四川大学期末考试试题（闭卷）

（2021 -2022 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 11 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）**提示：在每小题列出的备选项中只有一个是符合题目要求的，请将其代码填写在题后的括号内。错选、多选或未选均无分

1	2	3	4	5	6	7	8	9	10
C	A	A	D	C	D	D	C	C	C
11	12	13	14	15	16	17	18	19	20
C	B	F	D	E	E	C	A	C	E

1. Software deteriorates rather than wears out because

A) Software suffers from exposure to hostile environments

B) Defects are more likely to arise after software has been used often

C) Multiple change requests introduce errors in component interactions

D) Software spare parts become harder to order

2. Which of these are the 5 generic software engineering framework activities?

A) Communication, planning, modeling, construction, deployment

B) Communication, risk management, measurement, production, reviewing

C) Analysis, designing, programming, debugging, maintenance

D) Analysis, planning, designing, programming, testing

3. What is the goal of software engineering?

A) The production of fault-free software that satisfies the user's needs and that is delivered on time and within budget

B) The development of software that conforms to international standards

C) The replacement of hand coding by automatic programming

D) The application of engineering techniques to software production

4. The result of the requirements engineering elaboration task is an analysis model that defines which of the following problem domain(s)?

A) Information

B) functional

C) behavioral

D) all of the above

E）Both a and b

5. The spiral model of software development

A) Ends with the delivery of the software product　B) Is more chaotic (糟糕)than the incremental model

C) Includes project risks evaluation during each iteration　D) All of the above

6. The main difference between waterfall model and evolutionary model is in

A) different activities　B) different project size

C) different project management manner　D) different way of activity organization

7. What are the four framework activities found in the Extreme Programming (XP) process model?

A) analysis, design, coding, testing　B) planning, analysis, design, coding

C) planning, analysis, coding, testing　D) planning, design, coding, testing

8. Which of these is not an element of an object-oriented analysis model?

A) Behavioral elements

B) Class-based elements

C) Data elements

D) Scenario-based elements

9. For purposes of behavior modeling a state is any

A) consumer or producer of data.

B) data object hierarchy.

C) observable mode of behavior.

D) well defined process.

10. User requirements are expressed as _____ in Extreme Programming.

A) implementation tasks
B) functionalities
C) scenarios
D) none of the mentioned

11. Which of the following items does not appear on a CRC card?

A) class collaborators B)class name C)attributions and operations D)class responsibilities

12. Which process model is appropriate when requirements are fuzzy?
A) Incremental Process Model B) Prototyping Process Model
C) Spiral Process Model D) Concurrent Process Model

13. Which of these are characteristics of a good design?

A) exhibits strong coupling between its modules

B) implements all requirements in the analysis model

C) includes test cases for all components

D) provides a complete picture of the software

E) All of the above

F) both b and d

14. Agile Software Development is based on
A) Incremental Development
B) Iterative Development
C) Linear Development
D) Both Incremental and Iterative Development

