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 – 2018
HNDIT2313- Object Oriented Analysis and Design

Answers

Instructions for Candidates:
Answer only five questions

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

Question 01

(i) What is meant by object oriented approach in system development? (02 marks)

Approach to system development that views information system as a collection of interacting objects that work together to accomplish task

(ii) Mention two advantages of object oriented approaches (04 marks)

Simplicity
Modularity (easy to partition)
Modifiability
Extensibility (easily upgraded)
Maintainability

(iii) Briefly explain "inheritance". (02 marks)

Forming a new class from an existing class as new class acquires the old class information

(iv) Write the C++ code to implement the classes of restaurant program according to the given details. (12 marks)

Order class has String type **orderID,** String type **date,** float type **amount** and float type discount as protected data members and **addData()** ,**display()** as public method .

Constructor is used to initialize amount and discount variables. addData() method is used to input values to the variables. Display() method is used to display orderID and date.

dineInOder is a sub class of Order class and it has public method **calculate()**. It returns difference between amount and discount. Create object and call all the methods mentioned above.

Without Binary scope resolution operator

```
#include <iostream.h>
using namespace std;
class Order{
protected:
        char orderid[10];
        char date[10];
        float amount;                    02  marks
        float discount;
public:
        Order(){
        amount=0;                        02 marks
        discount=0;}
        void addData(){
        cout<<"Enter order id"<<endl;
        cin>>orderid;
        cout<<"Enter date"<<endl;
        cin>>date;                       02 marks
        cout<<"amount" <<endl;
        cin>>amount;
        cout<<"discount"<<endl;
        cin>>discount;
        }
        void display(){
        cout<<" Order id       :"<<orderid<<endl;
        cout<<"Date    :       "<<date<<endl;          02 marks
        }       };

        class dineOrder:public Order{
        public:
        float calculate(){               02 marks
        return (amount-discount);
        }       };
int main(){
dineOrder a;
a.adddata();                             02 marks
a.display();
cout<< "discounted amount    :"<<a.calculate()<<endl;
return 0;}
```

Question 02 **(Total 20 marks)**

(i) What is meant by polymorphism in object oriented analysis and designing?(04 marks)
Polymorphism is the ability of an object to take on many forms

(ii) Briefly explain the following terms

a. Overloading - Ability to create multiple methods of the same name with different implementations.
b. Overriding - Allows a subclass or child class to provide a specific implementation of a method that is already provided by one of its super classes or parent classes

(iii) What is meant by software development methodology? (04 marks)

Framework used to structure, plan, and control the software development process

(iii) Mention two advantages of efficient software development methodology (04 marks)
Clear understanding of the task ahead
Identify drawbacks earlier
Provide better estimates
Deliver stable systems
Allowing for sufficient time to make adjustments.
Keep the customer informed

(iv) Give two main activities of inspection phase of Unified Process (04 marks)
Customer communication
Planning activities
Business requirements for the software are identified
Rough architecture for the system is proposed

Question 03 **[Total 20 marks]**

(i) What is a model? (02 marks)
System representation of a thing, especially of a system

(ii) State two (02) roles of use case diagrams in modeling systems. (04 marks)

a. *Represent functions of a system behavior as user views.*

b. *Depicts the interactions between the system and external systems and users*

(iii) What is the use of **include** in use case diagrams (02 marks)

Depict the Relationship between an abstract use case and it included use case.

(iv) Draw a use case diagram for the following scenario in a hotel (12 marks)

