四川大学期末考试试题（闭卷）

（2022 -2023 学年第 1 学期）

课程号：**304064030** 课程名称：**现代软件工程（A 卷）** 任课教师：

适用专业年级：**计算机科学与技术 2020 级** 学号： 姓名：

考试须知

四川大学学生参加由学校组织或由学校承办的各级各类考试，必须严格执行《四川大学考试工作管理办法》和《四川大学考场规则》。有考试违纪作弊行为的，一律按照《四川大学学生考试违纪作弊处罚条例》进行处理。

四川大学各级各类考试的监考人员，必须严格执行《四川大学考试工作管理办法》、《四川大学考场规则》和《四川大学监考人员职责》。有违反学校有关规定的，严格按照《四川大学教学事故认定及处理办法》进行处理。

题　号	一	二	三	四	五	卷面成绩
得　分						
阅卷教师						
阅卷时间						

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? (d)

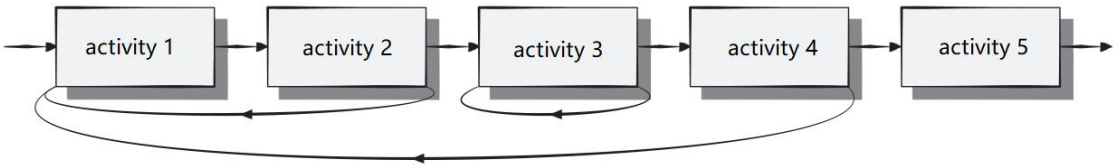
a. process b. quality focus c. methods d. development

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

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

3. The following figure illustrates (d) process flow.

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



4. The term DevOps means (b) .

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)

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).

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

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

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

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? (b)

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 —(d).

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

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

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

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

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

12. Following the (d) 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, (c) 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 (c) means "Does not alter the external behavior of the code yet improves its internal structure."

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

15. (a) 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 (b).

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

17. Equivalence partitioning is a (b) 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

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

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, (c) serve to replace modules that are invoked by the component to be tested.

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

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

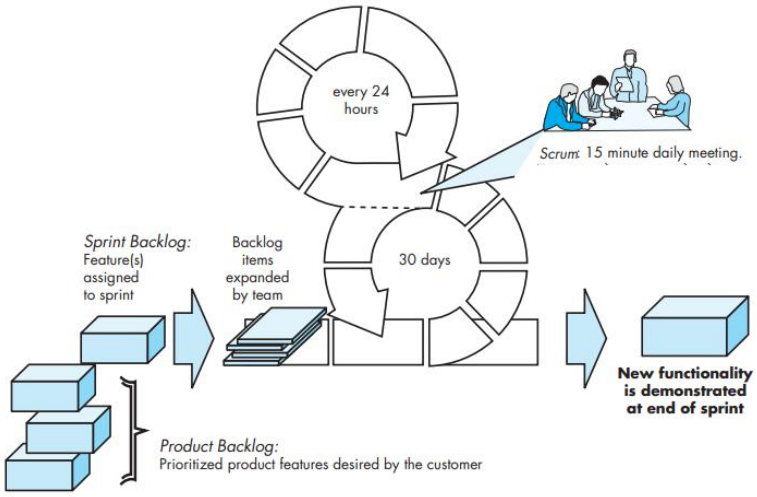
a. Validation b. Unit c. System d. Integration

二、 判断分析题（本大题共 2 小题，每小题 5 分，共 10 分）

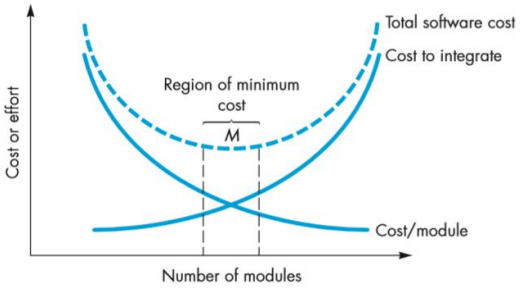
1. In the classic book *The Mythical Man-Month* , the author F. Brooks said, "adding people to a late software project makes it later." Do you think this statement is true? Why?
2. "Components should try to exhibit functional, layer, or communicational cohesion as possible." Do you think this statement 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 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, describe the impact of the number and size of modularity on software costs.



