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 – 2015**

**HNDIT23093- Object Oriented Analysis and Design**

# Model Answers

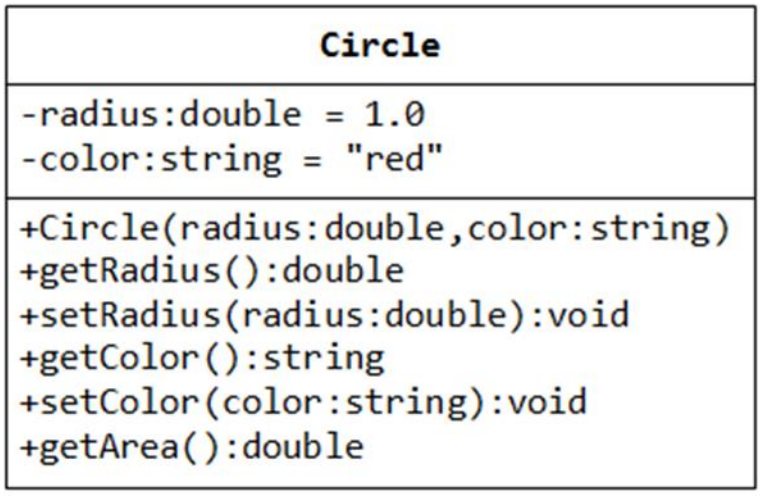
1)

2)

I) What are the advantages of following Object Oriented concepts and give examples using C++ to explain these concepts? (05 x 3 Marks)

a. Function overloading
b. Constructors
c. Inheritance

II) Write C++ code relevant to the following class. (05 Marks )



3)

I. What is a software development process?

**A software development process or life cycle is a structure imposed on the development of a software product**

(02 marks)

II. What are the key activities in software development process?

**Requirement specification and analysis**
**Design**
**Implementation**
**Testing**
**Maintenance**

(05 marks)

III. Describe what is Unified Software Development Process?

**Unified Software Development Process or Unified Process is a popular iterative and incremental software development process framework, which is more suitable for object oriented Software Development.**

(03 marks)

IV. State the main features of Unified Software Development Process?

**Iterative and incremental development.**
**Component-based development;**
**Requirements driven development;**
**Configurability;** (04 marks)

V. Briefly describe the followings

Inception Phase

**Create Vision document, draw Initial use-case model, prepare Initial risk assessment, crate Project Plan, and create required Prototypes**

Elaboration phase

**Draw elaborated Use-case model, identify functional, non-functional Requirements. Prepare analysis model, design software architecture, prepare Preliminary design model, prepare Revised risk list, create revised prototypes**

(03*2 = 06 Marks)

4)

I) Define what is UML?

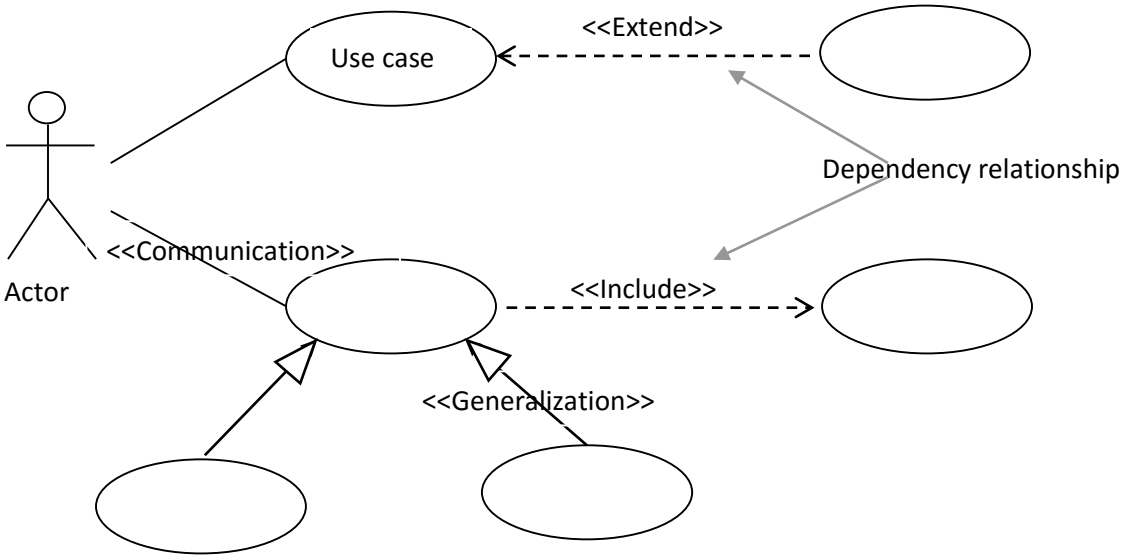
**UML is Unified Modeling Language.**

**It is the standard language for visualizing, specifying, constructing, and documenting the artifacts of a software-intensive system.**

(02 Marks)

II) Illustrate the basic notations used in the Use Case Diagram.