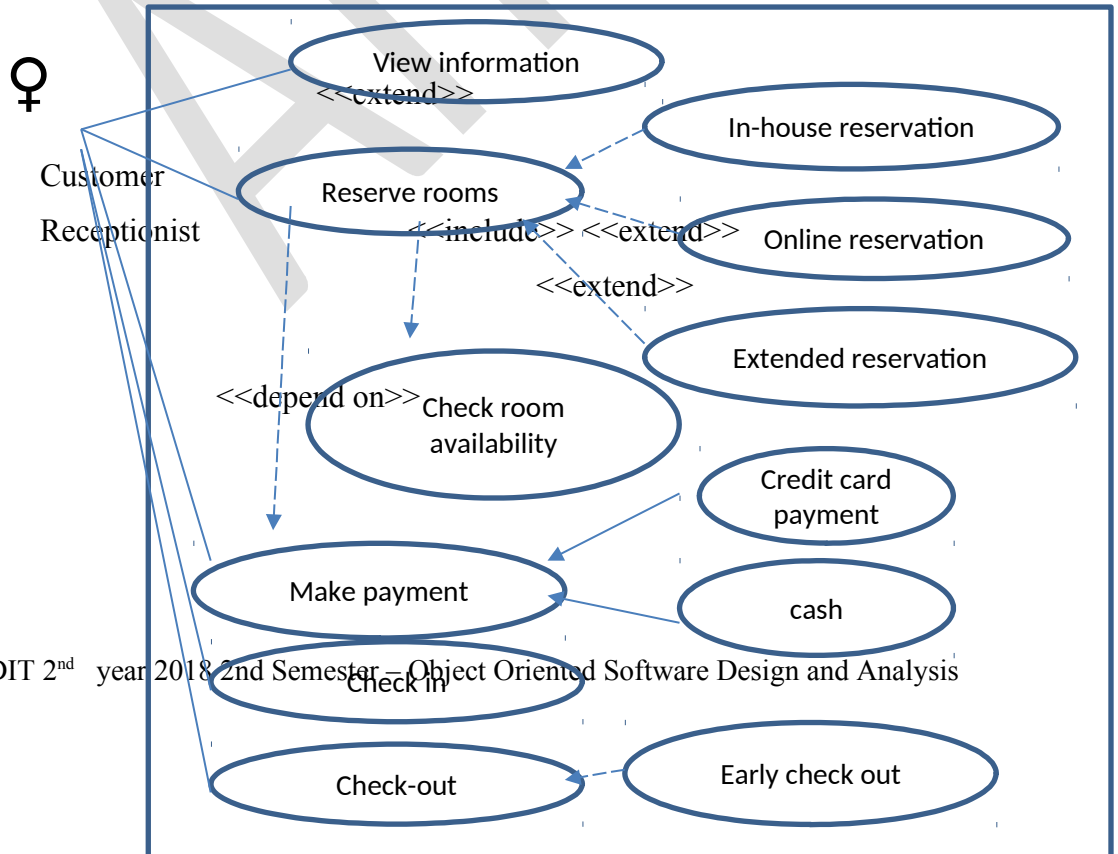
Following text describe the proposed Hotel Reservation System.

A customer can view the hotel information and reserve a room by online or visit the place and reserve rooms. Rooms can be Single room, double rooms or family rooms.

If they are online customers, system will check the room availability and notify the customer availability of rooms. If not, the receptionist does the task.

When the customer makes payment, the room is allocated for them. Online customers should pay via credit cards and others are allowed to pay by credit cards or cash payment.

When the customer checks-in the system is updated. The customer can check-out from the hotel at any time or extend after informing the receptionist. It will be accepted if rooms are available.



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Use cases (½)x12 , relationships- 06

Question 04

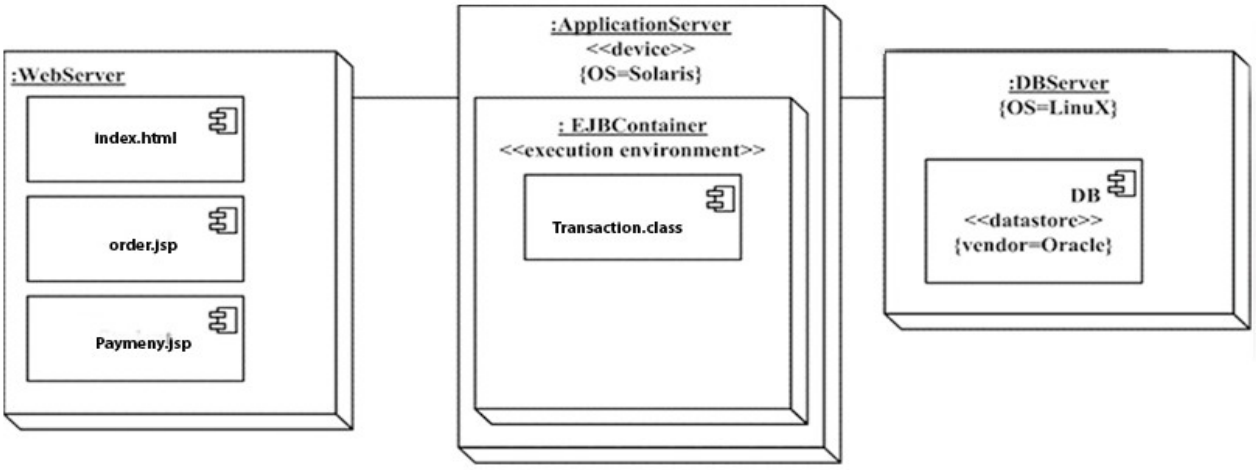
(i) Briefly explain deployment diagram. (02 marks)

UML deployment diagram depicts a static view of the run-time configuration of hardware nodes and the software components that run on those nodes.

