



UNIVERSITY OF COLOMBO, SRI LANKA



UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

*Academic Year 2010/2011 – 1<sup>st</sup> Year Examination – Semester 2*

***IT2404: Systems Analysis and Design***

***Multiple Choice Question Paper***

**31<sup>st</sup> July 2011**

**(TWO HOURS)**

**Important Instructions :**

- The duration of the paper is 2 (two) hours.
- The medium of instruction and questions is English.
- The paper has **50 questions** and **12 pages**.
- All questions are of the MCQ (Multiple Choice Questions) type.
- All questions should be answered.
- Each question will have 5 (five) choices with **one or more** correct answers.
- All questions will carry equal marks.
- There will be a penalty for incorrect responses to discourage guessing.
- The mark given for a question will vary from 0 (*All the incorrect choices are marked & no correct choices are marked*) to +1 (*All the correct choices are marked & no incorrect choices are marked*).
- Answers should be marked on the special answer sheet provided.
- Note that questions appear on both sides of the paper. If a page is not printed, please inform the supervisor immediately.
- Mark the correct choices on the question paper first and then transfer them to the given answer sheet which will be machine marked. **Please completely read and follow the instructions given on the other side of the answer sheet before you shade your correct choices.**

1) Which of the following is are correct regarding Information Systems?

- (a) Information Systems in organizations capture and manage data to produce useful information that supports the organization and its employees, customers, suppliers and partners.
- (b) Transaction Processing Systems use the transaction data to produce information needed by managers to run the business.
- (c) Expert Systems capture and reproduce the knowledge of an expert problem solver or decision maker and simulates the thinking of that expert.
- (d) Many organizations consider Information Systems to be essential for their ability to compete or gain competitive advantage.
- (e) Office Automation Systems help employees create and share documents that supports day-to-day office activities.

2) Today's Information Systems are built on some combination of networks to form distributed systems.

Which of the following is/are correct regarding distributed systems?

- (a) It is a system in which all components are hosted by a central , multi-user computer.
- (b) It is a system in which all components are distributed across multiple locations and computer networks.
- (c) Distributed systems are very easy to implement compared with Centralized systems.
- (d) Distributed computing moves information and services closer to the customers that need them.
- (e) Distributed systems are popular with modern businesses as they are already distributed and the centralized systems will not cater to their needs.

3) Which of the following is/are correct about stakeholders of an Information System?

- (a) For any Information System, large or small, there will be one or more system owners.
- (b) Unlike system owners, system users are less concerned with cost and benefits of the system.
- (c) System Designer studies the problems and needs of an organization to determine how people, data processes and information technology can best accomplish improvements for the business.
- (d) Systems Analyst is a technical specialist who constructs Information Systems and components based on the design specifications generated by the System Designers.
- (e) System Builders construct the system according to the System Designers' specifications.

4) Identify the possible values and benefits of well-designed Information Systems.

- (a) Improve the security
- (b) Increase business profit
- (c) Increase business costs
- (d) Improve customer relations
- (e) Fewer mistakes

5) Consider the following statements related to Systems Development Life Cycle.

- (i) System Development Life Cycle and System Development Methodology are the same.
- (ii) System Development Methodology is the process to build and maintain information systems through their life cycles.
- (iii) Problem Definition phase of the system development life cycle identifies and defines the need for the new system

Which of these is/are correct?

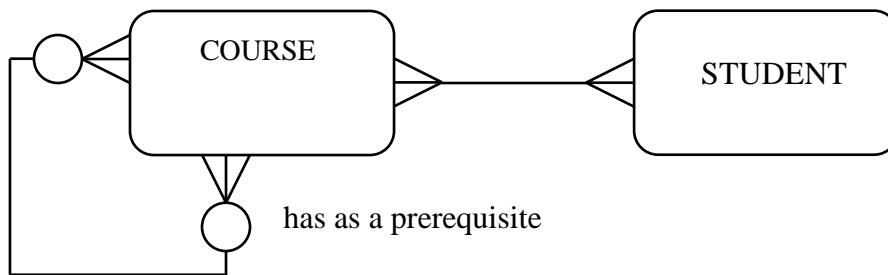
- (a) Only (i)
- (b) Only (ii)
- (c) Only (i) and (iii)
- (d) Only (ii) and (iii)
- (e) All

