



Open University *of* Mauritius

BSc (Hons) Applied ICT with Specialisation - [OUbs017]

EXAMINATION FOR	:	May/June 2017
MODULE	:	Object Oriented Design and Programming [OUbs017214]
DURATION	:	2 Hours
READING TIME	:	10 Minutes

INSTRUCTIONS TO CANDIDATES

1. This question paper consists of **Three (3) Structured Questions**
2. Answer **ALL** questions.
3. Always start a new question on a fresh page.
4. Total marks: 100 marks

This question paper contains 3 Questions and 4 pages.

ANSWER ALL THREE (3) QUESTIONS

QUESTION 1 [35 MARKS]

- a) Give the object oriented terminology for each of the following object oriented features and supply an example of code that illustrates the feature:
- i. A blueprint for an object which defines all the data items contained in the object and the operations that are permitted for the data;
 - ii. A representation of something within the domain that the program models which contains values of data and which implements operations on that data;
 - iii. An operation which will manipulate the data contained in an object;
 - iv. A variable which holds data that describes an individual object;
 - v. A variable which holds data that is relevant to all the objects created from the same template.

[10 Marks]

- b) Consider the following class definition:

```
public class date
{
    private int day;    // from 1 to 31
    private int month;  // from 1 to 12
    private int year;   // from 2000 upwards
    public void advance(); // move to next day
};
```

- i. Implement a constructor that initialises new objects of date class to be set to the values received in the parameters;
- ii. Implement getters and setters for day, month and year;
- iii. Implement the advance method, which moves to the next day, ensuring that all data members are updated appropriately. (if current day is 31/12/2016, next day will be 1/1/2017);

[5 marks]

[9 marks]

[11 marks]

QUESTION 2 [35 MARKS]

- a) Using the collection of LinkedList, write a java program that will declare, and insert 3 values in a LinkedList called Products. The program should then display the size and check whether “Milk” is one of the products of the LinkedList. Finally it displays the whole list.

[10 marks]

- b) Another important principle of Object Oriented Programming is Polymorphism. Using an appropriate example, explain polymorphism as applied to Object Oriented Programming.

[8 marks]

- c) ABC Kids Playgroup is an after school club for children under 12. The club wishes to keep information on the children and the staff who work there. Two types of staff are employed: Secretaries and Play Workers. Personal details, such as name and address are recorded for all staff and if they are a Play Worker they must also pass a police check. The system must record when this has been passed and when it must be renewed, because a Play Worker cannot work with the children until this condition is met.

When a child starts at the club, a Secretary records personal details such as name, address, date of birth and at least one emergency contact number, up to a maximum of three. As part of the registration process, the Secretary also records who is allowed to collect the child and their contact details. The Play Worker will use these contact details, so that they can check that the person collecting the child at the end of a session is authorised to make the collection.

Some children have special circumstances (e.g. suffers from asthma) which are treated with medication, and the Secretary will record what the condition is, what medicine can be used and what to do in an emergency.

There are different groups a child can join, after an initial assessment the Play Worker is responsible for allocating each child to a group appropriate to their age and ability.

Each week the Play Worker will generate a letter for the parents to advise them which activities their children will take part in.

At the end of each month the Secretary will generate an invoice for the parents to pay.

- (i) Draw a USE CASE diagram for the system **[9 marks]**

- (ii) Draw a SEQUENCE diagram for the system **[8 marks]**

QUESTION 3 [30 MARKS]

A private dental practice wishes to computerise its patient records system. A patient must register with the practice and the system needs to store their name, address and mobile telephone number. Each patient is given a unique seven digit patient number. The system will keep a count of how many patients the practice currently has.

Patients can book an appointment with a particular dentist; the system needs to store the date of the appointment and if the patient attended. A text message will be automatically sent out two working days before the appointment.

After the appointment the dentist update the system with the cost of the treatment undertaken.

The practice employs two types of staff: Receptionists and Dentists. The system needs to record their details; which for all staff includes a four digit employee number, their name, address, gender, contact telephone number and next of kin. Dentists must be qualified; the system will store their highest dental qualification, date awarded and their General Dental Council registration number.

A list of appointment statistics is required at the end of each week. This will be a summary of how many patients turned up and how many were no-shows. If a patient repeatedly misses an appointment they will be charged a fixed amount of money.

All receptionists must go on a first aid course every year. The system must record the date of when they last attended the course and the name of the course provider.

- (a) Write the classes of Staff and Dentist, such that inheritance is applied.
 (Hint you can omit getters and setters). **[5 + 5 marks]**

- (b) Write the class of patient. **[10 marks]**

- (c) Finally, write the class of appointment. **[10 marks]**