四川大学期末考试试题（闭卷）

（2023——2024 学年第 1 学期）　A 卷

课程号：　课序号：　课程名称：　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. The bedrock that supports software engineering is a (　　).

a. development process　b. methods and tools　c. technology　d. quality focus

2. (　　) is one of the 5 generic software engineering framework activities.

a. Debugging　b. Developing　c. Planning　d. Playing

3. The (　　) process flow repeats one or more of the activities before proceeding to the next.

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

4. The (　　) method is one of the popular agile methods.

a. Kanban　b. Muban　c. Tieban　d. Zhiban

5. Software has one fundamental characteristic that makes it considerably different from hardware: Software does not　“(　　).”

a. carry out　b. check out　c. wear out　d. work out

6. Which of the items listed below is not one of the work products produced during requirements elicitation for large systems? (　　)

a. a list of stakeholders　b. a list of requirements

c. a bounded statement of scope for the system　d. a solution for the system

7. The (　　) model indicates how software will respond to internal or external events or stimuli.

a. behavioral　b. class　c. data　d. use-case diagram

8. In UML swimlane diagrams, (　　) are represented as parallel segments that divide the diagram vertically.

a. reflections b. responsibilities c. responses d. reviews

9. Which of the items listed below is not one of the umbrella activities? ( )

a. quality assurance b. risk management

c. product delivery d. configuration management

10. ( ) is a software engineering term that refers to documented links between software engineering work products (e.g., requirements and test cases).

a. Usability b. Traceability c. Reusability d. Accessibility

11. In a data-flow architecture, ( ) connect components and transmit data from one component to the next.

a. packages b. patterns c. peers d. pipes

12. A CRC model can be viewed as a collection of index cards, where the 1st C and 2nd C denote respectively ( ).

a. class name and collaborators b. class cards and collection

c. class collection and cards d. class collaborations and name

13. The Dependency Inversion Principle means "Do not depend on ( )".

a. collaborations b. concretions c. concerns d. refinement

14. An architectural description is ( ) that reflect different views of the system.

a. a set of work products b. a set of patterns

c. a set of classes d. an operational software

15. Which of the following interface design principles does not allow the user to remain in control of the interaction with a computer? ( )

a. Allow interaction to interruptible b. Allow interaction to be undoable

c. Hide technical internals from users d. Show users the technical details

16. ( ) testing techniques derive sets of input conditions that will fully exercise all functional requirements for a program.

a. Glass-box b. Grey-box c. Black-box d. White-box

17. The value of cyclomatic complexity provides a/an ( ) bound for the number of tests that must be conducted to ensure that all paths have been executed at least once.

a. average b. lower c. middle d. upper

18. An edge in a flow graph must terminate at a ( ).

a. node b. path c. region d. statement

19. Which of the following is not a characteristics of testable software? ( )

a. observability b. infinity c. stability d. simplicity

20. As the development process progresses, the level of abstraction ( ).

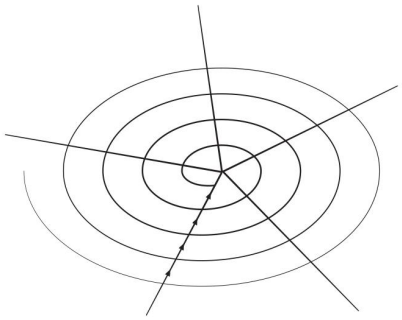
a. increases b. fluctuates c. decreases d. has remained stable

二、 判断分析题（本大题共 2 小题，每小题 5 分，共 10 分）

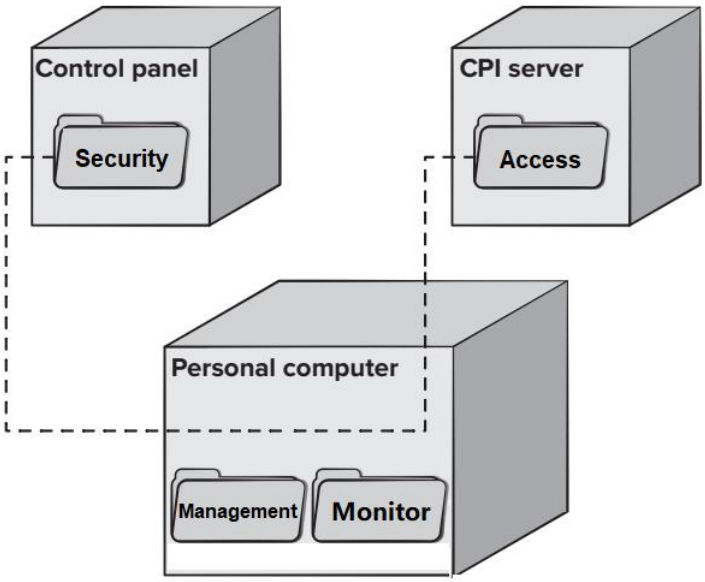
1. “A process adopted for one project might be significantly different than a process adopted for another project.” Do you think this statement is true? Why?
2. “Testing should be performed by an independent test group.” Do you think this statement is true? Why?

三、看图分析题（本大题共 2 小题，每小题 5 分，共 10 分）

1. According to the following figure, describe the characteristics of the Spiral Model in terms of process flow, as well as the advantages and disadvantages of the model when applied to development.



2. What type of UML diagram is the following diagram? Describe its meaning.



四、问答题（本大题共 4 小题，每小题 5 分，共 20 分）

1. Consider the following two requirements obtained during the elicitation task:
   (1) The software should be user friendly.
   (2) The probability of a successful unauthorized database intrusion should be less than 0.0001.
   For the two above requirements, what suggestions should be made during the validation task?
2. Describe the meaning of Functional independence. What are the two qualitative criteria to measure functional independence? Explain the meanings of the two criteria.
3. Describe the meaning and significance of regression testing.
4. Based on the following description, draw the corresponding class diagram.