- 6) Identify the traditional, system development phases in a software development life cycle?
- |                        |                        |                           |
|------------------------|------------------------|---------------------------|
| (a) Risk Management    | (b) Systems Initiation | (c) System Implementation |
| (d) Quality Management | (e) Systems Design     |                           |
- 7) Which of the following is a/are underlying principle(s) for Systems Development?
- |                                     |
|-------------------------------------|
| (a) Establish standards             |
| (b) Document throughout development |
| (c) Use a problem solving approach  |
| (d) Establish phases and activities |
| (e) Fixed requirements              |
- 8) Which of the following is/are correct regarding System Development approaches?
- |  |
|--|
| (a) In Waterfall Development approach one phase must be completed before the next phase starts           |
| (b) Waterfall Development approach is not time consuming compared with other approaches.                 |
| (c) Iterative Development approach completes the entire information system in successive iterations      |
| (d) In the Iterative Development approach, each iteration does some analysis, design and implementation. |
| (e) Waterfall approach is popular among the latest development methodologies.                            |
- 9) A model that allows us to communicate with end users with non technical or less technical knowledge is called a/an
- |                     |                      |                           |
|---------------------|----------------------|---------------------------|
| (a) logical model.  | (b) physical model.  | (c) implementation model. |
| (d) business model. | (e) technical model. |                           |
- 10) Which of the following is/are correct regarding the data flow diagrams (DFD)?
- |  |
|--|
| (a) It is a diagram that represents technical details in a system.     |
| (b) It does not allow processes to execute or to work simultaneously.  |
| (c) DFDs are used to identify the physical movements of the documents. |
| (d) It is a process modeling technique.                                |
| (e) It is a technique used with object oriented methodologies.         |
- 11) Some questions related to data flow diagrams (DFDs) with possible answers are given below.
- (i) Q. Is there a standard symbol used to represent an External Entity in a DFDs?  
A. No. It depends on the methodology.
- (ii) Q. What is the process symbol used in a Gane and Sarson Methodology?  
A. Rounded Rectangle
- (iii) Q. What is a Data Store?  
A. It is the stored data intended for later use.
- Which of the above pairs is/are correct?
- |                         |
|-------------------------|
| (a) Only (ii)           |
| (b) Only (i) and (ii)   |
| (c) Only (ii) and (iii) |
| (d) Only (i) and (iii)  |
| (e) All                 |
- 12) Which of the following is/are correct regarding the data flow diagrams (DFD)?
- |   |
|---|
| (a) Context Diagram is a model that actually illustrates a systems interfaces to the business and outside world, including other information systems. |
| (b) Processes in a DFD can be executed only one at a time.  |
| (c) The arrows in a DFD represent paths down which data can flow.   |
| (d) A single DFD might include processes that happen hourly, daily, weekly, yearly, and on demand.  |
| (e) An External agent in a Data flow diagram is represented by a square.  |