15. In component-level design "persistent data sources" refer to

A) Component libraries B) Databases C) Files

D) All of the above E) Both b and c

16. Which of the following principles are included in the four principles used to guide component-level design?

A) Dependency Inversion Principle

B) Reduce Complexity Principle

C) Interface Segregation Principle

D) Open-Closed Principle

E) a,c and d

17. Which model depicts the profile of the end users of a computer system?

A) design model B) implementation model

C) user model D) user's model

18. Which of these framework activities is not normally associated with the user interface design processes?

A) cost estimation

B) interface construction

C) interface validation

D) user and task analysis

19. What is the normal order of activities in which traditional software testing is organized?

A) integration testing, unit testing, system testing, validation testing

B) validation testing, unit testing, integration testing, system testing

C) unit testing, integration testing, validation testing, system testing

D) system testing, validation testing, integration testing, unit testing

20. Which of the following strategic issues needs to be addressed in a successful software testing process?

A) conduct formal technical reviews prior to testing

B) specify requirements in a quantifiable manner

C) use independent test teams

D) wait till code is written prior to writing the test plan

E) Both a and b

二、 判断改错题（本大题共 10 小题，每小题 1 分，共 10 分）

提示：正确打✓，错误打×，将其结果填写在下表中。

1	2	3	4	5	6	7	8	9	10
✓	×	×	✓	×	×	✓	×	×	×

1. Change cannot be easily accommodated in most software systems, unless the system was designed with change in mind.
2. In general software only succeeds if its behavior is consistent with the objectives of its designers.
3. The goal of software testing is to find all error in software prior to delivery to customer
4. Software development model is a framework of process, activity and task
5. We can modify the reused classes to add some new attributes and operations to meet our new requirements and don’t worry about any side effects
6. Software is a product and can be manufactured using the same technologies used for other engineering artifacts.
7. In the Unified Process model requirements are determined iteratively and may span more than one phase of the process.
8. Agility is nothing more than the ability of a project team to respond rapidly to change.
9. The best representation of system architecture is an operational software prototype.
10. The reason for reducing the user's memory load is to make his or her interaction with the computer quicker to complete.

三、 名词解释题（本大题共 5 小题，每小题 2 分，共 10 分）提示：解释每小题所给名词的含义，若解释正确则给分，若解释错误则无分，若解释不准确或不全面，则酌情扣分。

1. Behavioral model

   Behavioral model is a kind of requirement analysis model. It indicates how software will respond to external events or stimuli.

2. Software component

   The software component is a modular, deployable, and replaceable part of a software system that encapsulates implementation and exposes a set of interfaces.

3. Polymorphism

   Polymorphism refers to the technique that allows you to set a parent object to be equal to one or more of its children, so that the parent object can behave differently depending on the properties of the children currently assigned to it.

4. Refactoring

   Refactoring is the process of changing a software system in such a way that it does not alter the external behavior of the code yet improves its internal structure.

5. Black-Box Testing

Black-Box Testing is the function test program to check whether the input and output related to the function of the program are correct or not. There are two main approaches of black-box testing: equivalent classification method and boundary value analysis method

四、 问答题（本大题共 6 小题，每小题 5 分，共 30 分）

1. What are golden rules for UI design? Give at least three examples of UI design that do not follow the rules.

   Three rules: Place the user in control, Reduce the user's memory load, Make the interface consistent

   第 2 个问题是开放性的，只要举出 3 个例子就得分，1 个例子得 1 分。如没有遵循第 1 个黄金原则的编辑不能中断、删除文字不能取消。没有遵循第 3 个原则：界面有多个不同的确认图标（✔、、OK 等）。

2. What stages has software testing to go through and each stage with what documentation related?

   The software testing is followed by unit testing, integration testing, validation testing and system testing. The documentation related to unit testing is unit testing plan and component design documentation. The documentation related to integration testing is integration testing plan and software architecture design documentation (primary design document). The documentation related to validation testing is validation testing plan and software requirement specification. The documentation related to system testing is system testing plan, system requirement specification, user manual and installation manual.

3. What are the four design models required for a complete specification of a software design? Please descript their roles.

Data design : high level model depicting user's view of the data or information.

Architecture design: shows relationships and collaborations among specific analysis model software and hardware elements

Interface design : interface depicts a set of operations that describe the externally observable behavior of a class and provides access to its operations

Component design: describes the internal detail of each software component

4. What are the two qualitative criteria for measuring module independence? Give the definitions of these two standards and descript the goal of module independence in our software design.

The two qualitative criteria for measuring module independence are cohesion and coupling. Coupling refers to the degree to which different modules within a software structure are interdependent (connected) with each other. Cohesion is a symbol of how closely the elements within a module are combined with each other. In our software design, the goal of module independence is tight cohesion and loose coupling

5．An invoicing system is to have the following components: amend invoice, produce invoice, produce monthly statements, record cash payment, clear paid invoices from database, create customer records, delete customer. How could the system be broken down into four increments which would be of some value to the users .

increment 1: Create customer, Delete customer

increment 2: Produce invoice, Amend invoice

increment 3: Payment, Clear paid invoices

increment 4: Produce monthly statements

6. Do comparative analysis with software architecture by using the structure of a house or building as an analogy. What are the similarities between the principles of classical architecture (传统建筑) and software architecture? Also, what is the difference between them?

