



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (*EXTERNAL*)

Academic Year 2009/2010 – 2nd Year Examination – Semester 3

IT3203 Software Engineering 1

PART 1 - Multiple Choice Question Paper

**20th March, 2010
(ONE HOUR)**

Important Instructions:

- The duration of the paper is **1 (one) hour**.
- The medium of instruction and questions is English.
- The paper has **25** questions and **10** 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 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 statements is/are correct regarding Software and Software Engineering?

- (a) Software engineering is an engineering discipline which is concerned with all aspects of software production.
- (b) Software Engineering is concerned with all aspects of computer-based systems development, including hardware, software and process engineering.
- (c) Efficiency of a software system is characterized by reliability, security and safety.
- (d) The Usability of a software system is not of much importance if the Efficiency and Maintainability of the system are very high.
- (e) Software does not wear-out in the traditional sense of the term, but software does tend to deteriorate as it evolves.

2) Identify the correct statement(s) regarding the 'Usability' of a software system.

- (a) Software should not cause physical or economical damage in the event of system failure.
- (b) Software must be usable without undue effort, by the type of user for whom it is designed.
- (c) Software should be written in such a way that it may evolve to meet the changing needs of customers.
- (d) Software should not make wasteful use of system resources such as memory and processor cycles.
- (e) Software should have an appropriate user interface and adequate documentation.

3) Which of the following is/are true with respect to software process models?

- (a) Software process models can produce the sequence of activities in the process with their input, output and dependencies.
- (b) Software process models must decide the documents which should be created during a project.
- (c) Customers must participate for selecting the most suitable software process model for their product with the software development company.
- (d) Different features of different process models can be used together for some system development.
- (e) Many software development companies have developed their own approaches for deciding on a software process model that suits them.

4) Which of the following is a /are problem(s) associated with incremental development?

- (a) Development cost will be high compared to other process models.
- (b) A particular increment should be relatively small and should deliver some system functionality.
- (c) It can be hard to identify common facilities which are needed by all increments in advance.
- (d) It will be hard to respond to changing customer requirements.
- (e) There is a high risk of an overall project failure with incremental development.

5) The statements given below are associated with Agile methods.

- (i) Software is developed in increments.
- (ii) Team members should adhere to perspective processes when developing.
- (iii) Focus on maintaining simplicity in the development process.
- (iv) Customers pay for a specific set of requirements instead of developer's time.

Which of the above is/are true?

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

6) The Software process models in column X have to be matched with the software systems given in column Y.

Column X		Column Y	
1	RAD	A	Automate the manual system for an examination department of the University
2	Incremental Development	B	A virtual Reality System for military training
3	Waterfall Model	C	Management Information System for a hotel to be developed within two months
4	Prototyping	D	Word Processing Application Software start with only basic functionalities and then move on to advanced features

Which of the following is a /are most suitable match (es)?

- (a) 1&B, 2&A, 3&C, 4&D
- (b) 1&C, 2&B, 3&D, 4&A
- (c) 1&C, 2&D, 3&A, 4&B
- (d) 1&B, 2&A, 3&D, 4&C
- (e) 1&D, 2&B, 3&A, 4&C

7) It is required to match the software process models given below labeled (I) to (V) with the statements given labeled (A) to (E)

1. Waterfall Model
2. Prototyping
3. Incremental Development
4. Spiral Model
5. RAD

- (A) Customer involvement throughout the software development process is really important to the success of the project. Customer does not like to wait until entire system is developed and they are interested in core product features at very first.
- (B) Requirements are well understood and project scope is constrained and this is a data intensive business application. Customer needs a faster development hence they need to deploy the system as soon as possible.

- (C) Requirements are easily understandable and requirements can be defined early in the cycle. According to the domain of this application, requirements are unlikely to be changed.
- (D) Project has to use so many new technologies depending on the customer requirements hence a risk analysis should be conducted in order to identify issues of using those technologies.
- (E) Customer only has a generic set of objectives for their system and does not identify the requirements in detail. High user involvement is necessary in order to explore more detail view of the requirements from the customer.

Which of the following is a/are most suitable match(es)?

- | |
|---|
| <ul style="list-style-type: none"> (a) 1&B, 2&C, 3&E, 4&D, 5&A (b) 1&B, 2&E, 3&A, 4&C, 5&D (c) 1&D, 2&B, 3&E, 4&A, 5&C (d) 1&C, 2&A, 3&E, 4&B, 5&D (e) 1&C, 2&E, 3&A, 4&D, 5&B |
|---|

- 8) Which of the following statements is/are true with regard to functional and non-functional requirements?

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|--|
| <ul style="list-style-type: none"> (a) Non-functional requirements are rarely associated with individual system features. (b) Functional requirements of a system depend on type of software being developed. (c) Failing to satisfy a non-functional requirement will definitely result in a totally unusable system. (d) Non-functional requirements can be derived from product requirements. (e) Non-functional requirements for a system describe what the system should do. |
|--|

- 9) A set of requirements associated with an e-channeling system is listed below. Which of them is a/are functional requirement/s of the system?