- 13) Which of the following is/are correct regarding data flow diagrams (DFD)?
- |  |
|--|
| (a) A Customer can be a data store in an information system.   |
| (b) Looping and branching are typically shown on a DFD.  |
| (c) A process in a DFD represents the work performed by a system in response to incoming data flows.           |
| (d) Normalization is the act of breaking a system into its component sub systems, processes and sub-processes. |
| (e) Physical processes represent functionalities that must be performed with implementation details            |
- 14) How can one fill the blank space in the following sentence?  
 ..... are work or actions that must be performed no matter how you implement the system.
- |                         |                        |                 |
|-------------------------|------------------------|-----------------|
| (a) Primitive processes | (b) Physical Processes | (c) Data stores |
| (d) Data flows          | (e) Logical Processes  |                 |
- 15) Some questions related to data flow diagrams (DFDs) with possible answers are given below.
- (i) Q. What is an Elementary Process?  
 A. It is a process which can be decomposed into manageable components.
- (ii) Q. What is the symbol used in Gane and Sarson notation to represent an elementary process?  
 A. Square
- (iii) Q. Is it illegal to have two external entities directly connected in a DFD?  
 A. Yes. A process is needed to exchange data flows between external agents.
- Which of the above pairs is/are correct?
- |                         |
|-------------------------|
| (a) Only (iii)          |
| (b) Only (i) and (ii)   |
| (c) Only (ii) and (iii) |
| (d) Only (i) and (iii)  |
| (e) All                 |
- 16) Which of the following is/are correct regarding data modelling?
- |   |
|---|
| (a) Data modeling is a technique for defining business requirements for a database.   |
| (b) The Entity Relationship Diagram is a data model utilizing several notations to show data in terms of entities and relationships described by that data. |
| (c) The Entity Relationship Diagram is a process model utilizing several notations to show data and processes.  |
| (d) LastName can be an attribute of student entity.   |
| (e) Data type is a descriptive property of an attribute that defines what values the attribute can legitimately take.                                       |
- 17) Some questions related to entity modeling with possible answers are given below.
- (i) Q. What is an attribute?  
 A. It is a descriptive property or characteristic of an entity.
- (ii) Q. What is the name given for a relationship that exists between different instances of the same entity?  
 A. Recursive relationship
- (iii) Q. Degree defines the number of entities that participates in a relationship. What is the degree of a recursive relationship?  
 A. Two
- Which of the above pairs is/are correct?
- |                        |                       |               |
|------------------------|-----------------------|---------------|
| (a) Only (i)           | (b) Only (i) and (ii) | (c) Only (ii) |
| (d) Only (i) and (iii) | (e) All               |               |

Questions 18 and 19 are based on the diagram given below.

is a prerequisite for



18) Which of the following statement(s) is / are true regarding the above Diagram?

- (a) The degree of the relationship between *Student* and *Course* is many to many.
- (b) The cardinality interpretation of the student end of the *Student* – *Course* enrolment relationship is one or more.
- (c) The relationship that exists between different instances of the *Course* entity is called a recursive relationship.
- (d) The relationship that exists between *Course* and *Student* entity is called an associative relationship.
- (e) A *Course* may be a prerequisite for other Courses,

19) Which of the following statements is/are correct regarding the given diagram?

- (a) A course may have several other courses as its prerequisites.
- (b) The degree of the relationship between different instances of the Course entity is 1.
- (c) The given diagram uses the *Martin* notation.
- (d) The given diagram is an Entity Relationship Diagram.
- (e) The cardinality of the relationship between different instances of the Course entity is 1.

20) A Phrase from Column A has to be matched with the most appropriate phrase from Column B.

	Column A		Column B
(i)	Object modeling	A	An aggregation relationship in which the 'whole' is responsible for the creation and destruction of its parts
(ii)	UML	B	A set of modelling conventions that is used to specify or describe a software system in terms of objects
(iii)	Composition	C	A technique for identifying objects within the systems environment and identifying the relationships between those objects
(iv)	Inheritance	D	The concept that different objects can respond to the same message in different ways
(v)	Polymorphism	E	The concept wherein methods and/or attributes defined in an object class can be reused by another object class

The correct matching is

(a)	(i) & D	(ii) & C	(iii) & B	(iv) & E	(v) & A
(b)	(i) & C	(ii) & D	(iii) & A	(iv) & B	(v) & E
(c)	(i) & C	(ii) & B	(iii) & A	(iv) & D	(v) & E
(d)	(i) & D	(ii) & B	(iii) & C	(iv) & A	(v) & E
(e)	(i) & C	(ii) & B	(iii) & A	(iv) & E	(v) & D

The blanks in the Questions 21 – 25 have to be filled by selecting the most appropriate words/phrases from the list labelled (i) – (v). Note that one word/phrase may be used in more than one instance.

- (i) Zero or more
- (ii) Generalization/Specialization
- (iii) Use Case Diagram
- (iv) Class Diagram
- (v) Encapsulation
- (vi) One or more

21) In UML \* multiplicity refers to as .....

(a) (i)	(b) (ii)	(c) (iii)
(d) (iv)	(e) (v)	

22) ..... is the packaging of several items into one unit..

(a) (i)	(b) (ii)	(c) (iii)
(d) (iv)	(e) (v)	

23) The approach that seeks to discover and exploit the commonalities between object classes is referred to as.....

