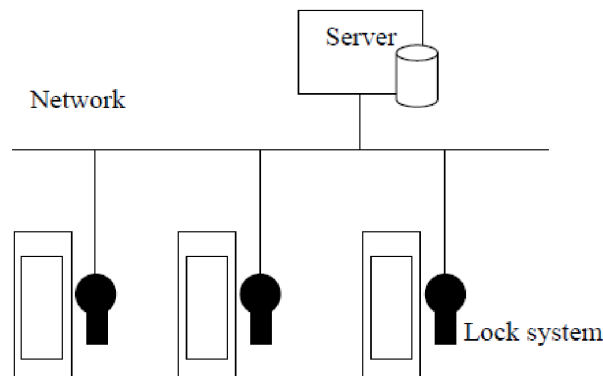


Figure 1. The system architecture

- A. Write five *functional requirement* for the previous scenario with its expected input and output **[5 Marks]**
- B. Draw a *class diagram* for the previous scenario
- C.
- D. + **[10 Marks]**