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|---|
| <ul style="list-style-type: none"> (a) Users should be able to search for doctors based on name, specialization and hospital. (b) Response time for a search query should not be too long. (c) Users must be able to make an appointment online. (d) Users must be able to pay for their appointments through credit card. (e) Online system should be easy to use by inexperienced users. |
|---|

- 10) Items in column X have to be matched with the descriptions in column Y.

Column X		Column Y	
1	Interviews	A	provide(s) a framework for discovering conflicts in the requirements proposed by different stakeholders.
2	Viewpoints	B	can be used to add details to an outline requirement description.
3	Scenarios	C	can be used to understand social requirements.
4	Ethnography	D	is/are suitable for getting an understanding of what stakeholders do and how they might interact with the system.

Which of the following is the most appropriate match?

- (a) 1&C, 2&B, 3&D, 4&A
- (b) 1&D, 2&A, 3&B, 4&C
- (c) 1&C, 2&A, 3&B, 4&D
- (d) 1&C, 2&A, 3&D, 4&B
- (e) 1&D, 2&B, 3&A, 4&C

- 11) Software Requirement Specification (SRS) is

- (a) an estimate of the resources which will be required to construct the software.
- (b) an agreed statement of what the system ought to do.
- (c) a mathematical specification of the behaviour of the proposed software.
- (d) a document which specifies resource allocation during the project.
- (e) essential when an outside contractor is developing the system.

- 12) Identify the advantages of using a shared repository model as the architectural design from the following statements.

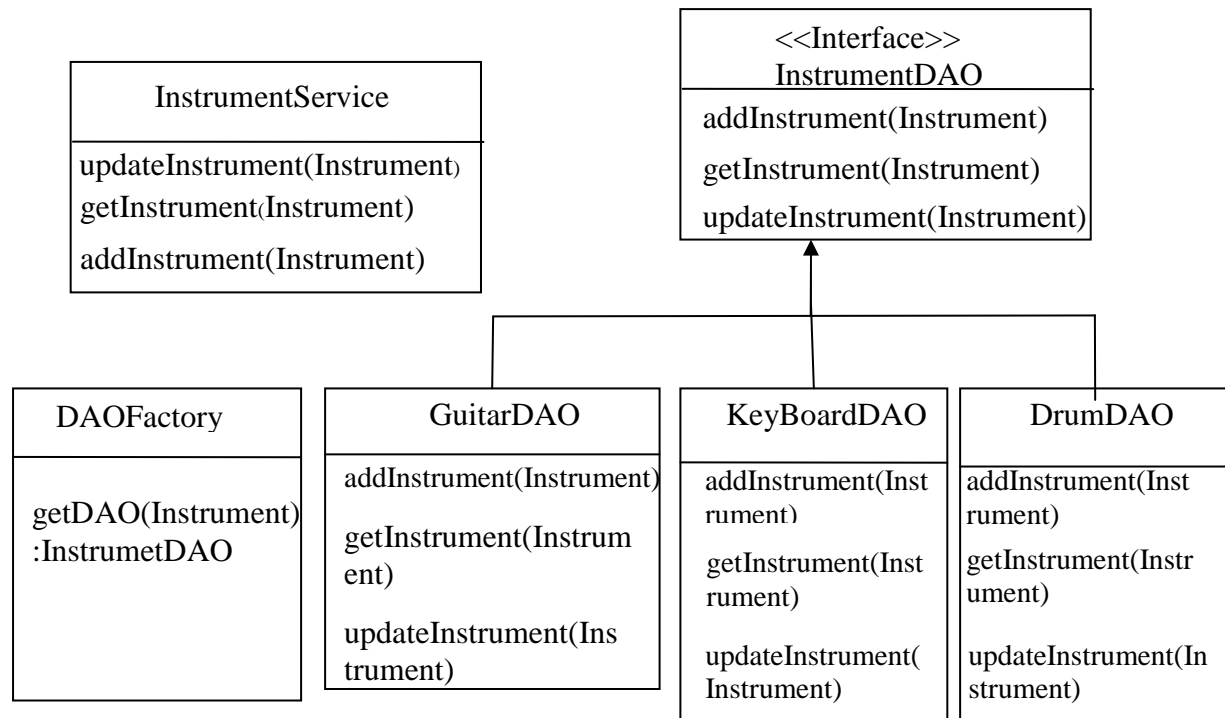
- (a) Repository can be distributed over a number of machines.
- (b) In-cooperating a subsystem that have a different data model can be done easily.
- (c) Specific needs of each tools required by sub systems can be accommodated.
- (d) Security and backup facilities for the data can be centralized.
- (e) Sub-system where the data is generated does not need to consider the data models of other sub systems.

- 13) Which of the following is/are true with respect to software design?

