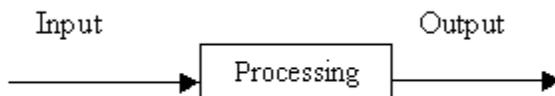


Higher National Diploma in Information Technology
 First Year, Second semester Examination-2011
IT2005: System Analysis and Design
Answer Script

No. of pages: 11

1. i. What are the 3 major components of a information system and show their relationship
 input
 output
 processing (1*3=3 marks)



(2 marks)

- ii. List down 3 stakeholders of information system development and describe each by indicating their role. (2*3=6 marks)

System User- A customer who use the information system and they define the business requirements

System Designer-technical specialists who translates user's requirements into technical solutions

System Builders- technical specialists who constructing, testing and delivering the system

System Analysts- people who analyze both business and computing

System Owner -Who owns the system, Responsible for funding, setting vision and priorities

Listing 3 -3 marks

Describing 3 -3 marks

- iii. Type of the information system is directly related with the organizational level. identify **one** information system used by following each level. (1*3=3 marks)

a) Strategic level-ESS, DSS

b) Management level-DSS, MIS

c) Operational level-TPS,OAS,MIS

- iv .Briefly explain the use of mentioned 2 information systems (3*2=6 marks)

Transaction Processing System (TPS)

- Information Systems that capture and process data about business transactions.
- Used mainly by operational level employees

Management Information System

- MIS is an information system application that provides for management oriented reporting.
- lower and middle **management can control, organize and plan** more effectively and efficiently.

Decision Support System (DSS)

- Provides its user with decision-oriented information whenever decision making situation arise.
- They are interactive systems that **assist** a decision maker when faced with **unstructured or semi structured business problems.**

Executive Information System (EIS)

- An information system designed for top-level managers.
- They integrates data from all over the organization into graphical indicators and controls

2. i. What are the main phases of System Development Life Cycle (5 marks)

Problem Definition(systems Investigation)
Systems Analysis
Systems Design
Systems Implementation
Systems Testing
Systems Maintenance

- ii. Identify the most suitable life cycle model for the following systems

- (a) A system with high technical risk- **spiral model**
(b) Clearly understood library system-**Linear waterfall model**
(c) Large system that would be developed gradually-**prototyping model**

(2*3=6 marks)

- iii. Mention 2 advantages and 2 disadvantages in prototyping

(2*2=4 marks)

Advantages of prototyping

1. Users are actively involving
2. Reduces development time.
3. Reduces development costs.
4. Requires user involvement.
5. Developers receive quantifiable user feedback
6. Facilitates system implementation since users know what to expect.

7. Results in higher user satisfaction
8. Exposes developers to potential future system enhancements.

Disadvantages of Prototyping

1. High cost
2. Can lead to insufficient analysis.
3. Users expect the performance of the ultimate system to be the same as the prototype.
4. Developers can become too attached to their prototypes
5. Can cause systems to be left unfinished and/or implemented before they are ready.
6. Sometimes leads to incomplete documentation.

iv. Write down 3 roles of a system Analyst (1*3=3 marks)

1. identify the problem
2. analyze and understand the problem
3. identify the requirements
4. identify the solution

any other acceptable one

v. Define the term Requirement elicitation (2 marks)

Requirements elicitation is the process of identifying the sources of requirements for a new system and obtaining those requirements from those sources.

3. i. List 4 fact finding techniques used to understand the requirements of the proposed system (1*4=4 marks)

Questionnaires, interviews, On site observation, prototyping, JRP

ii. Briefly explain Joint Requirement Planning (JRP) in requirement gathering
Highly structured group meetings are conducted to analyze problems and define requirements.
JRP is a subset of a more comprehensive joint application development or JAD technique. (3 marks)

iii. Explain tangible and intangible cost using 2 examples for each

Tangible cost definition – cost that can be easily measurable (1 marks)

ex;-hardware cost, software cost, salary for professionals (1*2 marks)

Intangible cost definition-cost that can't be easily measurable (1 marks)

ex;- losses in productivity, customer goodwill or drops in employee morale (1*2 marks)

iv. What is “present value method” when determining project is worthwhile (3 marks)

