1. Use the following example to describe the following questions:

   1) What is encapsulation? 3%

   2) What does the "final" mean? 2%

   3) Why do we use "protected" for getName()? 2%

```
1  public class Animal {
2      private String name = "Animal";
3      public String favFood = "Food";
4
5      protected final void changeName(String newName){
6          this.name = newName;
7      }
8
9      protected final String getName(){
10         return this.name;
11     }
12
13     public void eatStuff(){
14         System.out.println("Yum " + favFood);
15     }
16
17     public void walkAround(){
18         System.out.println(this.name + " walks around");
19     }
20
21 }
```

2. Use the following example to describe Inheritance 3% and Polymorphism 5%.

```
abstract class Animal {
    abstract String talk();
}

class Cat extends Animal {
    String talk() {
        return "Meow!";
    }
}

class Dog extends Animal {
    String talk() {
        return "Woof!";
    }
}

void letsHear(Animal a) {
    println(a.talk());
}

void main() {
    letsHear(new Cat());
    letsHear(new Dog());
}
```

3. Please describe the differences between Interfaces and abstract classes. 5%
4. Draw a class diagram: Customer can send message using both its consumed records and its super class people's birthday and sex. 5%
5. An ATM system includes the main functions a withdraw cash, deposit funds, check balance, transfer funds, perform routine maintenance, and fill ATM with cash. Please do the following: 1) Draw its use case diagram. 10% 2) Create an activity diagram for the use case "Withdraw money." 10%
6. The following is a general situation for a health center system. Whenever new patients are seen for the first time, they complete a patient information form that asks their name, address, phone number and brief medical history, which are stored in the patient information file. When a patient calls to schedule a new appointment or change an existing appointment, the receptionist checks the appointment file for an available time. Once a good time is found for the patient, the appointment is scheduled. If the patient is a new patient, an incomplete entry is made in the patient file; the full information will be collected when they arrive for their appointment. Because appointments are often made so far in advance, the receptionist usually mails a reminder postcard to each patient two weeks before their appointment. Please create **a sequency diagram** for the use case "make appointment". 10%
7. Draw a **class diagram** for each of the following situations: 10% Please also create **an object diagram** as an instantiation of the class diagram. 5%
   Whenever new patients are seen for the first time, they complete a patient information form that asks their name, address, phone number and insurance carrier which are stored in the patient information file. Patients can be signed up with only one carrier. but they must be signed up to be seen by the doctor. Each time a patient visits the doctor, an insurance claim is sent to the carrier for payment. The claim must contain information about the visit, such as the date, purpose, and cost. It would be possible for a patient to submit two claims on the same day.
8. Amazon.com, Inc. is an American electronic commerce company with headquarters in Seattle, Washington. It is the largest Internet-based company in the United States. Amazon.com started as an online bookstore, but soon diversified, selling DVDs, CDs, video and almost everything. Amazon has separate retail websites in the world. It also offers international shipping to certain other countries for some of its products. Please draw a **behavioral state machine** to depict an order as it goes through the whole ordering process. 10%

9. Find out the relationship of the following situations and draw the class diagram.
   20%

   1) Manager is an employee of ABC limited corporation.
   2) Manager uses a swipe card to enter ABC premises.
   3) Manager has workers who work under him.
   4) Manager has the responsibility of ensuring that the project is successful.
   5) Manager's salary will be judged based on project success.