Subject: Software Engineering

Dated: November 23, 2021.

Question #1:

Select the right answer.

1. The waterfall model of software development is:
   a. A reasonable approach when requirements are well defined.
   b. A good approach when a working program is required quickly.
   c. The best approach to use for projects with large development teams
   d. An old fashioned model that is rarely used any more
2. The spiral model of software development
   a. Ends with the delivery of software product
   b. Is more chaotic (confusing) than incremental model
   c. Includes project risks evaluation during each iteration
   d. Use automated tools for development
3. Complete Software is defined as ___
   a. Instructions
   b. Data structures
   c. Documentations
   d. All of above
4. Which of the following cannot be applied with software according to software engineering layers?
   a. Process
   b. Tools
   c. Manufacturing
   d. None of the above
5. The best way to maintain changes during software development is
   a. Documentation
   b. Project planning
   c. Team making
   d. Best team leader
6. The software is complex to maintain because
   a. Its spare parts are available easily
   b. We cannot maintain software
   c. Its spare parts does not exist like that of hardware
   d. Software is easy to maintain
7. Main aim of software engineering is to develop
   a. Reliable software
   b. Cost effective software
   c. Both a and b
   d. None of the above
8. In “software Engineering: A layered Technology”, which layer acts as a “Glue Layer”?
   a. A quality focus

b. Method
c. Tools
d. Process

9. The smallest data structure is
   a. Stack
   b. Variable
   c. Tree
   d. Array
10. Technical documentation contains ____ things. (also write mention their names with correct option)
    a. 3
    b. 4
    c. 6
    d. 5
11. Failure rate in initial stages of development of software and hardware is
    a. Low
    b. High
    c. Moderate
    d. None
12. The modification of the software to match changes in the ever changing environment, falls under which category of software maintenance?
    a. Correction
    b. Adaptation
    c. Enhancement
    d. Prevention
13. What is the first step in the software development lifecycle?
    a. System Design
    b. Coding
    c. System testing
    d. Preliminary Investigation and Analysis
14. What is the major drawback of the Spiral Model?
    a. Higher amount of risk analysis
    b. Doesn't work well for smaller projects
    c. Additional functionalities are added later on
    d. Strong approval and documentation control
15. Model selection is based on _____.
    a. Requirements
    b. Development team & users
    c. Project type & associated risk
    d. All of the above

16. Which of the following models doesn't necessitate defining requirements at the earliest in the lifecycle?
    a. RAD & Waterfall
    b. Prototyping & Waterfall
    c. Spiral & Prototyping
    d. Spiral & RAD
17. Software maintenance costs are expensive in contrast to software development.
    a. True
    b. False
18. Things we see in architecture:
    a. Planning of project
    b. Decision making
    c. Arrangement of data
    d. Both b and c
19. How many phases of designing:
    a. 5
    b. 6
    c. 4
    d. 3
20. The requirements given by customer are:
    a. Functional
    b. Non-functional
    c. Both
    d. None

Question #2:

Consider a university database for the scheduling of classrooms for -final exams. This database could be modeled as the single entity set exam, with attributes course-name, section number, room-number, and time. Alternatively, one or more additional entity sets could be defined, along with relationship sets to replace some of the attributes of the exam entity set, as

- Course with attributes name, department, and c-number

- Section with attributes s-number and enrollment, and dependent as a weak entity set on course

- Room with attributes r-number, capacity, and building.

Show an E-R diagram illustrating the use of all three additional entity sets listed.

Question #3:

Clients wishing to put their property on the market visit the estate agent, who will take details of their house, flat or bungalow and enter them on a card which is filed according to the area, price range and

type of property. Potential buyers complete a similar type of card which is filed by buyer name in an A4 binder. Weekly, the estate agent matches the potential buyer's requirements with the available properties and sends them the details of selected properties. When a sale is completed, the buyer confirms that the contracts have been exchanged, client details are removed from the property file, and an invoice is sent to the client. The client receives the top copy of a three part set, with the other two copies being filed. On receipt of the payment the invoice copies are stamped and archived. Invoices are checked on a monthly basis and for those accounts not settled within two months a reminder (the third copy of the invoice) is sent to the client.

Create an ERD and DFD (level 0 and 1) for this Estate Agency case study.

Question #4:

Video-Rental LTD is a small video rental store. The store lends videos to customers for a fee, and purchases its videos from a local supplier. A customer wishing to borrow a video provides the empty box of the video they desire, their membership card, and payment – payment is always with the credit card used to open the customer account. The customer then returns the video to the store after watching it. If a loaned video is overdue by a day the customer's credit card is charged, and a reminder letter is sent to them. Each day after that a further chard is made, and each week a reminder letter is sent. This continues until either the customer returns the video, or the charges are equal to the cost of replacing the video. New customers fill out a form with their personal details and credit card details, and the counter staff give the new customer a membership card. Each new customer's form is added to the customer file. The local video supplier sends a list of available titles to Video-Rental LTD, who decide whether to send them an order and payment. If an order is sent then the supplier sends the requested videos to the store. For each new video a new stock form is completed and placed in the stock file.