That method is determining how much money it is worthwhile investing now in order to receive a given return in some year's time.

v. What is the Present Value of Rs.100 we will receive in 5 Years, using a 5% discount rate?

$$\text{Hint- } PV = FV / (1+i)^n$$

$$PV = 100 / (1+0.1)^5$$

$$= \text{Rs.75.13}$$

(4 marks)

4. i. Consider the following statements and write whether they are true/false (1*5=5 marks)

(a) Rational Rose is a tool which assists analysts and designers to build information systems.-
true

(b) A Methodology is the process of building and maintaining a system to ensure that systems are built in the most effective way.-**true**

(c) Tools will support methodologies and will replace systems analysts.-**false**

(d) Automated tools improve the quality of the software being developed, because they check for completeness, consistency and contradictions.-**true**

(e) Any computer application assistant will be able to use these tools.-**false**

ii. Briefly explain the problem identification using internal consideration during initial analysis of a system (5marks)

Identify problem with respect to Goals within the practical bounds. Sub goals used to guide detailed analysis and design in later stages. Project goals will remove deficiencies in the existing system

- Deficiencies are found in Examining documents about performance e.g.:- Unsatisfactory performance
- Interviews–
- Etc.

Note: - Give marks any which reflects the idea

iii. "Polymorphism" and "Aggregation" are considered as important system concepts for object modeling .Define them briefly. (3*2=6 marks)

Polymorphism: -

meaning "many forms", the concept that different objects can respond to the same message in different ways. Both have the common behavior But the way it has been carried Out differs from one another

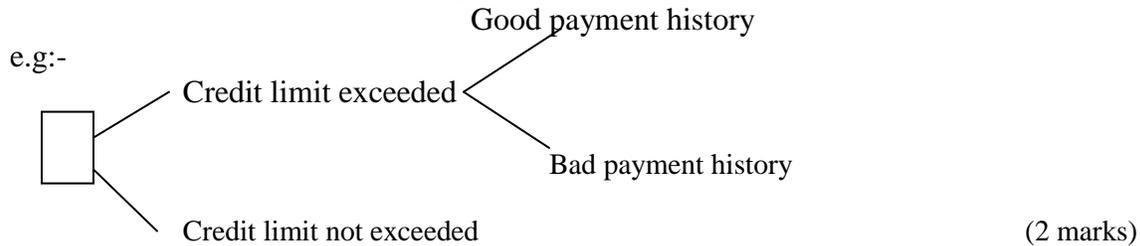
Aggregation:-

A relationship in which one larger “whole” class contains one or smaller “parts” classes. Conversely, a smaller “part” class is part of a “whole” larger class.

E.g. computer –a computer contains a case, CPU, motherboard ...etc.

iv. What is a Decision tree? Explain with a suitable example

A graph or model of decisions and their possible consequences, including chance event outcomes, resource costs, and utility. (2 marks)



5. i. Why should a feasibility study be carried out before commencing an information system development project?

The feasibility study investigates the problem and the information needs of the stakeholders.

- It seeks to determine the resources required to provide an information systems solution,
- the cost and benefits of such a solution.
- consider alternative information systems solutions,
- propose the alternative most suitable to the organization.

(1*4=4marks)

note:- allocate marks for any correct responses

ii. Write short notes on any (4) of the followings

(4*4=16 marks)

Document Flow Diagram

- Shows the flow of data through the system and the processing performed by the system
- analysts draw a decomposition diagram before DFD
- There exist several competing symbol sets for DFDs.
- Major components are process, external agent, data flow and data store

Rapid Application Development

- Development (RAD) is a development lifecycle designed to give much faster Development
- higher-quality results than those achieved with the traditional lifecycle

- RAD systems provide a number of tools to help build graphical user interfaces that would normally take a large development effort.
- RAD systems have tended to emphasize reducing development time and increased quality

Logical data modeling

- LDMs are used to explore the domain concepts, and their relationships, of problem domain. .
- LDMs depict the logical entity types, typically referred to simply as entity types, the data attributes describing those entities, and the relationships between the entities.
- A logical data model describes the data in as much detail as possible, without regard to how they will be physical implemented in the database.

