四川大学期末考试试题（闭卷）

（2020~2021 学年第 2 学期）　　　　　A 卷

课程号：__311232030__　　课程名称：__软件工程导论__　　　　任课教师：_____

适用专业年级：__软件工程 2019 级__　　　　学号：_____　　姓名：_____

题　号	一 (28%)	二 (8%)	三 (64%)
得　分			
卷面总分		阅卷时间	

注意事项：1. 请务必将本人所在学院、姓名、学号、任课教师姓名等信息准确填写在试题纸和添卷纸上；

　　　　　2. 请将答案全部填写在本试题纸上；

　　　　　3. 考试结束，请将试题纸、添卷纸和草稿纸一并交给监考老师。

评阅教师	得分

一、简答题（本大题共 3 小题，共 28 分）。

1. There are five activities in generic process framework. Please apply them to describe the Prototyping process model. (5 Points)

2. Please describe the differences between following items briefly. (15 Points)

   (1) Customer and End-User;

   (2) Requirement and Specification;

   (3) Software Design and Programming;

   (4) Software Construction and Software Deployment;

   (5) Black-Box Testing and White-Box Testing;

3. Please list the four designs models required for a complete specification of a software design and the role of each. (8 Points)

评阅教师	得分

二、非标准答案题（本大题共 **1** 小题，共 **8** 分）。

Please describe the Agile process model in your own words and explain why it is important for software processes to be agile. (8 Points)

评阅教师	得分

三、应用、设计及分析题（本大题共 **6** 小题，共 **64** 分）。

1. You have been asked to build a network-based course registration system for your university. (10 Points)

   (1) Please develop an entity-relationship diagram or class diagram that describes data objects, relationships, and attributes. (5 Points)

   (2) Please develop a sequence diagram showing the interaction involved when a student registers for a course. Courses may have limited enrolment（选课限制）, so the registration process must include to check whether the places are available. Assume that the student access an electronic course catalog to find out about available courses. (5 Points)

2. The working process of the copier（复印机）is as follows：

   When the copy order is not received, the copier is idle（空闲）. Once the copy order is received, the copier will enter the copy state. After completing the work specified in one copy order, the copier will return to the idle state and wait for the next copy order; If no paper is found during the execution of the copy command, it will enter the state of paper shortage, issue a warning, wait for the paper to be loaded, and enter the idle state after the paper is full, ready to receive the copy command; If a paper jam（卡纸）occurs during copying, enter the paper jam state, issue a warning, wait for the maintenance personnel to remove the fault, and return to the idle state after trouble shooting.

   Please use the UML State chart Diagram to describe the behavior of the copier. (12 Points)

3. There is the Deployment diagram for Safe Home system. Please answer following questions according to the diagram: (8 Points)

   (1) What's kind of software architecture was designed for Safe Home system? How many components were designed in this system and what are them? (5 Points)

(2) Please describe the networks and network protocols that were used in Safe Home system. (3 Points)
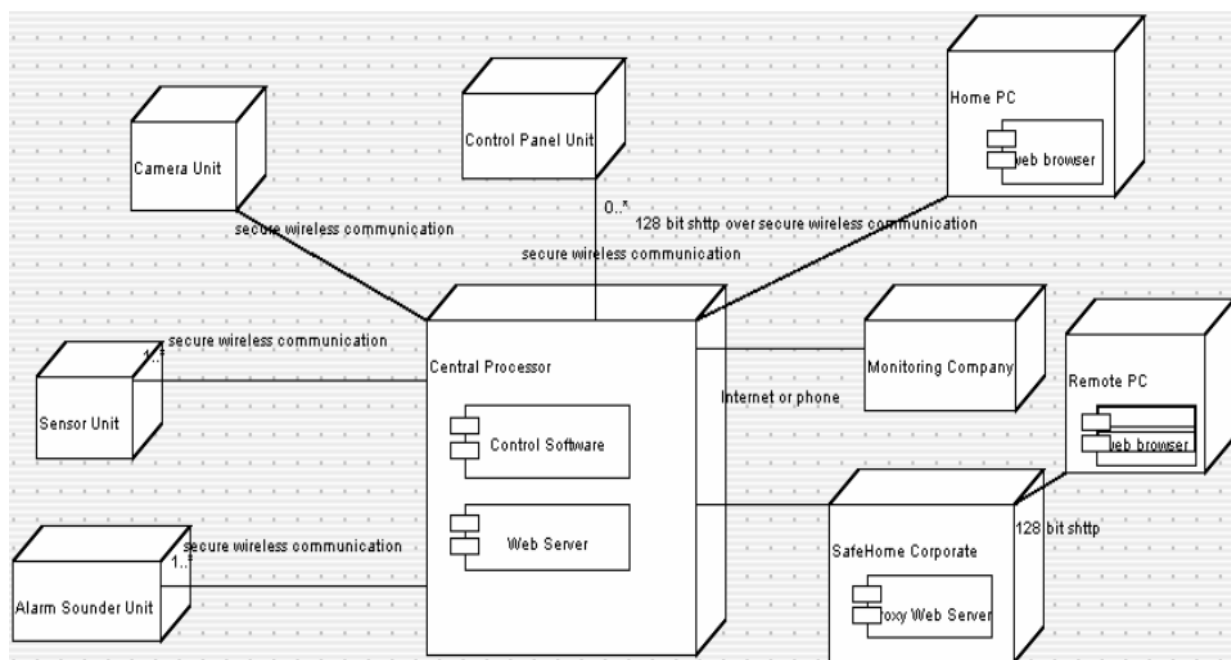
4. Given the program logic as follows: (12 Points)

```
int    a, b;
int    x=0;
int    y=0;
if( a>b ){
        x = a-b;}
    else  {
        x = b-a;   }
    while ( b<0 ) {
        y += b;
        b++;       }
```

