2022 年秋现代软件工程期末试题

一、单项选择题（本大题共 20 小题，每小题 1 分，共 20 分）

1. Which of the items listed below is not one of the software engineering layers? ( )

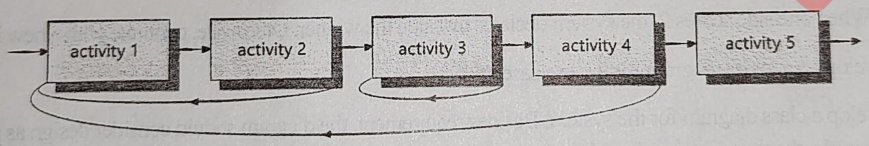
   a. process b. quality focus c. methods d. development

2. Which of the items listed below is not one of the 5 generic software engineering framework activities? ( )

   a. modeling b. planning c. debugging d. communication

3. The following figure illustrates ( ) process flow.

   a. linear b. parallel c. evolutionary d. iterative



4. The term DevOps means ( ).

   a. deviation and options b. development and operations

   c. deviation and operations d. development and options

5. Which of the items listed below is not the intent of the tasks during project inception? ( )

   a. class-based modeling b. people who want a solution

   c. basic problem understanding d. recognizing multiple viewpoints

6. Class responsibilities are defined by ( ).

   a. both its attributes and operations b. its attributes only

   c. neither its attributes nor operations d. its operations only

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7. For purposes of behavior modeling a state is any (　　).

a. consumer of data　　b. data object hierarchy

c. observable mode of behavior　　d. well defined process and behavior

8. Which of the following is not an objective for building an analysis model? (　　)

a. describe customer requirements

b. develop an solution for the problem

c. establish basis for software design

d. define set of software requirements that can be validated

9. The importance of software design can be summarized in a single word — (　　).

a. accuracy　b. complexity　c. efficiency　d. quality

10. An architectural style encompasses a set of components, a set of connectors, constraints, and (　　) models.

a. semantic　b. sentimental　c. syntactic　d. systematic

11. In the context of object-oriented software engineering a component contains (　　).

a. attributes and operations　　b. a set of collaborating classes　　c. collaborations　　d. objects

12. Following the (　　) principle means that if a method can accept a base class object as its parameter, it must accept a subclass object.

a. Parsimonious Complexity　　b. Dependency Inversion

c. Interface Segregation　　d. Liskov Substitution

13. To identify analysis classes, (　　) should be extracted from use-cases first.

a. adjectives and adjective phrases　　b. adverbs and adverb phrases

c. nouns and noun phrases　　d. verbs and verb phrases

14. The term (　　) means "Does not alter the external behavior of the code yet improves its internal structure."

a. recall　b. refine　c. refactor　d. review

15. (　　) design elements indicate how software functionality and subsystems will be allocated within the physical environment.

a. Deployment　b. Component　c. Architectural　d. Interface

16. As the design process proceeds, the abstraction of the design model becomes (　　).

a. higher and higher　b. lower and lower　c. higher and lower　d. lower and higher

17. Equivalence partitioning is a (　　) testing method that divides the input domain of a program into classes of data from which test cases can be derived.

a. white-box　b. black-box　c. glass-box　d. red-box

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18. Which of the items listed below is not one of the attributes of a good test? (　　)

a. A good test is not redundant.

b. A good test should be neither too simple nor too complex.

c. A good test has a high probability of finding an error.

d. A good test should be conducted by end users.

19. In the unit-test environment, (　　) serve to replace modules that are invoked by the component to be tested.

a. clusters　b. drivers　c. stubs　d. controllers

20. (　　) testing focuses on requirements established as part of requirements modeling.

a. Validation　b. Unit　c. System　d. Integration

二、判断分析题（本大题共 2 小题，每小题 5 分，共 10 分）

1. In the classic book *The Mythical Man-Month* , the author F. Brooks said, "adding people to a late software project makes it later." Do you think this statement is true? Why?

2. "Components should try to exhibit functional, layer, or communicational cohesion as possible." Do you think this statement is true? Why?

三、看图分析题（本大题共 2 小题，每小题 5 分，共 10 分）

1. The following figure 1 illustrates the overall flow of the Scrum. Please describe the flow in your own words.

2. Modularity is an important concept in design. Referring to the following figure 2, describe the impact of the number and size of modularity on software costs.

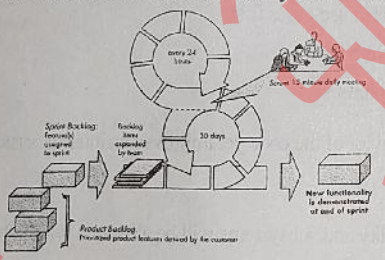

Figure 1

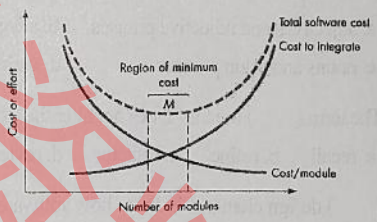

Figure 2

四、问答题（本大题共 5 小题，每小题 6 分，共 30 分）

1. Describe your opinions of why computer software needs to evolve over time.

2. Requirements usually include functional and non-functional requirements. A nonfunctional requirement can be described as a quality attribute, a performance attribute, a security attribute, or a general constraint on a system. List three functional requirements and three non-functional requirements for a university course selection system.

3. Describe the similarities and differences between sequence diagrams and state diagrams.

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4. Consider the following definition of a class. What design concept does the class violate? Briefly describe the meaning of the concept. What kind of coupling does it exhibit? Briefly describe the meaning of the coupling. If the class is to be improved, give your solution.

```
class Student {
    public String  Name;    public int  Age;
}
```

5. Design test cases for a product registration program using the equivalence partitioning method. The input data includes: product ID and number. The ID must be a combination of letters and numbers, start with a letter and contain 6 characters. The number of products to be registered is between 1 and 100 (including 1 and 100). If the input data meets the above conditions, the output data is "legal"; otherwise, "illegal".
   Give a description of valid and invalid equivalence class.
   Give a description of test cases, expected output, and covered equivalence classes.

五、综合题（本大题共 4 小题，第 1、4 题各 5 分，第 2、3 题各 10 分，共 30 分）

Consider the following use case for a game system: Scissors, Rock, Paper(剪刀、石头、布).

- The Player starts a game. The rule of the game is two out of three(三局两胜). Participants are the player and the AI.
- At the beginning of each inning(每一局), the player may select any pattern in Scissors, Rock, and Paper. While the player submits his choice, the AI randomly selects and submits a pattern in Scissors, Rock, Paper.
- Both patterns are displayed on the screen.
- The system automatically judges the winner, and the winner wins 1 score. If it is a draw, neither side scores. Then the player and AI's total scores will be displayed on the screen.
- When one side scores 2, the system declares that side the winner. Otherwise, continue with a new inning.

1. Develop an activity diagram for the use case. (5 分)

2. Develop a class diagram for the system. Besides requirement, the diagram should consider design as possible. For example, the three pattern should be drawn using the same method *draw*. (10 分)

3. The rules for judging the winner in each inning of the game are: Scissors wins Paper, Paper wins Rock, Rock wins Scissors. Draw the flow chart with simple condition corresponding to the rules, and compute cyclomatic complexity of the flow chart. (10 分)

4. Consider the following UI prototype. Critique it relative to the three golden rules in UI design. (5 分)