"Both geese and swallows are birds. Birds can fly and require water to survive. Many geese gather together in flocks."

五、综合题（本大题共 4 小题，每小题各 10 分，共 40 分）

1. Version 1.0 of a drawing software has the function of drawing rectangles. The operation steps are as follows: (1) Click the rectangle icon in the toolbar; (2) Press the left mouse button in the canvas window to locate one corner of the rectangle; (3) Drag the mouse to the other corner of the rectangle, during which, a dynamic rectangle will be displayed on the screen; (4) Release the mouse button and a fixed rectangle will be drawn on the screen.
   Based on the above description, draw the corresponding state diagram.
2. In version 2.0 of the drawing software, two new features have been added: (1) Drawing circles; (2) Calculating the area of rectangles/circles to display in the drawn graphics. In the future, the advanced versions may introduce new shapes and calculate other parameters of the shapes. The calculation function is also intended for reuse by other components.
   Provide the class diagram for version 2.0 of the drawing software, while following design concepts and principles as much as possible.
3. In version 2.0, users can draw a rectangle, and the area of the rectangle will also be displayed in the rectangle. Draw the corresponding sequence diagram.
4. The programming language C-Minus is a subset of C. Some rules about identifiers in C-Minus are as follows:

   Identifiers start with a letter, followed by letters or digits；
   Identifiers are between 1 and 8 characters long；
   At least one identifier is required in a declaration statement;
   Identifiers must be declared before use.
   Other rules of C-Minus are similar to C .

   Using the equivalence partitioning method, design test cases based on the above rules.
   (1) Give a description of valid and invalid equivalence class.
   (2) Give a description of test cases, expected output, and covered equivalence classes.

一、单项选择题（本大题共 20 小题，每小题 1 分，共 20 分）

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

二、 判断分析题（本大题共 2 小题，每小题 5 分，共 10 分）

1. Answer：

(1’) True.　(4’) 根据回答给分。参考：The software engineering process is not a rigid prescription that must be followed dogmatically by a software team. It should be agile and adaptable to the problem, to the project, to the team, and to the organizational.

2. Answer：

(1’) This statement is not entirely true. (4’) 根据回答给分。参考：The software developer is always responsible for testing the individual units of the program, ensuring that each performs the function or exhibits the behavior for which it was designed.

三、看图分析题（本大题共 2 小题，每小题 5 分，共 10 分）

1. (1’) Deployment.
   (4’) Three computing environments are shownThe subsystems housed within each computing element are indicated. For example, the personal computer houses subsystems that implement security and surveillance features. In addition, an external access subsystem has been designed to manage all attempts to access the system from an external source. Each subsystem would be elaborated to indicate the components that it implements.
2. (1’) The spiral model is an evolutionary software process model that couples the iterative nature of prototyping with the controlled and systematic aspects of the waterfall model.
   (2’) Pros: There is continuous customer involvement. Development risks are managed. It is suitable for large, complex projects. It works well for extensible products.
   (2’) Cons: Risk analysis failures can doom the project. The project may be hard to manage. It requires an expert development team.

四、问答题（本大题共 5 小题，每小题 6 分，共 30 分）

1. Answer:

(2’) The first requirement is too vague for developers to test or assess. What exactly does “user friendly” mean? To validate it, it must be quantified or qualified in some manner.

(3’) The second requirement has a quantitative element (“less than 0.0001”), but intrusion testing will be difficult and time consuming. Is this level of security even warranted for the application? Can other complementary requirements associated with security (e.g., password protection, specialized handshaking) replace the quantitative requirement noted?

2.

Functional independence is achieved by developing modules with “single-minded” function (1’) and an

“aversion” to excessive interaction with other modules(1’).
Cohesion and coupling (1’)
Cohesion is an indication of the relative functional strength of a module. (1’)
Coupling is an indication of the relative interdependence among modules. (1’)
3.
(3’) In the context of an integration test strategy, regression testing is the reexecution of some subset of tests that have already been conducted to ensure that changes have not propagated unintended side effects. Regression tests should be executed every time a major change is made to the software (including the integration of new components).
(2’) Regression testing helps to ensure that changes (due to testing or for other reasons) do not introduce unintended behavior or additional errors.
4. 重点在于类和关系
5 个类：geese，swallow，bird，water，flocks
关系：继承，依赖（依赖于水），聚集（聚集成 flocks）
Operations: fly，survive

五、综合题（本大题共 4 小题，每小题各 10 分，共 40 分）

1. Open question, open answer.
(5’) 核心状态：waiting for selecting rectangle icon; waiting for pressing the left button; dragging
(5’) 核心事件：selected rectangle icon; pressed the left button; released the mouse button
2. Open question, open answer.
核心点：
(1) 应该有一个 Shape 之类的抽象类或接口，其中封装 draw()，然后在子类中实现该方法；
(2) 把 Rectangle 等类分解成两个类，分别封装 draw 和计算面积等方法，以便复用。设计成 interface 也可以，在 interface 中计算面积。
3. Open question, open answer.
核心点：
顺序图的形式要正确，不能画成活动图、状态图等；
交互顺序要合乎逻辑。
4.
(1) 5’

input condition	Valid equivalence classes	Invalid equivalence classes
1st character	(1) letter	(2) don’t start with a letter
followed	(3) letters (4) digits	(5) !(letters or digits)
length	(6) 1-8	(7) >8
numbers	(8) >=1	(9) =0
use	(10) be declared before use	(11) not be declared before use

(2) 5’

Open answer， 根据回答给分