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
First Year, Second Semester Examination – 2018
HNDIT 1212-System Analysis and Design- Model Answer

Instructions for Candidates:	No. of questions : 05
Answer any four (04) questions	No. of pages : 04
Non programmable calculators are allowed	Time : Two (02) hours

Question 01 **[Total 25 Marks]**

(i) Define 'Computer Based Information System' (CBIS). (03 Marks)

*Any organized **system** for the collection, organization, storage and communication of information by **the support of computer and telecommunication technologies.***

(ii) Describe the purpose of having an Information System in an organization. (03 Marks)

To turn raw data into useful information that can be used for decision making in an organization.
Support and improve day-to-day operations.
Give marks for any suitable answer

(iii) Mention four (04) stakeholders of the Information System of SLIATE. (04 Marks)

Academic Staff, Non-Academic Staff, Students of SLIATE, Prospective Students of SLITE, The Government, Media, Any suitable answer

(iv) List two (02) problems arise in upgrading complex legacy systems. (04 Marks)

Skilled people not available, High cost

(v) Various types of Information Systems are being used by different levels of users in organizations.

a. List three (03) management levels available in an organization. (03 Marks)

- Operational level/Lower level management/ Line management
- Tactical Level/ Middle management
- Top level/Strategic level/ Senior management

b. Briefly explain four (04) types of information systems used by different management levels. (08 Marks)

Transaction Processing System (TPS)- *for Lower level management*

- *Information Systems that capture and process data about business transactions.*
- *Process routine transactions efficiently and accurately.*

Management Information System (MIS)

- *MIS is an information system application that provides for management-oriented reporting.*
- *Especially developed to support planning, controlling, and decision-making functions of* ***middle managers.***
- *Helps to ensure the smooth running of the organization in the short to medium term.*
- *Facilitates to structured business problems.*

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.*
- *Used by both middle and sometimes top management*
- *Such systems are usually interactive and are used to solve ill structured problems.*
- *Interactive computer-based modeling process*

Executive Information System (EIS) /Executive Support System (ESS)

- *They integrate data from all over the organization into graphical indicators and controls*
- *Analyze the environment in which the organization operates, to identify long-term trends, and to plan appropriate courses of action.*
- *Support non-routine decisions that affect the entire organization*

Question 02 **[Total 25 Marks]**

(i) Briefly explain the responsibility of the System Analyst. (03 Marks)

- *Responsible for the development of software and hardware solutions to efficient working of an organization. In performing these tasks the analyst must always match the information system objectives with the goals of the organization*

(ii) Mention five (05) underlying principles for system development methodology. (05 Marks)

Get the system users involved
Use a problem-solving approach
Establish phases and activities.
Document through out Development
Establish standards
Manage the process and Projects
Justify systems as Capital Investments.
Don't be afraid to cancel or revise scope.
Divide and conquer
Design systems for growth and change

(iii) Write down the main phases of System Development Life Cycle (SDLC) in the correct order. (04 Marks for 4 steps, 01 mark for the order)

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

(iv) In developing an Information System it is recommended to select a suitable life cycle model.

a. Why do we need a formal system development life cycle model? (04 Marks)

ease the process of building a system
build high quality systems that meets customer expectations, within time and cost estimates
work effectively and efficiently in the current and planned information technology infrastructure
avoid failures like unclear objectives, cost overruns
maintain and enhance cost effectively

b. Mention the phase which generates most of the errors in software projects.
System Testing (02 Marks)

(v) Propose the most appropriate SDLC model for each situation given below and justify your answer. (06 Marks)

a. Customer requests to build a new type of system which creates a sophisticated virtual living space. Assume that this is the first application of this type. *Spiral model. Since it is very sophisticated one the risk associated with it is very high*

b. Customer needs an ordinary library management system. Customer has a clear understanding of what the system must do and the requirements are stable. *Waterfall Method: Since it is a small scale one having clear understanding of system requirement*

c. Customer hopes to experience the system from the beginning, even though he has no clear understanding about the system requirements. *Prototype Method: Since the customer need the working software at the beginning and system requirement are not clear*

Question 03 **[Total 25 Marks]**

(i) Explain the difference in between evolutionary prototyping and throw-away prototyping models. (04 Marks)

Evolutionary: The prototype will be developed up to the end product and delivered

Throw-away: The objective is to understand the system requirements clearly. Starts with poorly understood requirements. Once the requirements are cleared, the system will be developed from the beginning.

(ii) RAD has become a popular process model in Information System development.

a. Briefly explain the RAD model. (03 Marks)

Rapid Application Development (RAD) is an incremental software development process model that emphasizes an extremely short development cycle. If requirements are well understood and project scope is constrained, the RAD process enables a development team to create a 'fully functional system' within very short time periods (eg. 60 to 90 days)

b. Explain two (02) problems arise with the RAD model. (04 Marks)

- *RAD requires sufficient human resources to create right number of RAD teams*

- RAD requires developers and customers who are committed to the rapid-fire activities necessary to get a system completed in a much abbreviated time frame.