Buildings are built by various components in different ways, for example, different houses have walls, foundations, and so on. Different construction methods constitute different styles of houses. The software architecture is the same, different components are assembled in different ways, forming different software systems.

Difference: 1) A house or building is more practical, and software architecture is more abstract

2) A house or building has less room to change, and software architecture has a larger span of change

五、 分析与设计题（本大题共 3 小题，每题 10 分，共 30 分）

1. In the teaching management system of University, students check their scores through the client terminal by following the steps：

a) At the beginning, the home page is displayed on the terminal. After the user selects the query request, the terminal displays "please enter the student number".

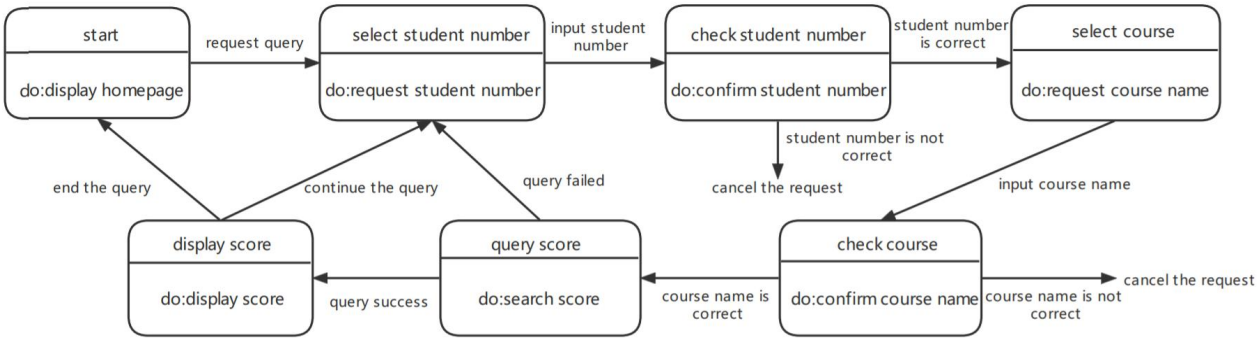
b) After user input student number, the system will check student file with the student number. if the student number is not correct, the terminal shows that the student number is incorrect and the query is cancelled. if the student number is correct, terminal displays "please input the course name".

c) Once the course name is entered, search the course file. If the entered course name is not correct, the terminal shows that the course name is incorrect and the query is cancelled. If the entered course name is correct, search the course selection file according to the student number and course name.

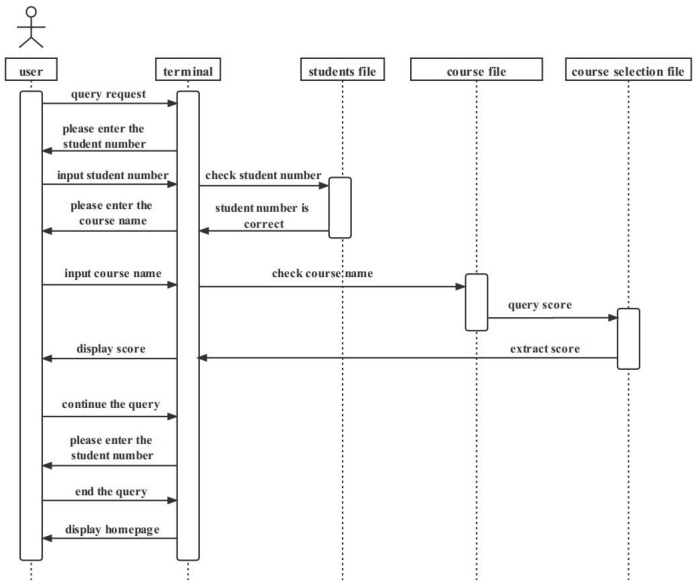
d) If the query is successful in the course selection file, the result queried will be displayed. When the user chooses to continue the query, the terminal displays "please enter the student number". When the user chooses to end the query, it will

return to the home page.