[Give any four: Actor, use case, extend and include] (4 marks)




(04 Marks)

III) Read the following scenario carefully and answer the following questions.

Hospital Reception subsystem supports some of the many job duties of hospital receptionist. When registering a patient the receptionist schedules patient's appointments and admission to the hospital. Patient may be admitted as outpatient or inpatient however registration is must. For the patient who will stay in the hospital ("inpatient") he or she should have a bed allocated in a ward. Receptionists might also receive patient's payments, record them in a database and provide receipts. Further he or she files insurance claims and medical reports also.

a. Identify the actor or actors in the above mentioned system.

**-Receptionist**

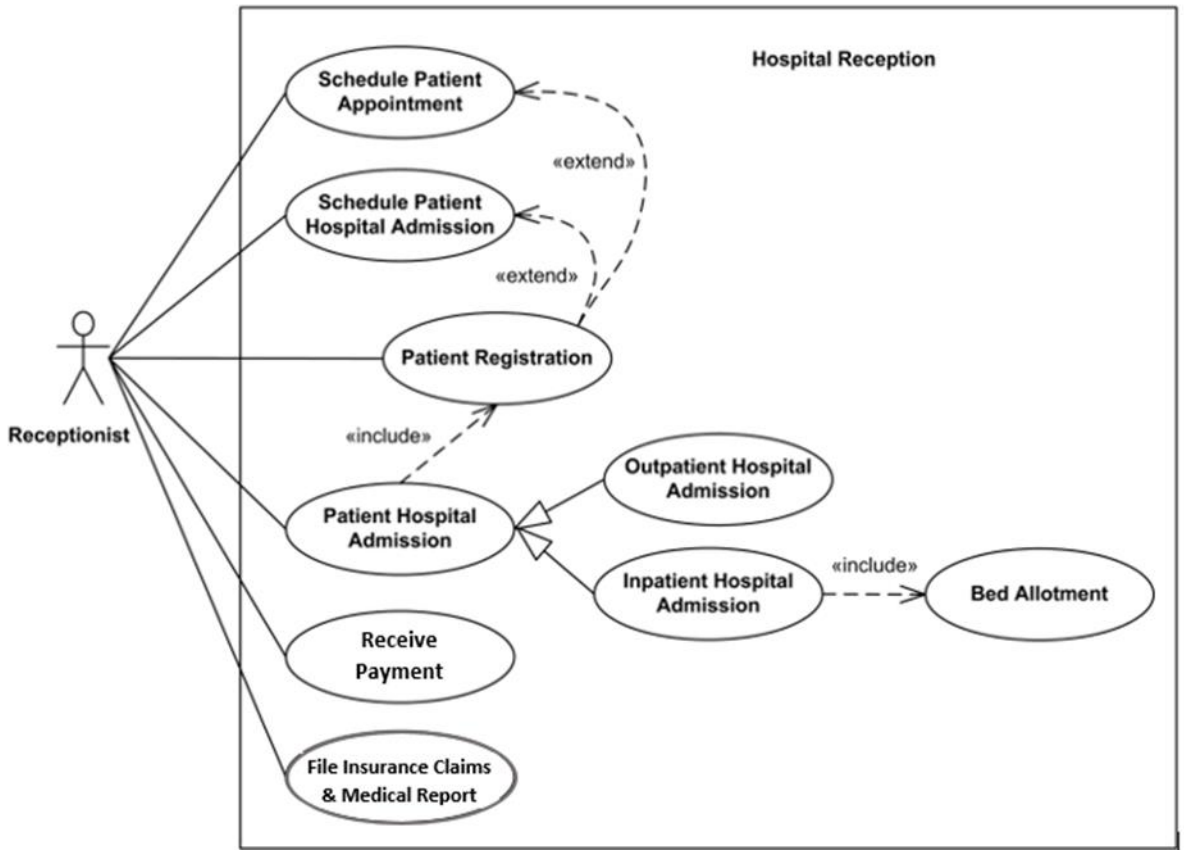
(02 Marks)

b. Identify the use case or use cases in the above system.