(1) Please draw the Flow Chat for this program. (4 Points)

(2) Please compute the cycle complexity of program. (3 Points)

(3) Please list a set of independent path and design a set of test case for basic path testing. (5 Points)

5. A POS (Point-of-Sale) system is a computerized application used to record sales and handle payments. It is typically used in a retail store（零售商店）. Consider the scenario "A Cashier process sale" as follows. (12 Points)

Use Case : Process Sale
Primary Actor: Cashier
Preconditions: Cashier is identified and authenticated.
Success Guarantee (Post Conditions): Sale is saved. Tax is correctly calculated.
Accounting and Inventory are updated. Commissions recorded. Receipt is generated.
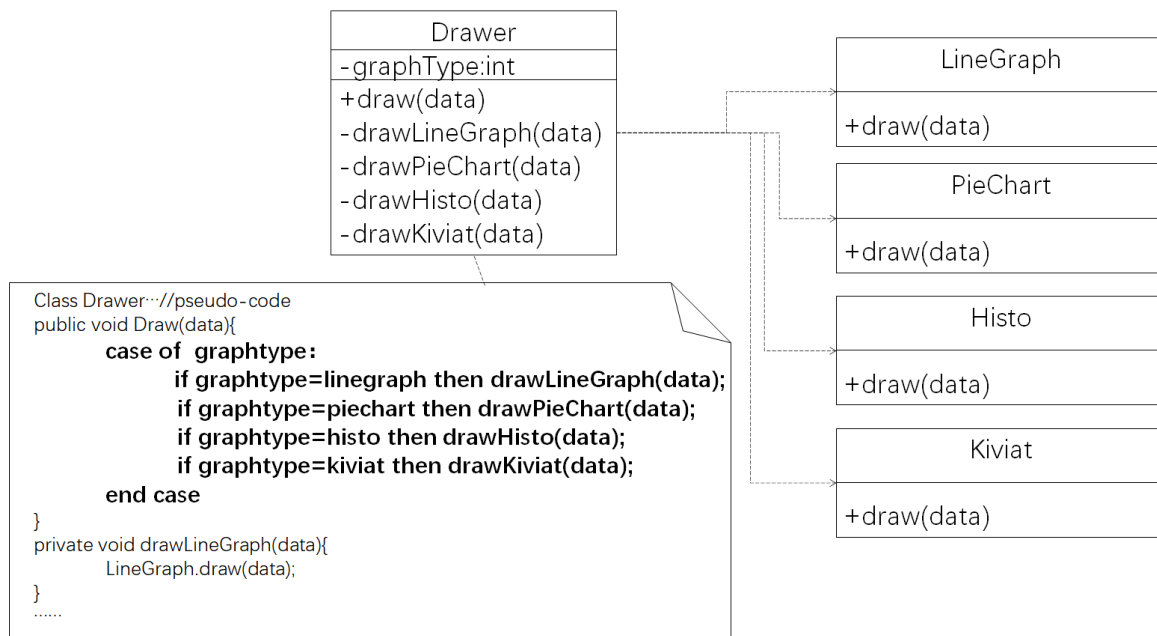Payment authorization approvals are recorded.
Main Success Scenario (or Basic Flow):
1) Customer arrives at POS checkout with goods and/or services to purchase.
2) Cashier starts a new sale.
3) Cashier enters item identifier.
4) System records sale line item and presents item description, price, and running total. Price calculated from a set of price rules. Cashier repeats steps 3-4 until indicates done.
5) System presents total with taxes calculated.
6) Cashier tells **Customer** the total, and asks for payment.
7) Customer pays and **System** handles payment.
8) System logs completed sale and sends sale and payment information to the external **Accounting** system (for accounting and commissions) and **Inventory** system (to update inventory).
9) System presents receipt.
10) Customer leaves with receipt and goods.

According to the above scenario, please design the GUI interface draft for the Cashier.

6. There is an example of component design that violated the principles of OCP (Open-Closed Principle). Please redesign this component model in order to obey OCP principles. (10 Points)

Drawer
- graphType:int
+ draw(data)
- drawLineGraph(data)
- drawPieChart(data)
- drawHisto(data)
- drawKiviat(data)

LineGraph
+ draw(data)

PieChart
+ draw(data)

Histo
+ draw(data)

Kiviat
+ draw(data)

```
Class Drawer···//pseudo-code
public void Draw(data){
        case of  graphtype：
                if graphtype=linegraph then drawLineGraph(data);
                if graphtype=piechart then drawPieChart(data);
                if graphtype=histo then drawHisto(data);
                if graphtype=kiviat then drawKiviat(data);
        end case
}
private void drawLineGraph(data){
        LineGraph.draw(data);
}
……
```

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