(ii) Explain the given deployment diagram for online ordering system. (04 marks)

The home index.html, order.jsp and Payment.jsp files of the restaurant web site are stored in a web server. Transaction file is stored in EJB container. Ejb container is in application server. database is stored in SQL server.

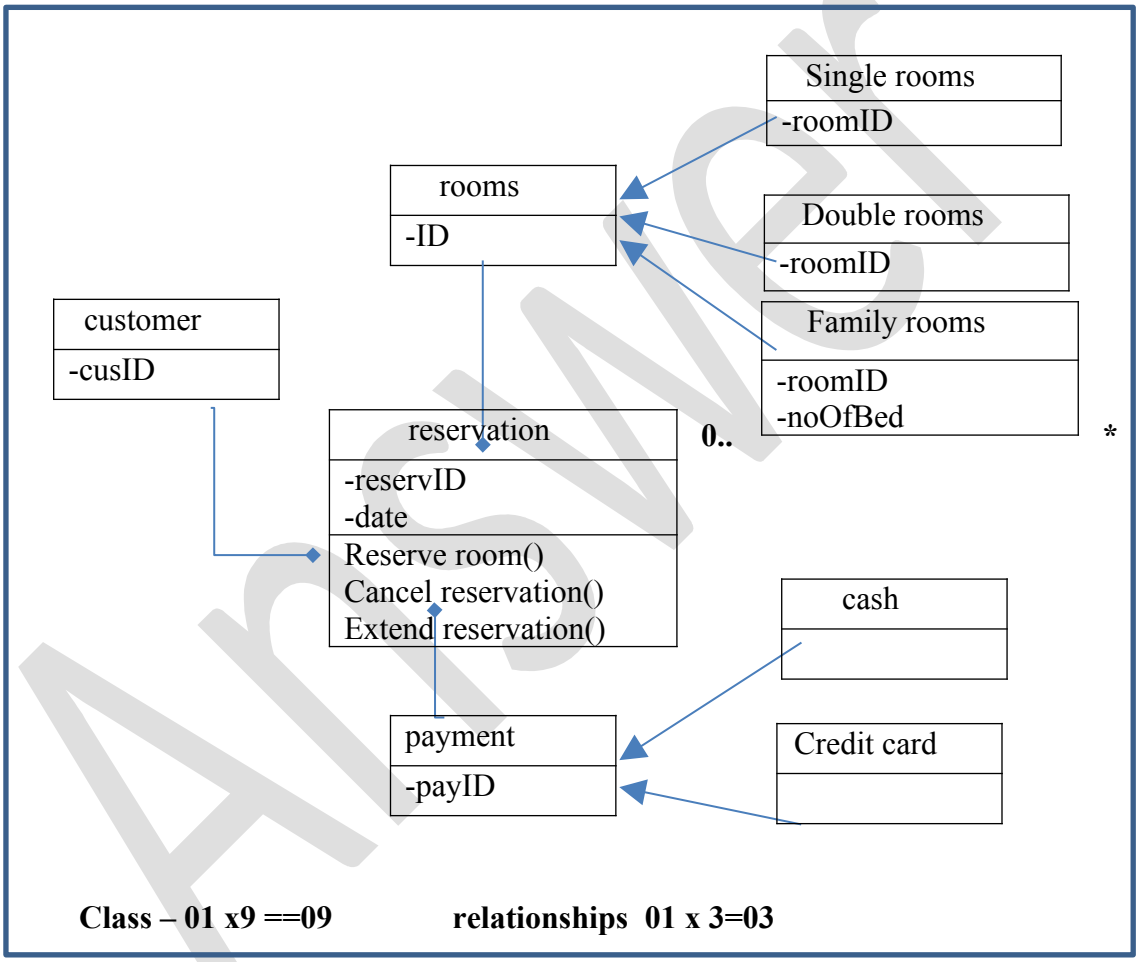
(iii)



