SLIATE

SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

Higher National Diploma in Information Technology

Second Year, First Semester Examination – 2016

HNDIT2313 Object Oriented Analysis and Design

Instructions for Candidates:
Answer only five questions

No. of questions : 6
No. of pages :
Time : 3 hours

Question 01

(i) Briefly describe the following in the context of object oriented programming:
   a. Class (02 marks)
   b. The term "inheritance". (02 marks)

(ii) What type of members cannot be inherited from the base class? (01 marks)

(iii) List three types of class member visibilities used in C++. (03 marks)

(iv) Create simple C++ class called "Student"using following description.

Private data member "***RegNo***" (Registration Number) of type integer, Private data member "***Name***" of type string, Private data member "***Marks***" of type float, Private data member "***Remark***" of type string. Private member function ***AssignRemark( )*** to assign Remarks as per the marks obtained by a student. Grading range and the respective remarks are shown as follows:

Grade	Remarks
Marks >= to 60	Selected
Marks < than 60	Not selected

Class should consist of public function ***Input_Data ( )*** to enter values for ***RegNo***, ***Name*** and ***Marks***. Private member function ***AssignRemark()*** should be invoked from ***Input_Data( )*** function. Add another public member function called ***Display ( )*** to display the content of data members. (marks 06)

(v) Answer the questions based on the following programme


```
class employee
    {
      private:
          char designation[20];
      protected:
          double Salary;
      public:
          employee();
          void startdate();
          void promotions();
    };
    class manager : public employee
    {
    Private:
          int ID;
          char Position[20];
          double Extrapayment;
    public:
          manager();
          void inputinfor();
          void Show();
    };
```

a. Write the names of all the member functions which belong to objects of class manager. (03 marks)

b. Briefly explain the term "Constructor" **and** Identify the constructors in above program (03 marks)

Question 02

(i) What is the importance of constructing a use case diagram? (03 marks)

(ii) What is an actor in use case diagram? (02 marks)

(iii) Briefly explain the following relationships. (03 marks)

a. Association
b. Extend
c. Uses or include

(iv) Use the given scenario to answer the questions

ABC caters is a pastry shop. It is going to restructure its pastry shop with implanting software. Here are their new facilities.

Customers are two types as dine-in and take-away customers. Take- away customers can order in the shop or use online facilities to place an order for their functions. Take- away customers can pick it up by themselves or get the service from the delivery person. If they use online facilities to make order he/she should pay using the credit card. Normally online facilities are for large orders.

Waiters help dine-in customers to place orders, and do the payment process. It can be large or small orders. Casher feeds the dine-in customer information to the system.

a. Identify the actor or actors in the above mentioned system. (03 marks)
b. Identify the use cases in the above system. (02 marks)
c. Draw a most suitable Use Cases Diagram for the above mentioned system (07 marks)

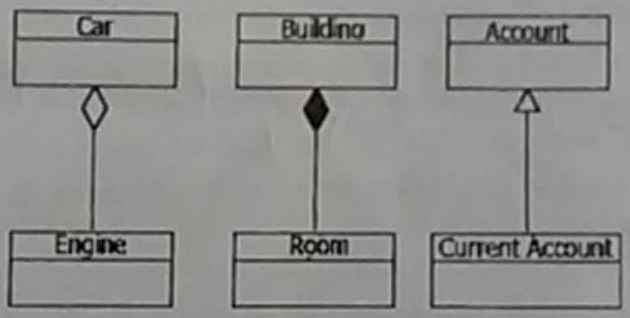
Question 03

(i) UML class diagrams show the classes of the system, their inter-relationships, and the operations and attributes of the classes. What is the importance of Class Diagrams? (03 marks)

(ii) Represent the given information of Student class using class notation.
Data members: Public name string, protected role integer, private section string.
Function members: public method Display(), private method Add() and private method Edit(), protected method Delete()

(06 marks)

(iii) Identify the relationships between the given classes of following diagrams. (03 marks)



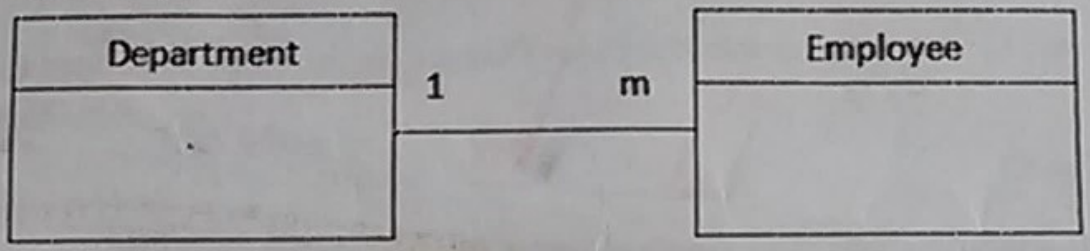
a. b c

(iv) Consider the following scenario, draw a class diagram for this information and be sure to label all associations with appropriate multiplicities.
A hockey league is made up of at least four hockey teams. Each hockey team is composed of six to twelve players, and one player captains the team. A team has a name and a record. Players have a number and a position. Hockey teams play games against each other. Each game has a score and a location. Teams are sometimes led by a coach. A coach has a level of accreditation and a number of years of experience, and can coach multiple teams. Coaches and players are people, and people have names and addresses.
(08 marks)

