

# 四川大学期末考试试题（闭卷）

## （20 —20 学年第 学期） A 卷

课程号：304064030 课序号： 课程名称：现代软件工程（双语） 任课教师： 成绩：

适用专业年级： 学生人数： 印题份数： 学号： 姓名：

### 考生承诺

我已认真阅读并知晓《四川大学考场规则》和《四川大学本科学生考试违纪作弊处分规定（修订）》，郑重承诺：

1. 已按要求将考试禁止携带的文具用品或与考试有关的物品放置在指定地点；
2. 不带手机进入考场；
3. 考试期间遵守以上两项规定，若有违规行为，同意按照有关条款接受处理。

考生签名：

### 一、单项选择题（本大题共 20 小题，每小题 1 分，共 20 分）

1. Generic process framework encompasses five activities, such as ( ).  
a. commitment   b. communication   c. commutation   d. community
2. In the process of iteratively developing the software, each iteration produces a/an ( ).  
a. function   b. inception   c. interface   d. increment
3. Process flow describes how the framework activities are organized with respect to ( ).  
a. technology and methods   b. organization and personnel  
c. sequence and time   d. path and structure
4. In Scrum model, work tasks take place in a relatively short time-boxed period called a ( ).  
a. sprint   b. sprinkler   c. spring   d. string
5. Agile development is more agreeable to the following option ( ).  
a. comprehensive documentation   b. contract negotiation  
c. following a plan   d. responding to change

6. A UML ( ) models an entity that interacts with a system object.  
a. actor   b. class   c. device   d. node
7. ( ) models depict software requirements from the user's point of view.  
a. Class-based   b. Data   c. Scenario-based   d. User
8. The ( ) diagram is a useful variation of the activity diagram.  
a. use-case   b. sequence   c. swim-lane   d. state
9. The work products produced during requirements elicitation do not include ( ).  
a. a statement of feasibility      b. a technical solution  
c. a list of requirements      d. a list of stakeholders
10. ( ) is not one of the tasks of requirement engineering.  
a. Construction   b. Management   c. Negotiation   d. Validation
11. ( ) should be extracted from use-cases to define attributes of analysis classes.  
a. Adjectives and adjective phrases      b. Adverbs and adverb phrases  
c. Verbs and verb phrases      d. Nouns and noun phrases
12. Refactoring means "Does not alter the external behavior of the code yet ( ) its internal structure."  
a. alters   b. improves   c. modifies   d. impacts
13. ( ) means that the system architect considers a variety of alternatives and ultimately decides on the specific architectural features that best meet the concern.  
a. Architectural decision      b. Architectural description  
c. Architectural style      d. Requirements review
14. The Open-Closed Principle means "A module should be open for extension but closed for ( )".  
a. notification   b. modification   c. movability   d. testation
15. The ( ) design for software is analogous to a set of detailed drawings for the doors, windows, and external utilities of a house.  
a. architectural   b. deployment   c. interface   d. component
16. As the design model continues to evolve, the level of abstraction of the model is ( ).  
a. stable   b. increasing   c. mutational   d. decreasing
17. One of the characteristics of testable software is ( ).  
a. complexity   b. infinity   c. simplicity   d. volatility
18. ( ) serve to replace modules that are invoked by the component to be tested.  
a. Clusters   b. Controller   c. Drivers   d. Stubs
19. The focus of ( ) testing is on design and the construction of the software architecture.  
a. unit   b. integration   c. system   d. validation
20. ( ) testing helps to ensure that changes do not introduce unintended behavior or additional errors.

a. Regression b. Regeneration c. Reschedule d. Safety

## 二、简答题（本大题共 4 小题，每小题 5 分，共 20 分）

1. “Until I get the program running, I have no way of assessing its quality.”

Do you think this statement is true? Why?

2. Briefly describe the benefits of high cohesion.

3. “The smaller the modules in software, the lower the development cost of the software.”

Do you think this statement is true? Why?

4. Review the following requirements for a ticketing system:

① The system is developed using JAVA;

② Users can select specific seats;

③ The system provides several payment methods;

④ The system should respond to user query requests in less than three seconds.

List the functional and performance requirements of these requirements;

Which requirements are not suitable for consideration in the requirements stage and why?

## 三、本大题共 4 小题，每小题 5 分，共 20 分

Consider the following use-case:

“Xiao Ming inserts his campus card into the transfer machine.

The transfer machine system prompts him to enter a password, and Xiao Ming enters the password.

The system displays service options, and Xiao Ming selects the "Recharge" service.

The system prompts him to input the recharge amount, and Xiao Ming inputs the amount.

The system displays the recharge amount and the balance in the bound bank card, and Xiao Ming chooses "Confirm".

The transfer machine system sends the recharge request to the bank system.

The bank system transfers the recharge amount to the campus card and returns a success message.

Xiao Ming takes out the campus card.”