(a) (i)	(b) (ii)	(c) (iii)
(d) (iv)	(e) (v)	

24) ..... shows the interactions between the system, external system and users.

(a) (i)	(b) (ii)	(c) (iii)
(d) (iv)	(e) (v)	

25) ..... shows object classes that the system is composed of as well as the relationships between those object classes.

(a) (i)	(b) (ii)	(c) (iii)
(d) (iv)	(e) (v)	

26) Each of the blanks labelled A – E of the paragraph given below has to be filled with the most appropriate word selected from the phrases labelled (i) – (iv). Note that one word or phrase might be used more than once.

- (i) Systems Design
- (ii) Object Oriented Design
- (iii) Joint Application Development
- (iv) Implementation
- (v) Rapid application development

Systems Analysis emphasized the business problem, whereas .....A..... focuses on the ...B..... concerns of the system. There are more strategies or techniques for performing systems design. They include modern structured design, information engineering, prototyping, JAD, RAD, and .....C..... .....D..... is the merger of various structured techniques with prototyping techniques and joint application development techniques to accelerate systems development. The expedition of design effort is enhanced through the emphasis on user participation in .....E..... During the .....F..... sessions for systems design, the systems designer will take on the role of facilitator for possibly several workshops intended to address different design issues and deliverables. JAD is an essential element contributing greatly to the acceleration emphasis of .....G.....

(a) A – (v)	B – (i)	C – (ii)	D – (iii)	E – (iv)	F – (ii)	G – (iv)
(b) A – (ii)	B – (iii)	C – (iv)	D – (v)	E – (i)	F – (iv)	G – (v)
(c) A – (i)	B – (iv)	C – (iii)	D – (v)	E – (ii)	F – (iii)	G – (v)
(d) A – (ii)	B – (iv)	C – (ii)	D – (v)	E – (iii)	F – (iii)	G – (iv)
(e) A – (i)	B – (iv)	C – (ii)	D – (v)	E – (iii)	F – (iii)	G – (v)

27) Which of the following is/are correct regarding physical data flow diagrams (DFDs)?

- (a) Physical processes are frequently assigned to specific Logical processes such as PCs, servers, people or other devices in a computer network.
- (b) It is a process model used to communicate the technical implementation characteristics of an information system.
- (c) They communicate technical choices and other design decisions to those who will actually construct and implement the system.
- (d) Physical DFDs are drawn before Logical DFDs.
- (e) Data Stores are carried over from the logical DFD to the physical DFD unchanged.

28) Which of the following is/are correct regarding stakeholders in an information system?

- (a) System Analyst is an important stakeholder who helps to build an information system.
- (b) System owner might also be a system user for an information system.
- (c) Stakeholder is any person who has an interest in an existing or proposed information system.
- (d) A system designer is a stakeholder who is solely responsible for studying the problems and needs of an organization.
- (e) System builder is a technical specialist who constructs information systems and components based on the design specifications generated by the system designers.

**Questions (29) and (30)** are based on the Systems architectures given below.

- I. File Server Architecture
- II. Client/Server Architecture
- III. Internet-based Architecture

29) Which of the above is/are example(s) for non distributed systems?

- (a) (II) Only
- (b) (I) and (II) Only
- (c) (II) and (III) Only
- (d) (I) and (III) Only
- (e) None

30) Identify the architecture(s) which is the/are LAN based solution (s) in which a server computer always hosts only the data layer and all the other layers are implemented on the client PC.

- (a) (I) Only
- (b) (II) Only
- (c) (III) Only
- (d) (I) and (II) Only
- (e) (II) and (III) Only

31) Consider the following statements related to Problem Definition phase..

- (i) In other methodologies, this might be called scope definition phase, preliminary investigation phase, initial study phase or planning phase.
- (ii) This phase must establish the project plan in terms of scale, development strategy, schedule, resource, requirements and budget.
- (iii) Candidate solutions are identified during this phase.

Which of the above statements is / are correct?

- (a) (i) Only
- (b) (ii) Only
- (c) (i) and (ii) Only
- (d) (ii) and (iii) Only
- (e) All

32) Which of the following statements is /are correct regarding the Scope Definition phase?