**Schedule Patient Appointment, Schedule Patient Hospital Admission, Patient Registration, etc.**

(04 Marks)

c. Draw a most suitable Use Cases Diagram for the above mentioned system.
(08 Marks)

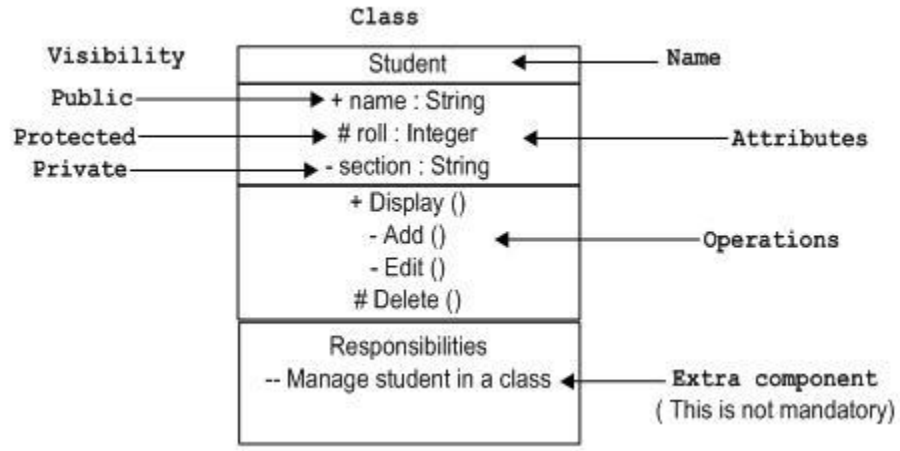



5)

Q5.

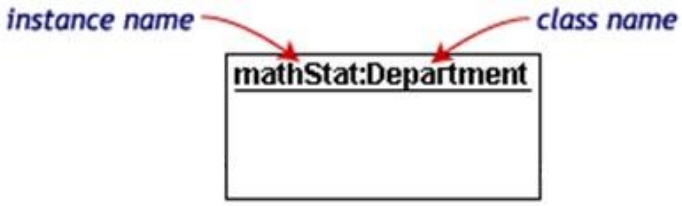
(i) What is the difference between class notation and object notation in UML? [02 marks]

**Class Notation:**




**Object Notation:**

**The object is represented in the same way as the class. The only difference is the name which is underlined as shown below.**

