MCSE/MSE-104
M. E./M. Tech. (First Semester)
EXAMINATION, Dec., 2010
OBJECT ORIENTED TECHNOLOGY
Time : Three Hours
Maximum Marks : 100
Minimum Pass Marks. : 40

Note : Attempt any five questions. All questions carry equal marks. Neat and to-the-point answers will fetch higher marks.

1. (a) There are two lists below. The first is a list of classes that describe implementation objects. The second is a list of operations. For each class, select the operations that make sense for objects in that class. Discuss the behavior of each operation list 'for each class.

CLASSES :

Variable length array—ordered collection of objects, indexed by an integer, whose size can vary at run time.

Symbol table—a table that maps text keywords into descriptors.

Set — unordered collection of objects with no duplicates.

OPERATIONS :

Append — add an object to the end of a collection.

Copy — make a copy of a collection.

Count —return the number of elements in a collection.

Delete —remove a member from a collection.

Index —retrieve an object from a collection at a given position.

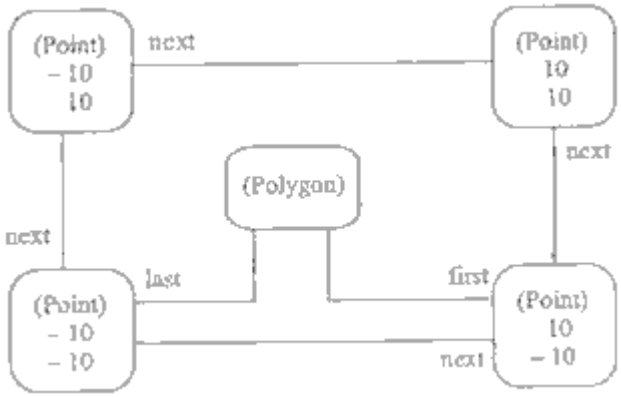
Intersect—determine the common members of two collections.

Insert — place an object into a collection at a given position.

Update —add a member to a collection, writing over whatever is already there.

(b) Describe the concept of Aggregation and Generalization by giving suitable example. Also discuss that how Aggregation is different from Association and Generalization ?

2. (a) Prepare a class diagram for the following instance diagram. Explain your multiplicity decisions. How does your diagram express the fact that points are in order ?



(b) Why sometimes it is better to model an association as a class ? Support your answer with proper example. Also describe the aggregation relations up. In what situation it should be used in construction of object models ?

3. (a) What do you understand by recursive aggregates ? Also discuss propagation of operations.

(b) What do you understand by multiple inheritance ? Describe with suitable example.

(c)Give an example of encapsulation at work in a telephone answering machine.

4. (a) What is the output of the following code segment ?

```
int counterl = 0;
int counter2 = 0;
 int counter3 = 0;
 int counter4 = 0;
int counters = 0;
for (int I = 0 ; I < 10 ; + +I) {
        + +counterl;
                for (int j = 0; j < 10; + +j)
                + + counter2;
                if (I== j) {
                                + + counter3;
                        }
                else {
                        + + counter4;
                        }
                }
+ + counter5;
}
cout < < counterl < < " " < < counter2 « " " « counter3 < < " " < < counter4 ;
```

(b) Design and implement a C + + program that prompts a user for the sides a, b, and c of a triangle, and if these sides do represent a triangle, the program displays the area of that triangle. The sides represent a valid triangle if the sum of the lengths for any two sides is greater than the length of the remaining side. The area of a triangle can be computed from its sides using the formula :

s . (s - a) . (s- b) . (s - c) where s is half of the sum of the sides.

5. (a) What do you understand by dynamic modelling ? What is the role of state diagrams in dynamic modelling ? Draw a state diagram to describe the behaviour of a class of objects of your choice. Also discuss pioblems with flat state diagrams.

(b) Differentiate between relational vs. OO databases.

6. (a) How can you define a class and create objects in C+ + ? Describe with example.

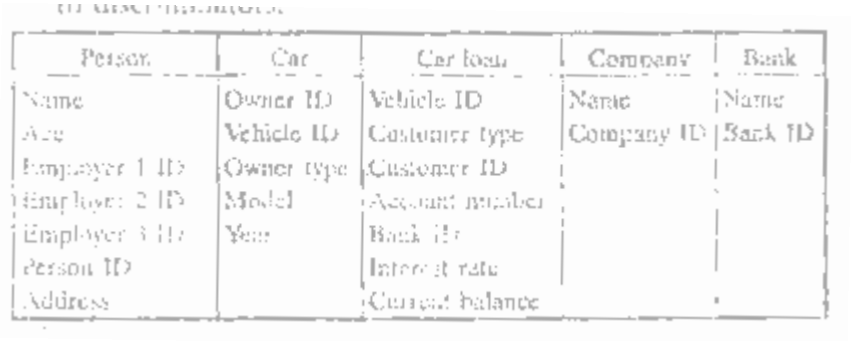
(b) How can you call operations in C+ + ? Describe with example.

(c) Give a suitable code segment to demonstrate the use of Inheritance in C+ +.

(d) Give a suitable code segment to demonstrate the implementation of associations in C+ +.

7. Several object classes shown in figure have attributes that are really pointers to other object classes and which could be replaced with associations. A person may have up-to three companies as employers. Each person has an ID. A car is assigned an ID. Cars may be owned by persons, companies or banks. Car owner ID is the ID of the person, company or bank who owns the car. A car loan may be involved in the purchase of a car.

Prepare an object diagram in which the pointers are replaced with relationships. '11-y to get multiplicities right. You may need to add one or more object classes of your own. Eliminate all Ids. Some attributes may he converted to discriminators.



Person	Car	Car loan	Company	Bank
Name	Owner ID	Vehicle ID	Name	Name
Age	Vehicle ID	Customer type	Company ID	Bank ID
Employer 1 ID	Owner type	Customer ID		
Employer 2 ID	Model	Account number		
Employer 3 ID	Year	Bank ID		
Person ID		Interest rate		
Address		Current balance		

8. Write short notes on any three of the following :
(a) Reusability and its advantages
(b) CORBA architecture
(c) Program design patterns
(d) Event Driven Systems
(e) Architecture of Object Oriented Database