- (a) Scope definition phase is concerned primarily with the system owners' view of the existing system and the problems or opportunities that triggered the interest.
- (b) Baseline schedule and budget is not considered during this phase.
- (c) Baseline project worthiness is assessed during this phase.
- (d) Functional requirements are clearly identified and described during this phase.
- (e) Although the scope of a project can change during the project , initial project plan must establish the preliminary scope.

33) Which of the following is / are correct regarding application architecture and modeling?

- (a) An application architecture for information systems specifies the technologies to be used to implement one or more information systems
- (b) Physical data flow diagram is an object oriented UML diagram.
- (c) Physical DFDs and their accompanying specifications were intended to represent the detailed non-technical requirements for the new system.
- (d) A Physical DFD does not use the same basic shapes connections as logical DFDs.
- (e) When drawing a Physical DFD , a logical process may split into two processes to show a part to be performed by people and the other part to be performed by the computer.

34) Which of the following design decisions will be communicated by the architectural blueprints?

- (a) The degree to which the information system will be centralized or distributed
- (b) The distribution of stored data across a network
- (c) Selecting of the users for the evaluation
- (d) The implementation technology for all software to be developed in-house
- (e) The technology to be used to implement the user interface

35) Which of the following is/are correct regarding automated tools ?

- (a) They improve productivity through automation of tasks.
- (b) They provide better and more consistent documentation because it is easy to create and assemble consistent, high quality documentation.
- (c) They improve quality since they check for completeness, consistency and contradictions.
- (d) Life time maintenance cost can be reduced because of the system quality improvements combined with better documentation.
- (e) Microsoft Visio is an example for a CASE tool.

36) Consider the following statements related to Automated tools.

- (i) Quality management tools analyze system models, descriptions and specifications, and design for completeness, consistency and conformance to accepted rules and methodologies.
- (ii) Using a CASE tool one can reverse engineer a poorly designed system into a system model , edit and improve that model and forward engineer the new model into an improved system.
- (iii) Common synonym given for Application Development Environment (ADE) is Integrated Development Environment (IDE).

Which of the above is / are correct?

- |                       |               |                         |
|-----------------------|---------------|-------------------------|
| (a) Only (i)          | (b) Only (ii) | (c) Only (ii) and (iii) |
| (d) Only (i) and (ii) | (e) All       |                         |

37) Consider the following incomplete statement.

..... is / are example(s) for CASE tools.

Select the correct word(s) to fill in the blank in the above statement.

- |                               |                         |                             |
|-------------------------------|-------------------------|-----------------------------|
| (a) Oracles Designer 2000     | (b) Oracles's Developer | (c) Microsoft Visual Studio |
| (d) Popkin's System Architect | (e) Borland's J Builder |                             |



38) Which of the following statement(s) is/are correct regarding Project Management?

- (a) Microsoft Project is a Project Management tool.
- (b) PERT and Gantt charts are two models used in project management software.
- (c) For any system development project effective project management is necessary to ensure that the project meets the deadline.
- (d) For any system development project effective project management is necessary to ensure that the project is developed within an acceptable budget.
- (e) Effective project management is not necessary to fulfill customer expectations and specifications.

39) Which of the following statement(s) is/are correct regarding Project Management and Process Management?

- (a) Process management is the process of scoping, planning, staffing, organizing, directing and controlling the development of an acceptable system at a minimum cost within a specified time frame.
- (b) Project Management is the activity of documenting , managing and continually improving the process of system development.
- (c) A project manager must define the boundaries of the project in order to plan activities, estimate costs and manage expectations.
- (d) PERT stands for Project Evaluation and Review Technique.
- (e) PERT charts are effective when you want to study the relationships between tasks.

40) Consider the following problems in software development.

- (i) Failure to establish upper management commitment to the project
- (ii) Premature commitment to a fixed budget and schedule
- (iii) Use of Poor estimating techniques used

Which of the above is/ are related to poor project management ?

- (a) Only (i)
- (b) Only (i) and (ii)
- (c) Only (ii)
- (d) Only (i) and (iii)
- (e) All

41) Which of the following can be considered as (a) fact finding technique(s)?