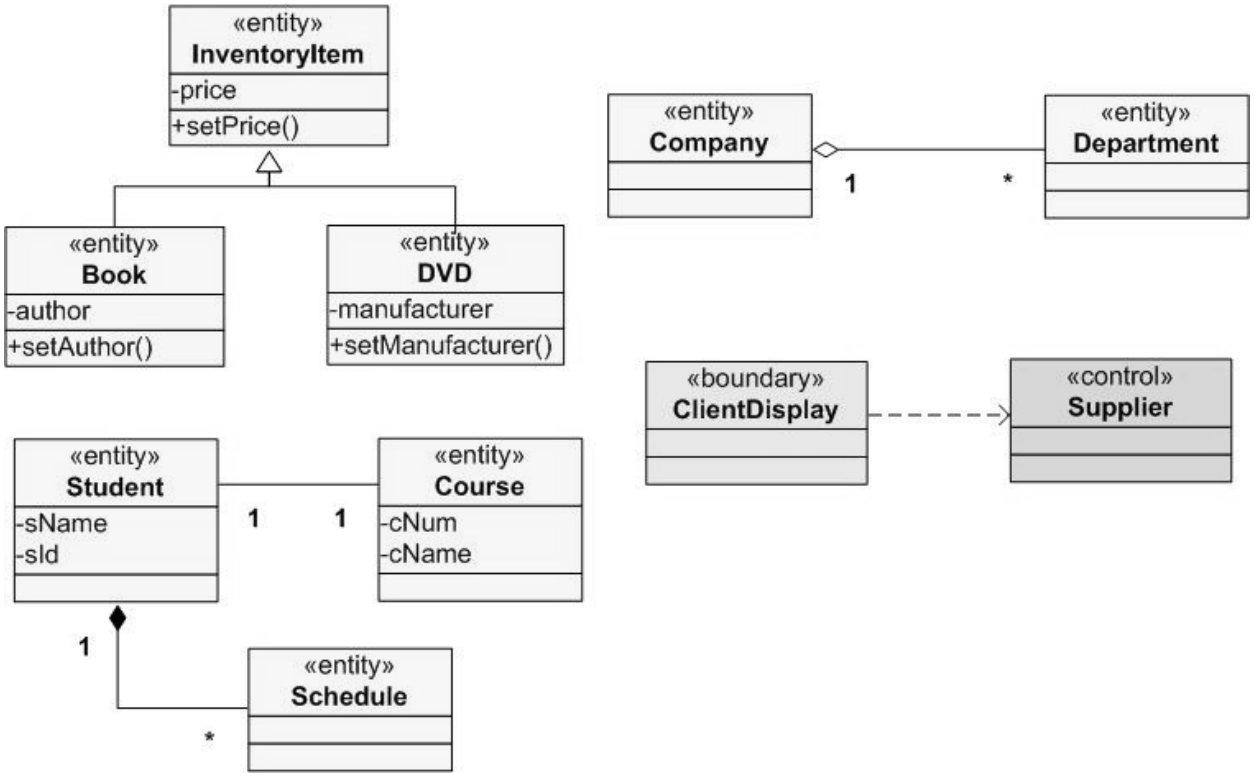



(ii) State three (03) key entities can be identified in the composite structure diagrams?

[1 x 3 =03 marks]

**Any three entities among structured classifiers, parts, ports, connectors, and collaborations**

(iii) Consider the following UML Class Diagram snippets. Identify the type of relationship between classes given below.




a) InventoryItem and Book : **Generalization(Inheritance)**

b) Student and Course : **Association**

c) Student and Schedule : **Composition**

d) ClientDisplay and Supplier : **Dependency**

e) Department and Company : **Aggregation**

[1 x 5 = 05marks]

(iv) Consider the following description to design a system for a university.

- In a university there are different lecture rooms, offices and departments. A department has a name and it contains many offices.
- Each person may play the role of student or employee and has a unique ID. Employee can be either professor or registrar. Student may be an under-graduate, master student or Ph.D. student. A professor can be a full, associate or assistant professor and he/she is enrolled in one department.
- Offices and classrooms have a number ID, and a classroom has a number of seats.
- Every employee works in an office.

a) Identify the classes of the system.

**University, Department, Room, Office, Class Room, Person, Employee, Student, Professor, Registrar, Full Professor, Associate Professor, Assistant Professor, Undergraduate student, Master student, Ph.D Student**

[0.25 x 16 = 04 marks]

b) Draw the UML class diagram for the above system. Indicate relationships and multiplicities between classes clearly. [06 marks]

6)

I) Describe the purpose of drawing an activity diagram?
**Draw the activity flow of a system.**
**Describe the sequence from one activity to another.**
**Describe the parallel, branched and concurrent flow of the system.**
(03 Marks)

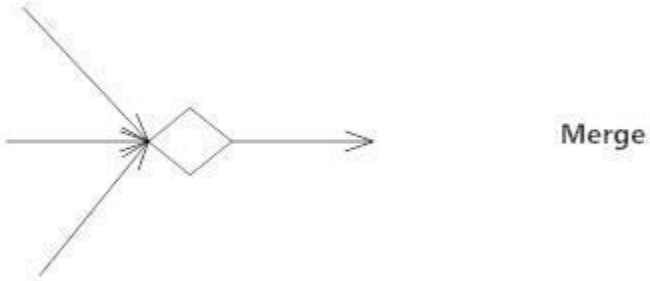
II) Clearly illustrate the following symbols used in activity diagrams.

a. Initial state /Start point

b. Action state /Activity


Activity

c. Join /Merge




d. Decision making


(04 Marks)

III) Give three (03) uses of swim lanes?