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.
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.

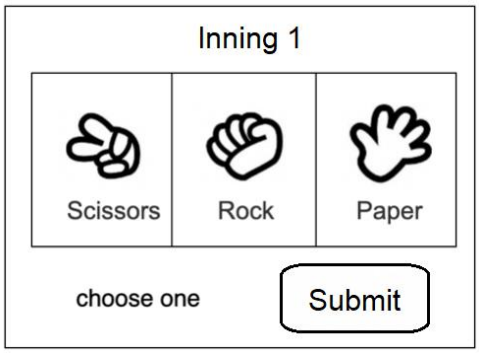
1. Please develop an activity diagram for the use case. (5 分)

2. Please 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. Please 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)



Answer:

二、 判断分析题（本大题共 2 小题，每小题 5 分，共 10 分）

1.

Answer：这句话不完全正确，不过作者坚持这样的观点也是有原因的。

At first, this statement may seem counterintuitive. However, as new people are added, people who were working must spend time educating the newcomers, thereby reducing the amount of time spent on productive development effort. People can be added but only in a planned and well-coordinated manner.

2.

Answer：true

1. The three cohesion belong to the level of high cohesion.

2. easy to implement, test, and maintain

3. 自己发挥

三、看图分析题（本大题共 2 小题，每小题 5 分，共 10 分）

1.

Answer：

(1) Sprint Backlog and Backlog—a prioritized list of project requirements or features that provide business value for the customer. Items can be added to the backlog at any time (this is how changes are introduced). The product manager assesses the backlog and updates priorities as required.
(2) Sprints—consist of work units that are required to achieve a requirement defi ned in the backlog that must be fit into a predefined time-box 10 (typically 30 days). Hence, the sprint allows team members to work in a short-term, but stable environment.
(3) Scrum meetings—are short (typically 15-minute) meetings held daily by the Scrum team. Three key questions are asked and answered by all team members • What did you do since the last team meeting? • What obstacles are you encountering? • What do you plan to accomplish by the next team meeting?
(4) Demos—deliver the software increment to the customer so that functionality that has been implemented can be demonstrated and evaluated by the customer.

2.

Answer：

The cost to develop an individual software module does decrease as the total number of modules increases. Given the same set of requirements, more modules means smaller individual size. However, as the number of modules grows, the effort(cost) associated with integrating the modules also grows. These characteristicslead to a total cost or effort curve shown in the fi gure. There is a number, M, of modules that would result in minimum development cost, but we do not have the necessary sophistication to predict M with assurance.

四、问答题（本大题共 5 小题，每小题 6 分，共 30 分）

1. Answer:

Software must be adapted to meet the needs of new computing environments or technology.
Software must be enhanced to implement new business requirements.
Software must be extended to make it interoperable with other more modern systems or databases.
Software must be re-architected to make it viable within a network environment.

2. Answer:

开放试题，根据回答进行判断。

3.

Answer:

Similarities: dynamic model(1 分), can be used for behavioral modeling(1 分)
Differences:
Sequence diagrams can also be used to show how events cause transitions from object to object. (2 分)
state diagrams can be used to model how system elements respond to external event. (2 分)

4.

Answer:

Information hiding(1 分), 概念描述(1 分); Content coupling(1 分) , 概念描述(1 分).
Solution: public → private(2 分)

```
class Student {
    private String  Name;
    private int  Age;
    public String GetName();
    public int GetAge();
}
```

Answer:

Software must be adapted to meet the needs of new computing environments or technology. (3 分)