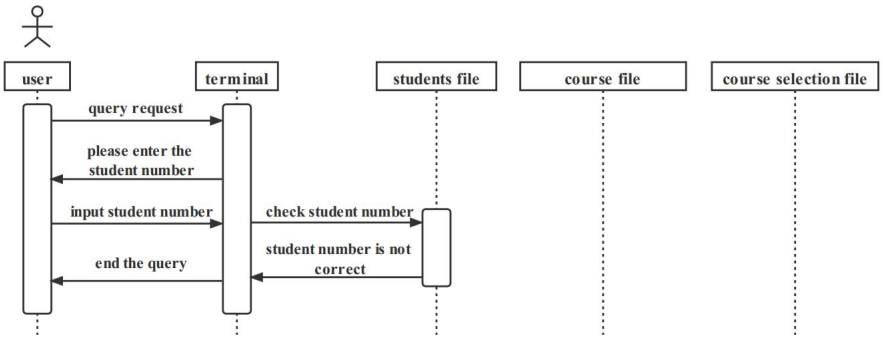
According to UML standards, please draw sequence diagrams (including student number and course name are incorrect) and a state diagram for the score inquiry.



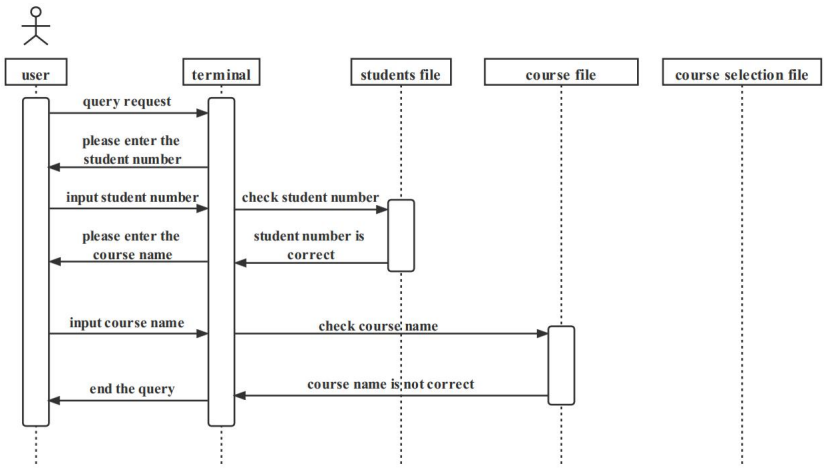
State diagram



Sequence diagram with normal process



Sequence diagram with incorrect student number



Sequence diagram with incorrect course name

2. Given the program code of implementation for Safehome system as follows:

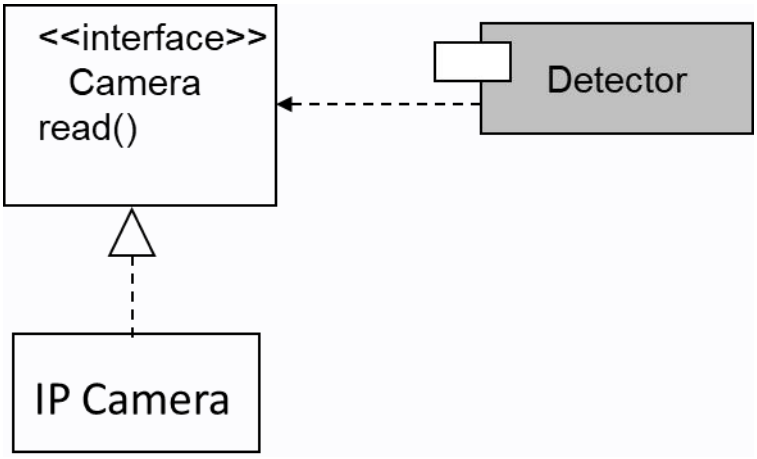
```
//Detector Camera
public class Detector {
        Camera camera;
        public Detector(Camera camera){
                this.camera =camera;
        }
        public void detectCamera(Camera camera){
                System.out.println(camera.read());
        }
}
//Camera 接口
public interface Camera {
        public String read();
}
// IPCamera
public class IPCamera implements Camera{
        public String read(){
                return “Network Camera";
        }
}
```