Create a DFD (level 0 and 1) for this Video Rental LTD case study.

Question #5:

You have been appointed a project manager for an organization. You are asked to build a software that can take home addresses and contact numbers of the employees of that organization and sort them all alphabetically. The CEO has made a team including you, to develop that software. One of the team members who is professional coder, met a severe accident and is unable to come to job.

What software process model(s) would you choose and why? Explain in detail.

Question #6:

You are appointed as a project manager to develop a complex gaming software. The game is very famous already and has few versions already existing in market. Now the company wants to launch an updated version in almost 2 months. The requirements are precisely documented. What software process model(s) would you choose and why? Explain in detail.

Question #1: MCQs from Pre-Mid.

Select the right answer.

21. The waterfall model of software development is:
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    f. Data structures
    g. Documentations
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24. Which of the following cannot be applied with software according to software engineering layers?
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    f. Tools
    g. Manufacturing
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25. The best way to maintain changes during software development is
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28. In "software Engineering: A layered Technology", which layer acts as a "Glue Layer"?
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    f. Method
    g. Tools
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29. The smallest data structure is

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f. Variable
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36. Which of the following models doesn't necessitate defining requirements at the earliest in the lifecycle?
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    f. Prototyping & Waterfall
    g. Spiral & Prototyping
    h. Spiral & RAD

37. Software maintenance costs are expensive in contrast to software development.
    c. True
    d. False
38. Things we see in architecture:
    e. Planning of project
    f. Decision making
    g. Arrangement of data
    h. Both b and c
39. How many phases of designing:
    e. 5
    f. 6
    g. 4
    h. 3
40. The requirements given by customer are:
    e. Functional
    f. Non-functional
    g. Both
    h. None

Question #2: MCQs from Post-Mid.

Select the right answer.

1. Mini-specification is maintained of:
    a. The first level of DFD
    b. Context level of DFD
    c. The level which is further divisible
    d. The level which is not further divisible
2. Mini-Specification is used to develop ____ in design phase.
    a. Final Logic
    b. Entities
    c. Functions
    d. Data members
3. Occurrence that causes system to exhibit some predictable form of behavior.
    a. State
    b. State Transition
    c. Event
    d. Action
4. State Transition is shown by a
    a. Rectangle
    b. Line
    c. Box
    d. Arrowhead
5. The documentation of STD is known as:
    a. Process Specification
    b. Control Specification

    c. Mini-Specification
    d. Data Dictionary
6. Abstraction means
    a. High level view
    b. Details of all levels
    c. Proper interface
    d. Breaking larger code into small parts
7. Modular design is shown to improve the design process by allowing
    a. Better re-usability
    b. Workload handling
    c. Easier debugging
    d. All of the above
8. Control Hierarchy is also known as
    a. Modular Program
    b. Structural Program
    c. Program Structure
    d. Modular Hierarchy
9. The measure of the number of modules that are directly controlled by another module.
    a. Subordinate
    b. Fan in
    c. Fan out
    d. Depth
10. Direct relationship between modules and constraints applied on business logic
    a. Visibility
    b. Abstraction
    c. Refinement
    d. Connectivity
11. Information Hiding is a type of Encapsulation.
    a. True
    b. False
12. Degree to which one module is connected to another.
    a. Functional Independence
    b. Coupling
    c. Cohesion
    d. Information Hiding
13. Placement of modules according to requirements.
    a. Data modelling
    b. Architecture
    c. Coding
    d. Control Hierarchy
14. How many types of flow in DFD?
    a. 2
    b. 3

c. 4
d. 5

15. The process in Transactional flow is known as
    a. Transactional Centre
    b. Decision Maker
    c. Both a and b
    d. Process
16. Principle of Functional Independence states that "While designing, we should maintain high cohesion and low coupling".
    a. True
    b. False
17. In component level design, we do
    a. Make structures
    b. Make circuits
    c. Coding
    d. Arrange logic for solutions
18. The approaches used in component Level Design are:
        a. review the design description for the component
        b. use stepwise refinement to develop algorithm
        c. use structured programming to implement procedural logic
        d. All of the above
19. User Interface Design has ____ Golden Rules.
    a. 2
    b. 3
    c. 4
    d. 5
20. The User's memory load is reduced means
    a. The memory hold by the user's data is freed
    b. User can revisit previously visited pages
    c. User don't need to memorize much.
    d. Both a and b
    e. Both b and c
21. What do we make in Interface Design?
    (No options, write names in the space given)

    _____

22. In OOA, we have _____ no of diagrams.
    a. 2
    b. 5
    c. 4
    d. 3

23. Inside of current system is judged in
    a. High level Use case
    b. Description of Use case
    c. Analysis level Use case
    d. Domain model
24. Before Use case modelling, we must gather
    a. Information
    b. Requirements
    c. Functionalities
    d. Data
25. How many views of the software can be represented through the Unified Modeling Language (UML)?
    a. Four
    b. Five
    c. Nine
    d. None of the above
26. What are the notations for the Use case Diagrams?
    a. Use case
    b. Actor
    c. Prototype
    d. Use case and Actor
27. A UML diagram that facilitates requirements gathering and interacts between system and external users, is called as
    a. Flowchart diagram
    b. Sequence diagram
    c. Use case diagram
    d. Data flow diagram
28. How many elements of use case?
    a. 2
    b. 3
    c. 4
    d. 5

    Also name them.