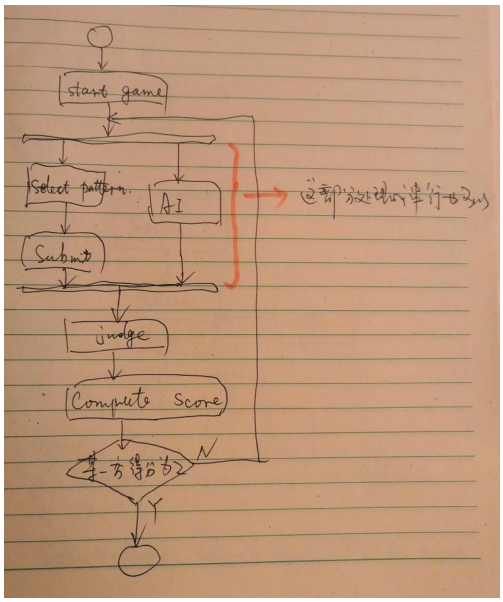
input data	Valid equivalence classes	Invalid equivalence classes
ID	(1) legal ID	(2) the length of ID is not 6 (3) don't start with a letter
N	(4) 1≤N≤00	(5) N＜1 (6) N＞100

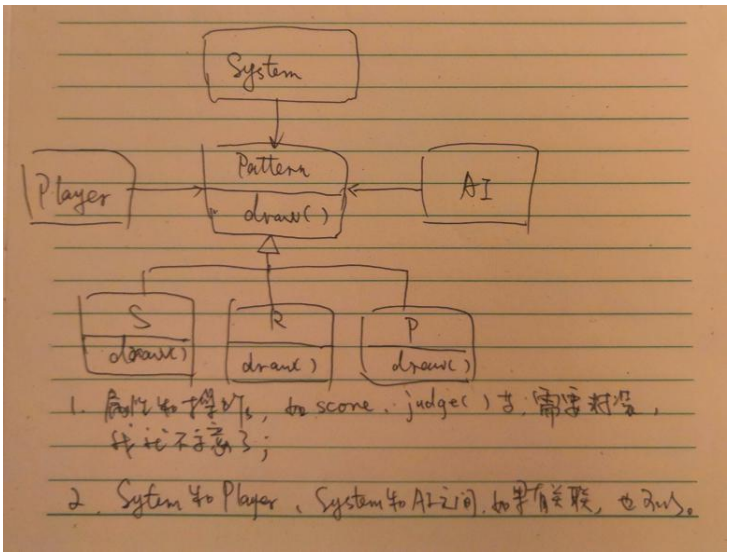
(3 分)

Test case	Expected output	Covered equivalence classes
(SE0101, 30)	legal	(1) (4)
(S0101, 20)	illegal	(2)
(1E0101, 50)	illegal	(3)
(SE0101, 0)	illegal	(5)
(SE0101, 200)	illegal	(6)

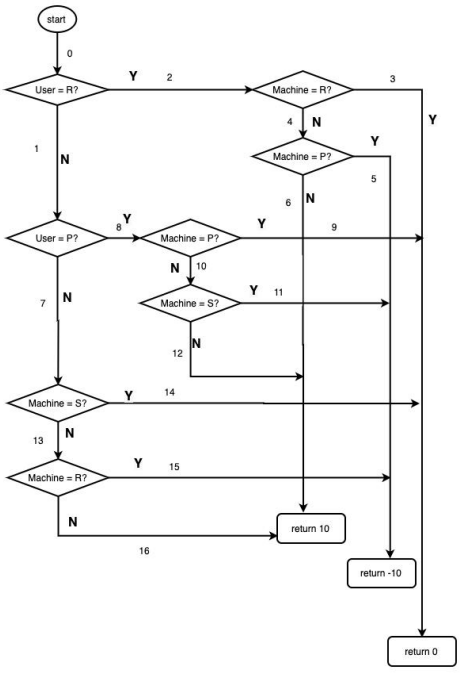
五、综合题（本大题共 4 小题，第 1、4 题各 5 分，第 2、3 题各 10 分，共 30 分）

1. 2.





3. 下面这个图来自 2020 年的答案。如果处理成 switch…case 的形式，也可以。



V(G) = 8+1=9

4.

开放试题，无标准答案。关键点：符合“减少用户记忆负担”中“界面的视觉布局应该基于真实世界的象征”。