Question 04

(i) What is the purpose of drawing an object diagram? (02 marks)

(ii) Draw a sample object diagram for following class diagram. (04 marks)



(iii) Describe the importance of State Chart Diagram. (04 marks)

(iv) Draw the symbols used for following states in Sate Chart diagrams. (05 marks)

a. Start State
b. Stop State
c. Transition
d. Self-Transition
e. State

(v) Consider the following description and draw the state transition diagram for described digital watch. (05 marks)

Consider a simple digital watch which has a display and two buttons to set it, the button and the B button. The watch has two modes of operation, "display time" mode, t watch displays hours and minutes, separated by a flashing colon.

The "set time" mode has two sub modes: set hours and set minutes. The A button sele modes. Each time it is pressed, the mode advances in sequence: display, set hours, minutes, display etc.

Within the sub modes, the B button advances the hours or minutes once each time i pressed. Buttons must be released before they can generate another event.

Question 05

(i) What is a Model? (02 marks

(ii) What is UML? (02 marks

(iii) What are the advantages of creating a UML model? (04 marks

(iv) Briefly explain three basic building blocks of UML. (06 marks

(v) Explain the following relationships in UML (06 marks

a. Dependency
b. Association
c. Generalization

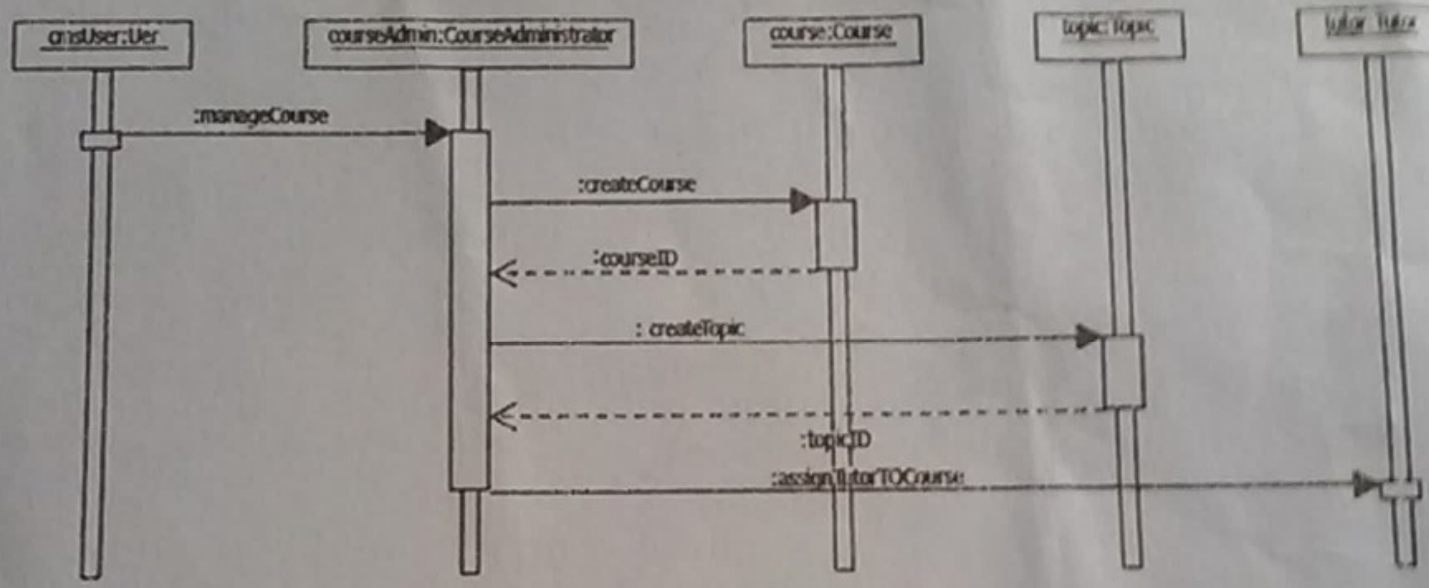
Question 06

(i) Briefly describe what UML Sequence Diagram is. (02 marks)

(ii) Give the symbols for the followings used in a Sequence Diagram:

a. Actor
b. Object
c. Timeline
d. Message and Focus of Control. (04 marks)

(iii) By carefully observing the following sequence diagram, write down the scenario used (06 Marks)



(iv) Draw an Activity Diagram for Airline Reservation System based on the scenario given below.

First, you have to enter arrival/departure dates. Then you can enter your personal information and at the same time the system could be searching availability. The system flow then joins back into one and you can select the specific flight on the dates you want to fly. Then the system takes two different paths depending on whether you are using reward points or not. If you are using reward points, you have to enter points and at the same time the system hold reservation. After entering payment information, the system performs two processes at the same time that is marking seats as reserved and processing payment. Finally it sends out a confirmation email. (08 marks