- (a) Sampling of existing documentation
- (b) Research and site visits
- (c) Observation of work environment
- (d) Interviews
- (e) Modeling

42) In addition to documents that describe the system, a systems analyst may also look at documents that describe the business functions being studied or designed. Identify such (a) document(s) from among the following.

- (a) Companies mission statement.
- (b) Policy Manuals
- (c) Standard operating procedures
- (d) Companies vision statement
- (e) Formal objectives for the organization subunits being studied

43) Identify the advantages of using 'Observation of the work environment' as a fact finding method.

- (a) Data gathered is very reliable.
- (b) System Analyst is able to see exactly what is being done.
- (c) Observation is relatively inexpensive compared with other methods.
- (d) It allows the systems analyst to do work measurements.
- (e) Customers like this method compared with other methods.

44) Identify the disadvantages of using 'Observation of the work environment' as a fact finding method.

- (a) People usually feel uncomfortable when being watched.
- (b) The work being observed may not involve the level of difficulty or volume normally experienced during that time period.
- (c) Some systems activities may take place at odd times, causing a scheduling inconvenience for the systems analyst.
- (d) The tasks being observed are subject to various types of interruptions.
- (e) It is a very expensive method.

45) Which of the following is/are non functional requirement types?

- (a) Calculate GPA
- (b) Security
- (c) Efficiency
- (d) Economy
- (e) Performance

46) What are the disadvantages of the Interview as a fact finding technique?

- (a) No opportunity to motivate the interviewee to respond freely and openly
- (b) There is no immediate opportunity to clarify a vague or incomplete answer.
- (c) It is a costly approach when compared with observation on working environment.
- (d) It is very time-consuming when compared with questionnaires.
- (e) Success of the interviews is highly dependent on the systems analyst's human relation skills.

47)

Map the statements in Column A with the fact finding techniques in the column B.	
Column A	Column B
(i) Allows individual to maintain anonymity.	a. Interviews
(ii) Allows the systems Analyst to probe for more feedback.	b. Observation of the work environment
(iii) a process whereby highly structured group meetings are conducted for the purpose of analyzing problems and defining requirements.	c. Questionnaires
(iv) Can be used to check the validity of data obtained directly from individuals	d. Prototyping
(v) Serves as a training mechanism for users.	e. Joint Requirement Planning (JRP)

- (a) (i)&c, (ii)&a, (iii)&e, (iv)&b, (v)&d

(b) (i)&e, (ii)&c, (iii)&b, (iv)&d, (v)&a

(c) (i)&a, (ii)&e, (iii)&c, (iv)&d, (v)&b

(d) (i)&d, (ii)&e, (iii)&a, (iv)&c, (v)&b

(e) (i)&c, (ii)&d, (iii)&a, (iv)&e, (v)&b

48)

Which of the following statement(s) is/are true about fact finding techniques?
<div> <div>(a) System analyst must take great care to protect the security and privacy of any facts or data with which they are being entrusted.</div> <div>(b) Analyst should not use more than one technique to gather requirements.</div> <div>(c) When observing the work environment, those who will be observed should not be informed early.</div> <div>(d) Observation does not allow the system analyst to do work measurements.</div> <div>(e) Responses taken using online questionnaires can be analysed quickly.</div> </div>

49)

What is/are true about prototyping used as a fact finding technique?
<div> <div>(a) It allows users and developers to experiment with the software and develop an understanding of how the system might work.</div> <div>(b) It aids in determining the feasibility and usefullness of the system before high development costs are incurred.</div> <div>(c) It aids in building system test plans and scenarios to be used last in the system testing process.</div> <div>(d) It may minimise the time spent on fact finding and help define more stable and reliable requirements.</div> <div>(e) Doing prototyping will not extend the development schdule and increase development costs.</div> </div>

\

50)

Consider the following statements.

- (i) A computer should not be used to harm the people.
- (ii) Proprietary software for which you have not paid should not be used.
- (iii) A Computer should always be used in a way to ensure respect for fellow humans.

Which of the above statements is/are commandments of computer ethics?

- (a) Only (i)
- (b) Only (ii)
- (c) Only (i) and (ii)
- (d) Only (i) and (iii)
- (e) All

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