Briefly explain the class diagram in UML. (02 marks)

Diagram describes the types of objects in the system and the various kinds of static relationships that exist among them

(iv) Draw a class diagram for the scenario given in question number three(03) part four(iv) . (12 marks)



Class – 01 x9 ==09 **relationships 01 x 3=03**

Question 05 **[Total 20 marks]**

(i) What is an activity diagram in UML? (02 marks)

Activity diagrams *are graphical representations of workflows as stepwise activities.*

(ii) Mention two advantages of using activity diagrams (04 marks)

a. *Describe the workflow behavior of a system.*
b. *Illustrates the dynamic nature of a system*
c. *Allow an analyst to display multiple conditions and actors in swim lanes.*

(iii) Briefly describe the advantages of activity diagram with swim lane. (02 marks)

- *Clearly identify the activity holders*
- *Useful in designing integrated process map across the organization that can be analyzed For inefficiencies and aid improvements*

(iv) Draw an activity diagram with swim lane for the following scenario related to food order process in a restaurant. . (12 marks)

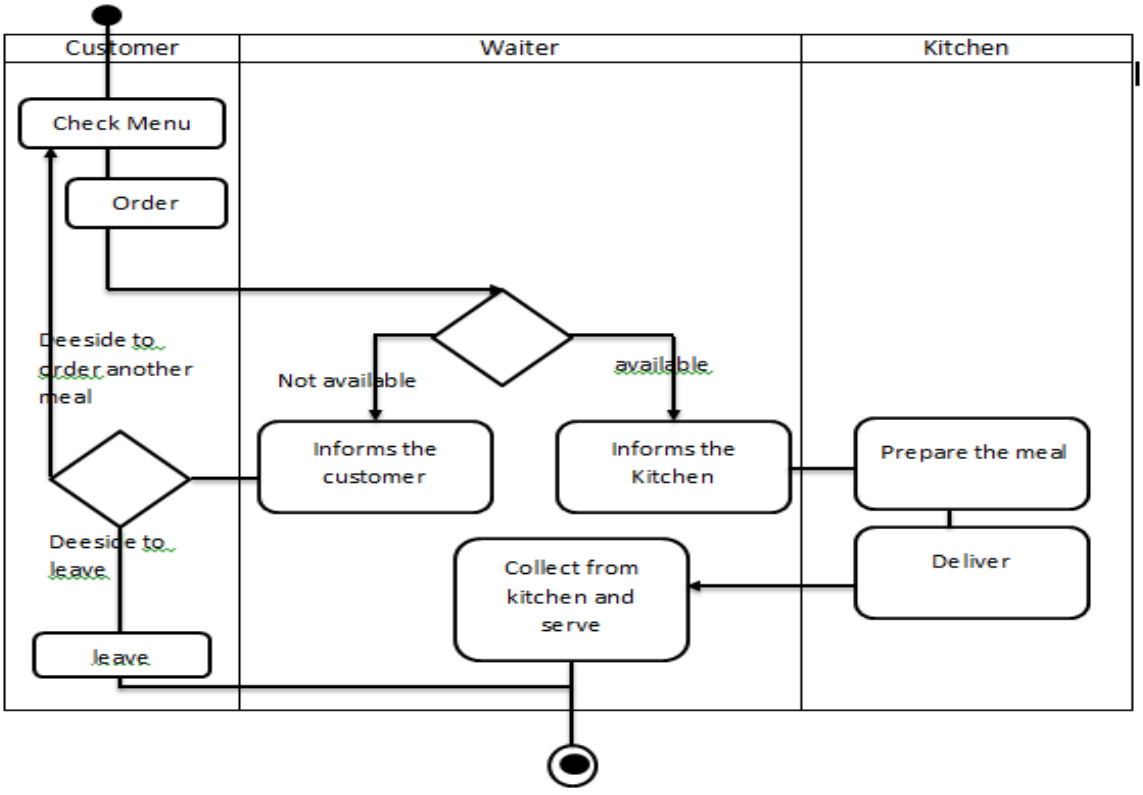
A customer checks the menu and orders food. The waiter checks the availability of food and if available, he informs the kitchen, if not available, he informs the customer.