1）Draw a class diagram corresponding the program code

2）Indicate what and why the design principle is used in the program code

3）Update the program code to expand the camera category to 2 (IPCamera and Infrared Camera)

1）



2）OCP is used in the program code. We use OCP to design module so that the module can be open for extension easy and closed for modification.

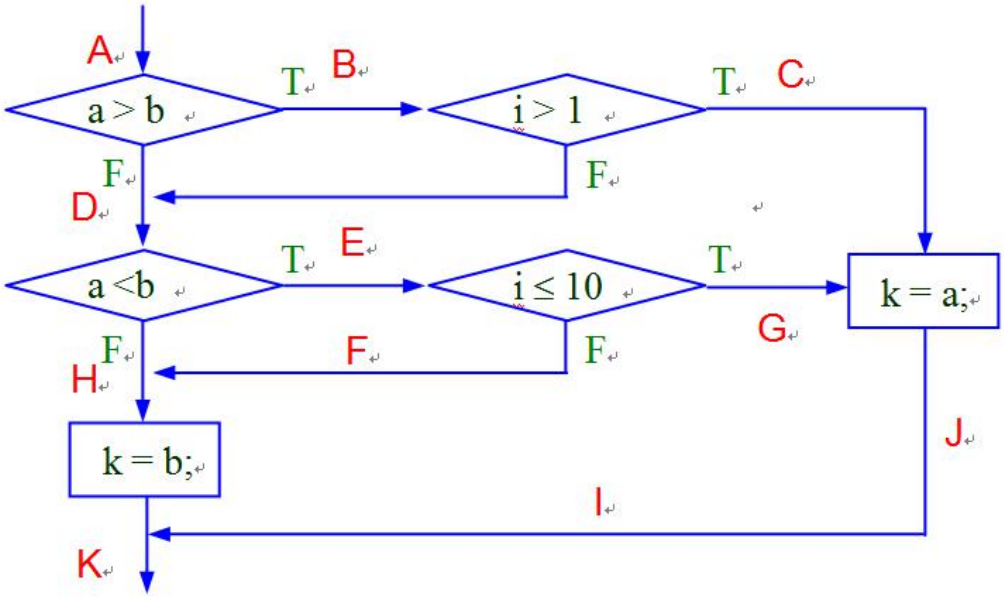
3）

```
//Detector Camera
public class Detector {
        Camera camera;
        public Detector(Camera camera){
                this.camera =camera;
        }
        public void detectCamera(Camera camera){
                System.out.println(camera.read());
        }
}
//Camera 接口
public interface Camera {
        public String read();
}
// IPCamera
public class IPCamera implements Camera{
        public String read(){
                return “Network Camera";
        }
}
//扩充一个Camera
public class InfraredCamera implements Camera {
        public String read(){
                return “Infrared Camera";
        }
}
```

3. Given the program code as follows:

```
void Do (int k, int a, int b, int i)
    {
        if ( (a > b && i > 1) || (a <b && i <= 10) )   k = a;
        else k = b;
        }
```

1) Draw the program chat with simple condition



2) Compute McCabe cycle complexity（环路复杂度）

V（G）=5

3) List a set of independent path for conducting basic path testing

Path1 A→D→H→K

Path2 A→B→C→J→K

Path3 A→B→E→H→K

Path4 A→D→F→G→J→K

Path5 A→D→F→I→K

4) Design test cases to conducting basic path testing

test case

Path1: a=3,b=3, i=10　　expected k=3

Path2: a=3,b=2, i=5　　expected k=3

Path3: a=4,b=2, i=1　　expected k=2

Path4: a=2,b=4. i=9　　expected k=2

Path5: a=4,b=5, i=11　　expected k=5