29. In UML, what is shown by stick figure?
    a. Actor
    b. Use case
    c. Process
    d. Scenario
30. In high level use case, we only use
    a. Secondary actor
    b. Off stage actor

c. None
d. Primary actor

31. One actor cannot be primary for one Use-Case and secondary for another Use-Case.
    a. True
    b. False
32. "<<" and ">>" are angular brackets known as
    a. Curly brackets
    b. Greater than or less than
    c. Stereotypes
    d. None
33. Open Issues are also named as:
    a. Current items
    b. Current issues
    c. Mysteries
    d. Both a and b

    (If there is any other name, write here: _____)

34. Most common documentation of Use case is
    a. Formality context
    b. Fully dressed
    c. Brief
    d. Casual
35. Extend shows
    a. Generalization
    b. Specialization
    c. Inheritance
    d. All of above
36. System Acts as a Black box in
    a. Domain Model Diagram
    b. Sequence diagram
    c. System Sequence Diagram
    d. Design class Diagram
37. The illustration of input and output events of a system are shown with _____ in SSD.
    a. [ )
    b. [ ]
    c. ( )
    d. { }
38. Which Diagram is optional in OOAD?
    a. SSD
    b. DCD
    c. Sequence Diagram
    d. Use case modelling
39. Which diagram introduces the concept of classes?
    a. DCD
    b. Sequence Diagram

c. Use case
d. Domain Model

40. The classes of domain model are known as
    a. Conceptual classes
    b. Physical classes
    c. Both a and b
    d. Abstract classes
41. Physical classes become integral part of
    a. Domain model
    b. SSD
    c. DCD
    d. Use case diagram
42. Multiplicity is equivalent to
    a. Modality
    b. Cardinality
    c. State Transition
    d. No. of entities
43. In domain model, what are not necessary to show?
    a. Attributes
    b. Methods
    c. Functions
    d. Both b and c
44. System acts as a white box in
    a. DCD
    b. SSD
    c. Sequence Diagram
    d. Domain model
45. The methods of classes are represented in Sequence diagram in form of
    a. Blocks
    b. Comments
    c. Messages
    d. Actors
46. If sequence diagram is made using actor (stick figure), then this diagram is called
    a. Coordination diagram
    b. Actor relationship diagram
    c. Collaboration diagram
    d. Interaction diagram
47. Containment contains
    a. Generalization
    b. Composition
    c. Aggregation
    d. None
48. Design patterns are actually solution of recurring problem.
    a. True
    b. False

49. GRASP has a full form
    a. General Receipts of Analysis Software Pattern
    b. Generic Responsibilities Account of Software Pattern
    c. Generic Responsibilities Assignment Software Pattern
    d. General Responsibilities Assignment Software Pattern
50. No of controllers in Grasp pattern depend on the no of
    a. Analysis level use cases
    b. Sequence messages
    c. High level use cases
    d. Processes

Question #3:

Case Study:

A student enters a Photo Studio to get a passport size photo clicked. The student asks the studio owner that he wants 12 photographs. So, studio owner at the counter takes money from the student, generates a bill and hand over it to the student. The student then went to the studio room where the photographer clicks his photograph. Then, the student come outside the studio room and wait in the waiting area. A person took the photograph in his computer. He edits the photograph and then prints it with printer. Then, another worker there cuts out the pictures in passport size. The third worker puts all the 12 photographs in an envelope and gives it to the student.

Draw the Use Case Diagram (High Level and Analysis Level), SSD, Domain Model, Sequence Model and DCD of above mentioned Case Study.

Question #4:

Case Study:

A European customer enters a commercial bank to convert his Euros into Rupees. He goes to the money exchange counter. There he signs a form and gets his money exchanged.

Another customer enters in the bank. If the new customer wants to open an account, he goes to bank employee.

If the new customer wants to deposit funds in an already existing account. Some bonus amount is given to the customer if his age is more than 50 years and the amount that he deposited is more than 10000. Then bonus will be calculated and given to the customer.

And the deposited funds and the bonus would then update the balance of customer's account. Then the customer wants to withdraw his money, then the required amount would be subtracted from updated balance and given to the customer.

Draw the Use Case Diagram (High Level and Analysis Level), SSD, Domain Model, Sequence Model and DCD of above mentioned Case Study.

Question #5:

Write the case study of the diagram below.