1. Extract analysis classes (without encapsulating attributes and operations) from the above use-case, and draw the corresponding class diagram.
2. Based on the above use-case, draw a state diagram of the recharge process.
3. Based on the above use-case, draw an activity diagram of the recharge process.
4. Based on the analysis classes in 1, draw a sequence diagram of the recharge process.

#### 四、本大题共 2 小题，每小题 10 分，共 20 分

A company is developing a game called “Journey to the West”. In the game, Tang Sanzang, on his journey to the West to get the scriptures, first takes on the disciple Wukong, and then later takes on the disciples Bajie and Sha Wujing.

1. Provide a design solution represented by a class diagram that describes the relationship between Tang Sanzang and his disciples; and the solution should follow the basic design principles when adding new disciples. Briefly describe how the solution works.
2. Each of the disciples has his own weapon. Wukong's weapon is the Golden Cudgel, Bajie's weapon is the Nine-Toothed Rake, and Sha Wujing's weapon is the Demon-quelling Staff. Give a design solution represented by a class diagram that describes combinations between disciples and weapons, and allows for the flexibility to swap weapons when necessary.

Briefly describe how the solution works.

#### 五、本大题共 2 小题，每小题 10 分，共 20 分

The rules for the license plate number in a certain location are as follows:

The first two characters of the license plate must be "SC";

The third character can be any uppercase letter (A-Z);

The 4th to 8th characters can be any digit (0-9).

1. Based on the above rules, design test cases using equivalence partitioning method.
  - ① Give a description of valid and invalid equivalence class.

② Give a description of test cases, expected output, and covered equivalence classes.

2. Based on the above rules,

① draw the flow chart with simple condition corresponding to the rules,

② compute cyclomatic complexity of the flow chart, and

③ list a set of independent path for conducting basic path testing.

### 一、单项选择题（本大题共 20 小题，每小题 1 分，共 20 分）

b d c a d   a c c b a   d b a b c   d c d b a

### 二、简答题（本大题共 4 小题，每小题 5 分，共 20 分）

1. False(1 分). The formal technical review is one of most effective software quality assurance mechanisms(2 分). Software reviews are a “quality filter” that have been found to be more effective than testing for finding certain classes of software errors(2 分).

2. key points: easier to development, test, and maintain. (3 分)

Then expand on this with appropriate text. (2 分)

3. False(1 分). As the number of modules grows, the effort (cost) associated with integrating modules with each other grows(2 分). These characteristics lead to a total cost or effort curve(2 分).

4. Functional: ② ③, Performance: ④,

not suitable for consideration:①, overthinking technical details

### 三、本大题共 4 小题，每小题 5 分，共 20 分

1. 分析类（3 分）至少包括：用户、校园卡账户、银行卡账户；系统或界面（酌情考虑）；

类与类之间的关联关系（2 分）；

2. 至少 5 个状态：读取密码、比较密码、选择功能、读取金额、处理充值请求（各 0.5 分）

状态之间通过合理的事件进行转移（各 0.5 分）；

- 3. 活动图的形式要正确，流程要合理；
- 4. 顺序图中的类/对象要与 1 中的分析类一致；顺序图的形式要正确，交互顺序要合理。

**四、本大题共 2 小题，每小题 10 分，共 20 分**

本题考查学生灵活运用设计原则分析问题、解决问题的能力。

- 1. 唐三藏与三个徒弟之间（四个类，各 0.5 分），通过一个抽象类或接口进行关联（3 分）；继承或实现关系在图中应表述正确（2 分）；文字表述正确（3 分）。
- 2. 三种武器（三个类，各 0.5 分）应该有一个抽象的父类或接口（2 分）；徒弟通过这个接口访问不同的武器，并可以灵活地调换武器（2.5 分）；文字表述正确（3 分）。

第 1 小题的类中，可以不包含属性和操作；第 2 小题的徒弟类中，应该有 setWeapon 或 useWeapon 之类的操作，才能调换武器。

**五、本大题共 2 小题，每小题 10 分，共 20 分**

- 1. ① 每行 1 分，整张表的形式正确（1 分）；

input condition	Valid equivalence classes	Invalid equivalence classes
The fist two characters	(1) SC	(2) don't start with "SC"
The third character	(3) A-Z	(4) not (A-Z)
The 4th to 8th characters	(5) 0-9	(6) not (0-9)

Length(隐含条件)	(7) 8	(8) not 8
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② Open answer, 根据回答给分（5分）

2. Open answer

① 根据学生所画流程图/流图的正确性给分；如果流程图整体体现为依次对每位字符的穷举处理，当然也可以，但是不推荐这样写；流程图中应该有一个循环，在循环中处理8个字符，或者处理后五位字符。（4分）

② 环复杂度根据①中所画流程图计算；（2分）

③ 独立路径的集合应覆盖所有路径，且没有冗余。（4分）