- If a system cannot be properly modularized, building the components necessary for RAD will be problematic.

- RAD is not applicable when technical risks are high.

(iii) What do you mean by the term 'Feasibility Study'? (03 Marks)

An assessment of the practicality or viability of a proposed plan or method (new project).The measure of how beneficial an information system will be to an organization.

(iv) Name four (04) feasibility tests you have to perform in developing an e-commerce web site. (04 Marks)

Operational Feasibility, Cultural / Political Feasibility, Technical Feasibility, Schedule/Time Feasibility, Economic Feasibility, Legal Feasibility (Any 04)

(v) Dharmadasa & Sons are expecting a profitable investment in the next year. They wish to select project A or B for the said investment. They are much interested on the NPV of the investment. Expected cash flows of Projects A and B for the next five years are given as follows.

Year	**Project A**		**Project B**	
	Cash outflow	**Cash inflow**	**Cash outflow**	**Cash inflow**
1	5000	0	2000	1000
2	1000	2000	2000	2000
3	1000	3000	2000	4000
4	1000	4000	2000	4000
5	1000	5000	2000	4000

a. Considering the discount rate as 10%, calculate the NPV for the projects A and B.

Year	Project A				
	Cash outflow	Cash inflow	Net Cash Flow	Discounting Factor	Present value (PV)
1	5000	0	-5000	0.909	- 4545
2	1000	2000	1000	0.826	826
3	1000	3000	2000	0.751	1502
4	1000	4000	3000	0.683	2049
5	1000	5000	4000	0.620	2480
NPV					**2321**

Year	Project B				
	Cash outflow	Cash inflow	Net Cash Flow	Discounting Factor	Present value (PV)
1	2000	1000	-1000	0.909	- 909
2	2000	2000	0	0.826	0
3	2000	4000	2000	0.751	1502
4	2000	4000	2000	0.683	1366
5	2000	4000	2000	0.620	1240
NPV					**3199**

(06 Marks)

b. Identify the best project to be invested in the next year. (01 Mark)

Project B is profitable to invest since the NPV of Project B is greater than the NPV of Project A.

(Consider that $PV=FV/(1+i)^n$)

Question 04 **[Total 25 Marks]**

(i) Briefly explain 'System Proposal'. (03 Marks)

Output of the Problem Definition phase: report / presentation of a recommended solution. Usually a formal written report or oral presentation, Intended for system owners and users. Consists of Formal written report and Oral presentation

(ii) Expand and briefly describe the abbreviation 'DFD' in process modelling. (03 Marks)

Data Flow Diagram A Popular Process Modelling Technique which shows the flow of data through the system and the processing performed by the system

(iii) Mention three (03) types of illegal data flows in a DFD. (03 Marks)

Entity to Entity

Entity to Data Store

Data Store to Data Store

Read the following scenario.

Lanka Books (Pvt) Ltd is a mail order company that distribute books at discounted prices to its members. As soon as the Assistant receives the order form, he checks whether the sender is a member of it with the Member Registry. If the sender is not a member, the Assistant returns the order along with a membership application form. If

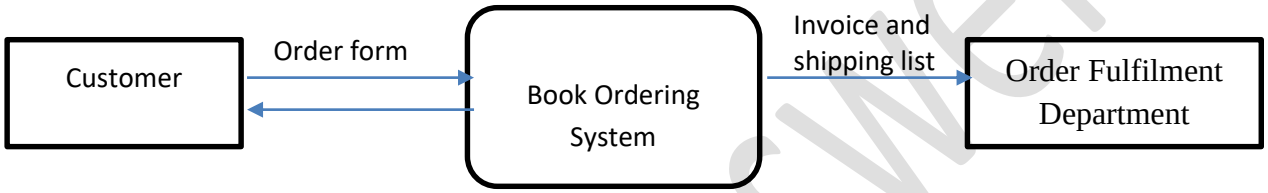
the customer is a member, the Assistant verifies the ordered books by checking the Book Registry. Then the Assistant enters the ordered books and saves it to the Book Orders File. At the same time the Assistant also prints an invoice and shipping list for each order, which are forwarded to the Order Fulfillment Department for processing there.

(iv)

a. Identify the external entities of Lanka Books information system. (02 marks)

Customer, Order fulfilment department

b. Draw the Context Diagram (04 Marks)



(v)