If the meal is ready it will be informed to the waiter by the kitchen. The Waiter collects the meal and serves the customer. The customer finishes his meal and asks for bill. The Waiter informs the cashier about the order. The cashier prints the bill and issues it to the waiter. The waiter collects the bill and gives it to the customer.

Question 06 [Total 20 marks]

(i) What is a state diagram? (02 marks)

Behavioral diagram that shows different states of a component / object in a system



(ii) State two reasons to draw state diagrams (02 marks)

a. *Model the dynamic nature of a system*
b. *Describes different states of a component*

- Developers, in particular, have to know
  - how objects are supposed to behave
  - because they have to implement these behaviors in software.
  - It is not enough to implement only objects.
  - Developers have to make that object do something.
- State diagrams ensure that they won't have to guess about what the object is supposed to do.

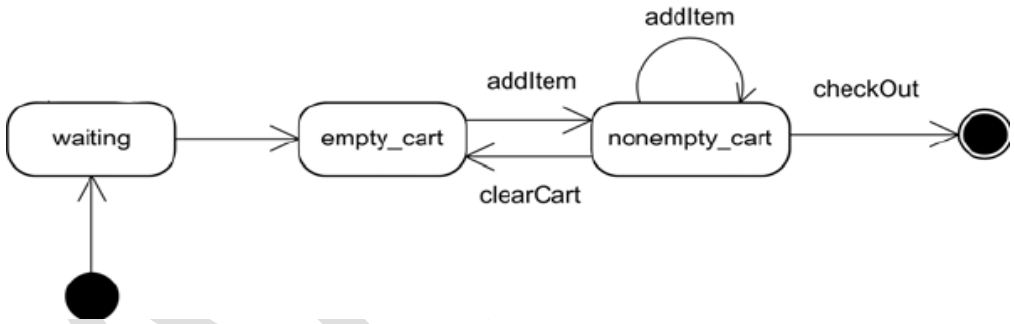
c.

(iii) Briefly explain the following terms in state diagram

a. state transition - *An action which represent a change from one originating state to successor state* (02 marks)

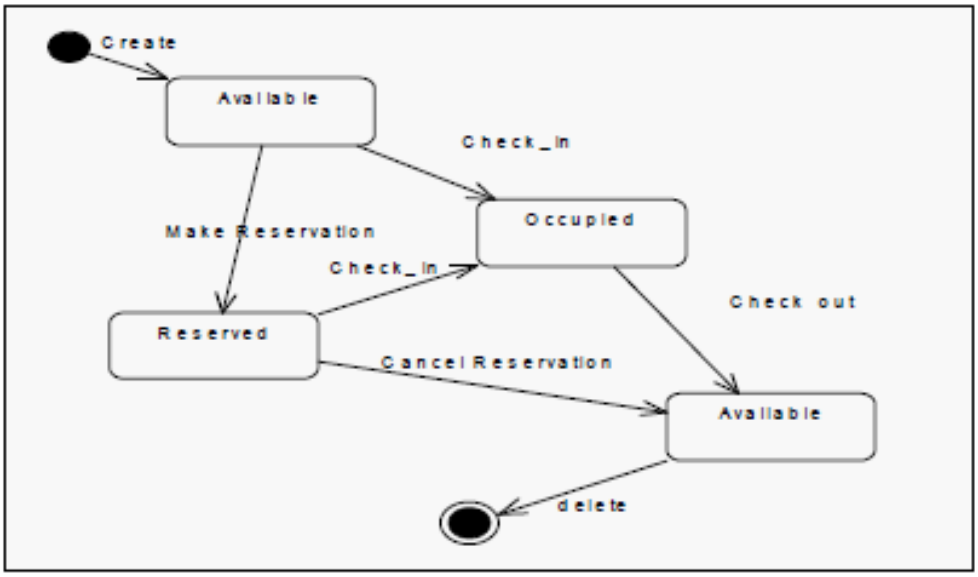
b. entry action - *Behavior that occurs while the object is transitioning to the state* (02 marks)

(iv) Briefly explain the scenario given in the following state diagram (04 marks)



New cart → start to process it will empty card when add item it is nonempty-cart and it allow to add items. If remove item, it will become empty-card again.

(v) Identify the states of **room** in hotel reservation system and draw the state diagram for it. (08 marks)


Create
Available
Check_in
Occupied
Make Reservation
Check_in
Check out
Reserved
Cancel Reservation
Available
delete