Spiral model

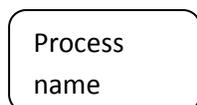
- Spiral model is a system development life cycle model
- That is an evolutionary version of incremental prototyping.
- Each iteration of the prototype represented as a cycle in the spiral.
- The Spiral software development model is a risk-oriented.
Spiral software development model may be applicable to projects where the projects requirements are very difficult to identify

Economic feasibility

- A measure of the cost-effectiveness of a project
- once specific requirements and solutions have been identified this is carried out
- Weight the costs and benefits of each alternative
- Prepare Cost benefit Analysis
E.g. Personnel cost, Computer cost, Training, Software

4. i. What do you mean by a context data flow diagram? (3 marks)
A diagram that shows the system as a “black box “and its main interfaces with its environment.
That is used to document the scope of the system

- ii. Draw the symbol used in Gane and Sarson notation to represent a process? (2 marks)



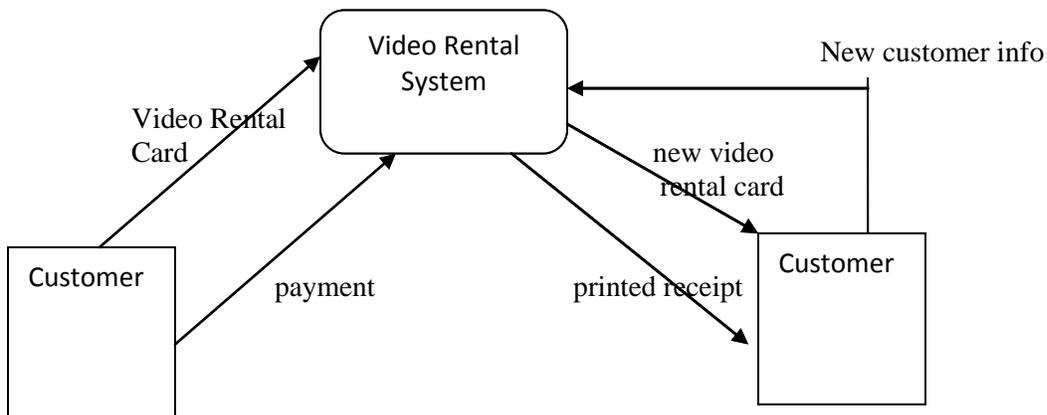
- iii. "Super film" is a video rental shop conducting video rental business. Following are the business activities for video rental system

- customer requests video rental items by presenting the clerk video rental card containing customer id

- Then information about video is retrieved from the system and if it is available then customer can rents video item and settle the payment and also receive the printed receipt and video.
- After that inventory file and rental details file are updated
- When new customer comes first he want to be registered and that is inserted to the customer details file and customer receives new video rental card
- When customer returns the video rental details and inventory are updated to show the video has been returned

