


Course No: SWE5441  
Course Title: Soft. Modeling  
Date: 18/05/2014  
No. of Questions: (04)  
Time: 2hours  
Using Calculator (Yes)

University of Palestine  
  
Final. Exam  
2013/2014  
Total Grade: 50 Marks


Instructor Name: Dr. Ibrahim Tabash  
Student No.: \_\_\_\_\_  
Student Name: \_\_\_\_\_  
College Name: \_\_\_\_\_  
Dep. / Specialist: \_\_\_\_\_  
Using Dictionary (No)

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**Q1) Choose the correct answer**

1. What is the goal of software validation?
  - (a) Building the system
  - (b) Building the right system
  - (c) Building the system right
  - (d) Testing the system
  
2. What is the goal of software verification?
  - (a) Building the system
  - (b) Building the right system
  - (c) Building the system right
  - (d) Testing the system
  
3. What is “white box” testing?
  - (a) Unit testing
  - (b) Integration testing
  - (c) Testing with knowledge of the system internals
  - (d) Testing without knowledge of the software internals
  
4. What is “black box” testing?
  - (a) System testing
  - (b) Integration testing
  - (c) Testing with knowledge of the system internals
  - (d) Testing without knowledge of the software internals
  
5. Which of the following are object oriented concepts?
  - (a) Modules and interfaces
  - (b) Modules and information hiding
  - (c) Classes, information hiding, and inheritance
  - (d) Concurrency and information hiding
  
6. Which of the following is a characteristic of an object?
  - (a) A function or subroutine
  - (b) A module

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- (c) Groups data and procedures that operate on the data  
(d) Groups a function and an algorithm
7. What is an operation (also known as method) of a class?
- (a) Specification and the implementation of a function performed by a class  
(b) Specification and the implementation of a subroutine provided by a class  
(c) Specification and the implementation of a function or procedure provided by a class  
(d) Specification and the implementation of an interface provided by a class
8. What is the signature of an operation?
- (a) The operation's name  
(b) The operation's function or subroutine  
(c) The operation's name, parameters, and return value  
(d) The object's interface
9. What is information hiding in software design?
- (a) Hiding information so that it cannot be found  
(b) Hiding a design decision that is considered likely to change  
(c) Hiding information to make it secure  
(d) Encapsulating data in a class
10. What is data abstraction?
- (a) Another name for information hiding  
(b) Encapsulating data so that its structure is hidden  
(c) Storing data in a database  
(d) Storing data in a data structure
11. What is inheritance?
- (a) A mechanism for inheriting characteristics from a parent  
(b) A mechanism for sharing and reusing code between classes  
(c) A mechanism for sharing data between classes  
(d) A mechanism for hiding information between classes

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Q2) List and briefly explain the software quality attributes?

Q3) Suppose you have studied the software requirements document for an Automated Teller Machine (ATM) software system. Answer the following questions:

1. Suppose we enabled a user of our ATM system to transfer money between two bank accounts. Draw the use case diagram for the ATM system.
2. Draw the activity diagram for a `Withdrawal` transaction.
3. Draw the classes in the ATM system with attributes and operations
4. Draw the sequence diagram that models a `Deposit` executing.

Q4) The Automated Guided Vehicle (AGV) is a real time system. Taken in conjunction with the other systems with which it interfaces, the Supervisory System and the Display System, it is also an example of a distributed system of systems. The Supervisory System and the Display System are existing systems to which the AGV System must interface.

**PROBLEM DESCRIPTION for AGV**

An AGV System has the following characteristics:

A computer-based AGV can move along a track in the factory in a clockwise direction, and start and stop at factory stations.

The AGV has the following characteristics:

1. A motor, which is commanded to Start Moving and Stop Moving. The motor sends Started and Stopped responses.
2. An arrival sensor to detect when the AGV has arrived at a station, e.g., arrived at station x. If this is the destination station, the AGV should stop. If it is not the destination station, the AGV should continue moving past the station.
3. A robot arm for loading and unloading a part onto and off of the AGV.

The AGV system receives Move commands from an external Supervisory System. It sends vehicle Acknowledgements (Acks) to the Supervisory System indicating that it has started moving, passed a station, or stopped at a station. The AGV system also sends vehicle status to an external Display

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System every 30 seconds. It is given that the arrival sensor is an event-driven input device and that the motor and arm are passive I/O devices. It is also given that the AGV system communicates with the Supervisory System and Display System by means of messages.

**Answer the following questions:**

1. Draw and write the Event and Action sequence numbering on Vehicle Control Statechart.
2. Draw the communication diagram for the send Vehicle Status use case
3. Draw integrated communication diagram for AGV