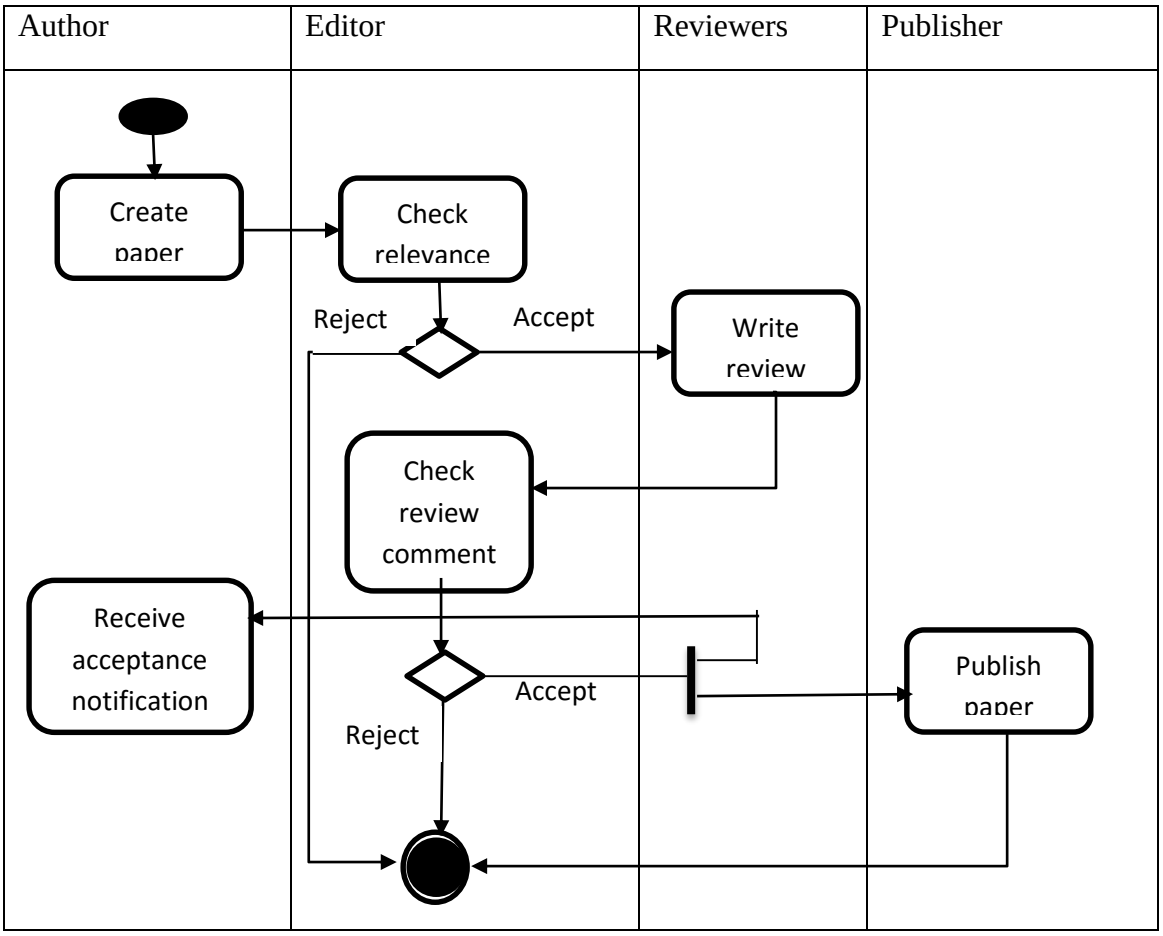
- **Swim lanes (or activity partitions) indicate where activities take place.**
- **Swim lanes (or activity partitions) indicate who performs the activities.**
- **Swim lanes can also be used to identify areas at the technology level where activities are carried out**

(03 Marks)

IV) Construct an activity diagram with swim lane for the following scenario.

(10 Marks)

This describes the business process to publish a research paper. The author submits a paper to an editor of a journal. The editor first checks whether the paper fit the theme of the journal. If not, the editor rejects the paper. Otherwise, the editor assigns the paper to a number of reviewers. The reviewers review the paper, and write a review. The review is sent to the editor. The editor then assesses the quality of the paper with the help of reviewers' comments. If the quality is good, the paper will be accepted, and the author notified. Furthermore, the paper is forwarded to the publisher for publication. If the quality is bad, the editor rejects the paper. (Use paper as the object flow).


Author
Editor
Reviewers
Publisher
Create paper
Check relevance
Reject
Accept
Write review
Check review comment
Receive acceptance notification
Accept
Reject
Publish paper