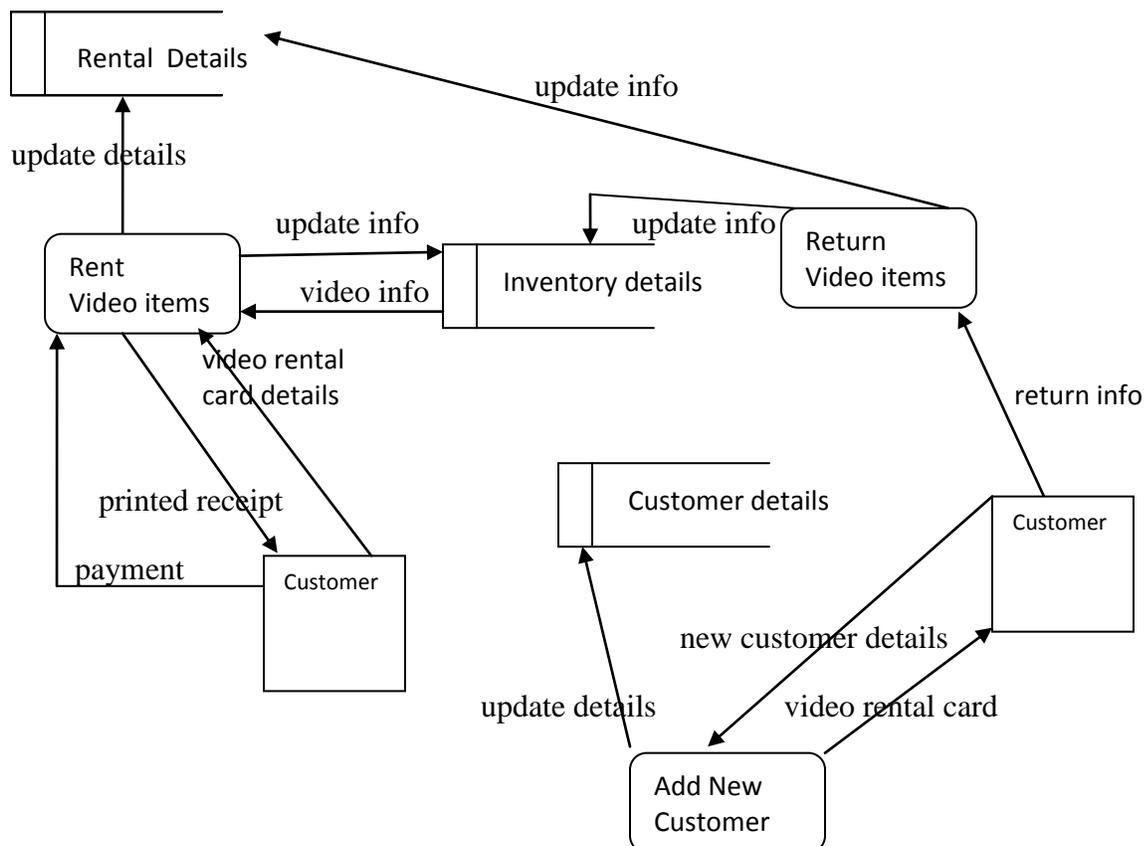
(a) Draw a context diagram for the above system

(5 marks)



(b) Draw a level 0 DFD for the above system

(10 marks)



5. i. Fill in the blanks using the given words (entity, attribute, cardinality, domain) (4 marks)

A/An ...A..... of an attribute defines what values the attribute can legitimately take on. A/An ...Bis something about which the business needs to store data. A/An ...C.....(s) are specific pieces of data one wants to store about each instance of a given entity.D..... defines the minimum and maximum number of occurrences of one entity that may be related to a single occurrence of the other entity.

- A- domain
- B- entity
- C- attribute
- D- cardinality

- ii. Define the following terms with respect to Entity Relationship Diagram (2*2=4 marks)

(a) Cardinality

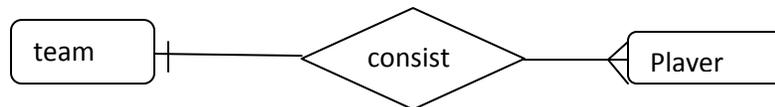
Defines the minimum and maximum number of occurrences of one entity that may be related to a single occurrence of the other entity.

(a) Degree

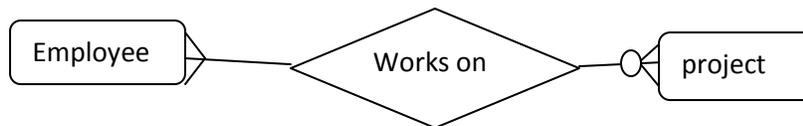
Number of entities that participate in the relationship

- iii. Identify two entity types and one relationship type for each of given cases. State the degree and cardinality for each. (2*6=12 marks)

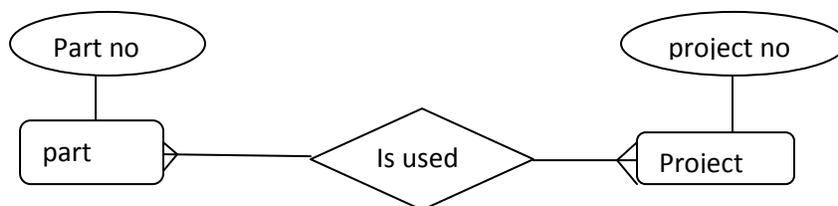
(a) A team consists of many players. A player plays for only one team