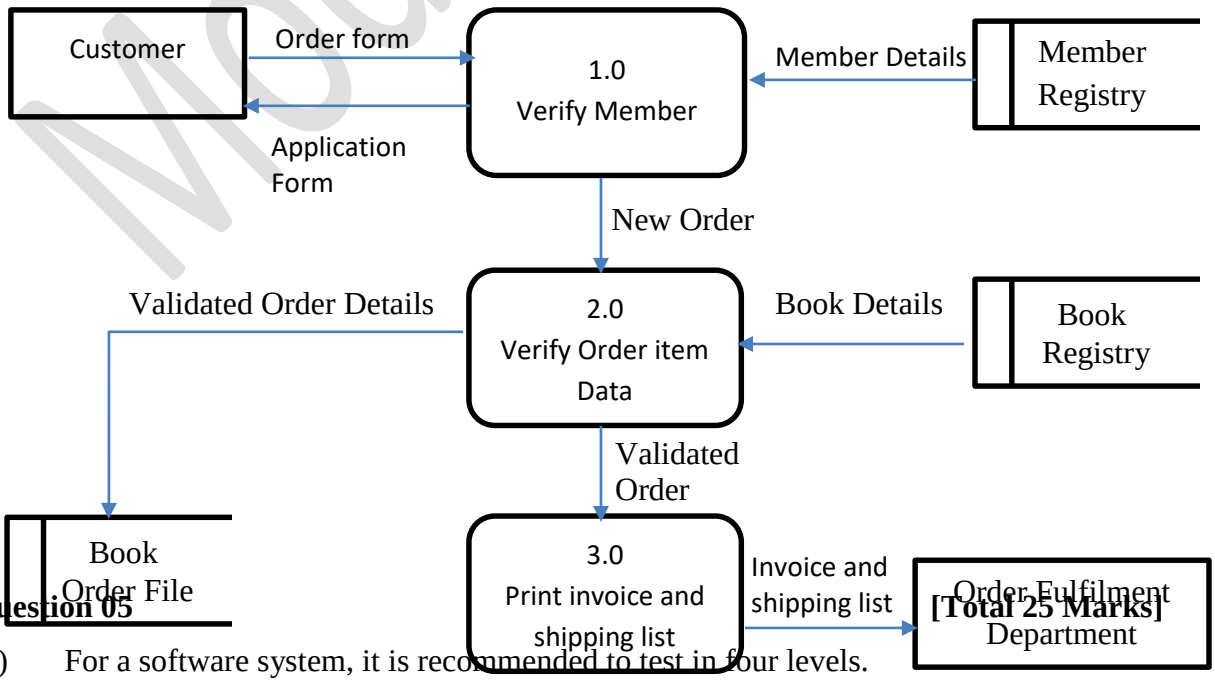
a. Identify three (03) sub processes of this system. (03 Marks)

Verify member, Verify order item data, print invoice and shipping list

b. Identify the data stores of this system. (03 Marks)

Member registry, Book registry, Book order file

c. Draw the Top level DFD of Lanka Books Information System. (04 marks)



Question 05 **[Total 25 Marks]**

(i) For a software system, it is recommended to test in four levels.

a. List the four (04) levels of software testing in the correct order. (05 Marks)

Unit testing → Integration testing → System testing → User acceptance testing (04 marks) + 01 mark for the order

b. Briefly explain two (02) testing methods you mentioned above. (04 marks)

unit testing *is a software verification and validation method in which a programmer tests if individual units of source code are fit for use. Unit tests find problems early in the development cycle. Unit Testing is performed by the programmer using the White Box Testing method.*

Integration testing *:the phase in software testing in which individual software modules are combined and tested as a group. The purpose of integration testing is to verify functional, performance, and reliability requirements placed on major design items.*

System Testing *is a level of the software testing process where a complete, integrated system/software is tested. Black Box Testing method is used. independent Testers perform System Testing.*

User Acceptance Testing (UAT) *is a process to obtain confirmation by a Subject Matter Expert (SME), preferably the owner or client of the object under test, through trial or review, that a system meets mutually agreed-upon requirements.*

(ii) State three (03) factors to be considered when choosing a standard off-the –shelf application package. (03 Marks)

User requirements - does the package fit the user's requirements

Processing times – Are the processing time fast enough?

Documentation – Is there full and clear documentation for the user?

Compatibility-Is the package compatible with existing hardware and software?

Controls – Access and security controls should be included

User-interface – the interface should be clear, logical and consistent

Modification – can the package be modified by the user

Support maintenance and update

cost

(iii) Name three (03) major causes of system maintenance problems. (03 Marks)

Unstructured code, Insufficient domain knowledge, Insufficient documentation

(iv) Briefly describe the followings. (04 Marks)

a. Test Automation ***Test automation*** *is the use of software to control the execution of tests, the comparison of actual outcomes to predicted outcomes, the setting up of test preconditions, test reporting functions*

b. Pilot Operation method in file conversion ***The pilot operation*** *involves selecting part or parts of an organization to operate running the new system in parallel with the existing system. When the branch or department piloting the system is satisfied with the new system, they cease to use the old system. The new system is then piloted in another area of the organization.*

(v) Software System maintenance activities can be divided into four kinds. Briefly explain three (03) of them, (06 Marks)

Corrective Maintenance: *to repair software faults (fixing bugs in the code)*

Adaptive Maintenance *: adapting the software to new environments) Maintenance to add to or modify the system's functionality, Modifying the system to satisfy new requirements, Modifying the system to suit new operation environment*

Perfective Maintenance*: Looking for opportunities for improvements, Improving programs performance, structure, reliability etc. Making changes to avoid future problems or prepare for future changes*

Preventive Maintenance*: Similar to the perfective Maintenance involves changing some aspects of the system to prevent failures. This take place when the programmer identifies the potential faults.*