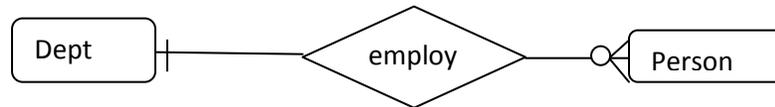
(b) Employee works on many projects and project is done by many employees



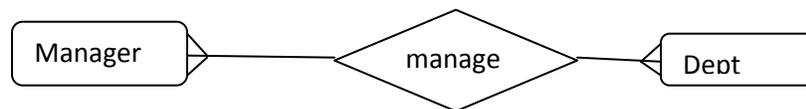
(c) A part (identified by part number) used in many projects(identified by project number)and project used the parts



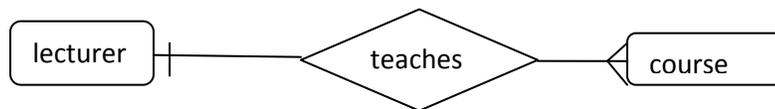
(d) A department employs many persons. A person is employed by at least one department



(e) A manager manages at least one department. A department is managed by at least one manager



(f) A lecturer teaches at least one course. A course is taught by exactly one lecturer



- 8 i. What are the 3 main components used in a use case diagrams (3 marks)
- usecases
actors
relationships

ii. List out three advantages of an use case diagrams in unified modeling language (UML)

Use case diagrams are often used to:

- Provide an overview of all or part of the usage requirements for a system or organization in the form of an essential model or a business model
- Communicate the scope of a development project
- Model your analysis of your usage requirements in the form of a system use case model

(1*3=3 marks)

Note: - Give marks for any other acceptable fact

iii. Define the following terms with respect to UML

(2*3=6 marks)

(a) Actor

Actors represent external entities of the system. These can be people or things that interact with the system that is being modeled.

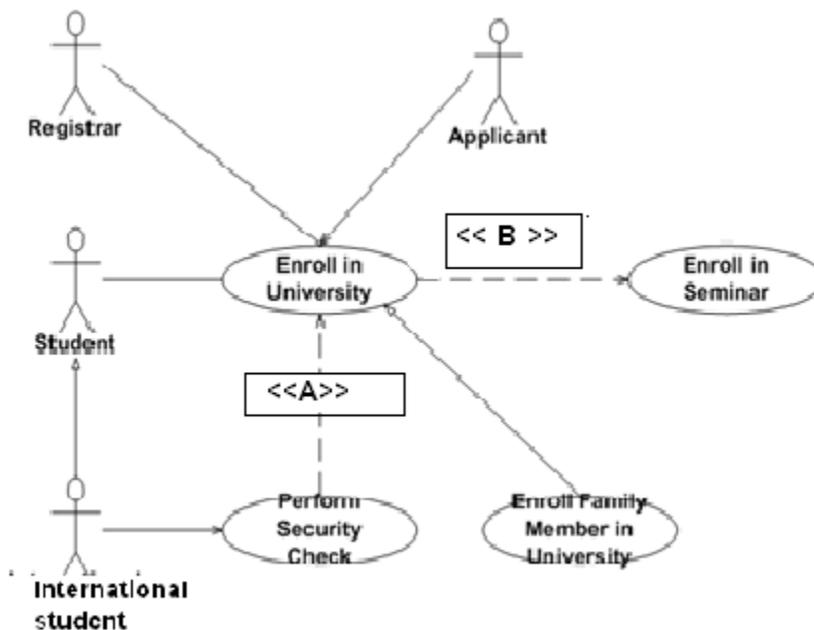
(b) Include relationship

An **include** relationship is a directed relationship between two use cases when required, not optional behavior of the **included** use case is inserted into the behavior of the **including** (base) use case.

(c) Extend relationship

Extend is a directed relationship that specifies how and when the behavior defined in usually supplementary (optional) **extending use case** can be inserted into the behavior defined in the **extended use case**.

iv. This figure represents a use case Diagram for a university Enrollment System



(a) Identify use cases for the above university Enrollment System

(1*4=4 marks)

- Enroll in university
- Enroll in seminar
- Perform security check
- Enroll Family member in university

(b) Identify A,B relationships for the above university Enrollment System

(4 marks)

A-extend
B include