- (a) Refinement in software design specify procedure and data, yet suppress low level details.
- (b) Software architecture is the structure of the system which comprises of sub systems and modules.
- (c) Increasing the number of modules as much as possible in a program would lead to decreasing the total cost.
- (d) Dynamic Models in the architectural design process address the behavioral aspects of the program architecture.
- (e) Design patterns are recurring solutions to software design problems found in real world application development.

Questions 14) and 15) will be based on the following scenario.

The diagram given below shows a part of the class diagram designed for musical instrument marketing company to automate their manual operations.



- Instrument can be a Guitar, KeyBoard or Drum.
- All the DAO (Data Access Object) classes are therefore to interact directly with the relevant Database tables. (Eg: GuitarDAO adds a Guitar instrument to the Guitar Database table when `addInstrument(instrument)` method is called).
- DAOFactory class will return relevant DAO object (GuitarDAO, KeyBoardDAO, etc..) depending on the type of the object (Guitar, Keybord, etc..) once user requests to add, get or update any type of instrument.(Guitar, Keybord, etc..)

14) Which of the following steps is/are taken to improve the cohesion and reduce the coupling?

- Create a one **InstrumentService** class for all instruments instead of using separate **InstrumentServices** for each instrument.
- Use **Instrument** as a method parameter in the **InterfaceService** class instead of using **Guitar**, **KeyBoard** and **Drum** classes as method parameters.
- Create **InstrumentDAO** class and make **InstrumentService** class depend on **InstrumentDAO** through **DAOFactory** instead of creating separate instrument DAO instances in **IntrumentService**.
- Write separate `addInstrument`, `getInstrument` and `updateInstrument` methods in each and every DAO class.
- Define **InstrumentService** class as the interface.

15) Which of the following design principles is/are promoted by defining the InstrumentDAO?

- | | | |
|-------------------|---------------------------------|---------------------|
| (a) Encapsulation | (b) Model View Controller (MVC) | (c) Design Patterns |
| (d) Abstraction | (e) Refinement | |

16) Which of the following is/are true with respect to a Thin Client Model?

- | |
|---|
| (a) Places a heavy processing load on both server and the network |
| (b) Generates a significant network traffic between the client and the server |
| (c) Manages processing power more efficiently |
| (d) Distributes application logic processing and presentation to the client |
| (e) Modification to the application functionality is much more easy |

17) Evaluating the usability of a User Interface is based on

- | | |
|-------------------------|----------------------|
| (a) Learn ability. | (b) Colourfulness. |
| (c) Speed of Operation. | (d) High Text Usage. |
| (e) Recoverability. | |

18) Which of the following is a/are good practices which guide the coding tasks?

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|--|
| (a) Using complex data structures wherever possible |
| (b) Always choosing a basic text editor to write programs |
| (c) Whenever there are nested loops, writing the code in a testable way |
| (d) Creating interfaces which are consistent with the software architecture |
| (e) Selecting the most widely used programming language in the industry to develop the program |

19) Following systems are to be developed.

- i. Numerical weather prediction system
- ii. A device driver
- iii. A prototype for a Management Information System
- iv. An expert system for medical diagnosis

What are the most suitable programming languages to develop these systems?

- | | | | |
|-------------------|---------------------|---------------------|--------------|
| (a) (i)- C, | (ii) -Fortran, | (iii)-Java, | (iv)- Pascal |
| (b) (i)- Fortran, | (ii) -C, | (iii)-Visual Basic, | (iv) -Prolog |
| (c) (i)- C, | (ii) -Visual Basic, | (iii)-Java, | (iv)-Prolog |
| (d) (i)- Java, | (ii) -C, | (iii)-Pascal, | (iv)-Fortran |
| (e) (i)- Pascal, | (ii) -C, | (iii)- Java, | (iv)-Fortran |

20) Following are some software testing activities in software development projects.

- (i) Acceptance testing
- (ii) Code walkthroughs
- (iii) Unit testing
- (iv) Requirement reviews
- (v) Design reviews

Identify the correct classification of these activities into:

- (A) Software Validation
- (B) Software Verification

- | | |
|----------------------------|-----------------------------|
| (a) (A) – (ii), (iii), (v) | (B) – (i), (iv) |
| (b) (A) – (iv) | (B) – (i), (ii), (iii), (v) |
| (c) (A) – (i), (iv) | (B) – (ii), (iii), (v) |
| (d) (A) – (i), (iv), (v) | (B) – (ii), (iii), (v) |
| (e) (A) – (ii), (iii) | (B) – (i), (iv), (v) |

21) Identify the correct statement/(s) from among the following statements which are related to software testing.

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|--|
| (a) Testing should be scheduled as part of the project planning process. |
| (b) Software testing is a constructive process as it can show that there are no errors in a program. |
| (c) Regression testing is used to check that the changes made to a program have not introduced new faults. |
| (d) Equivalence partitioning is a black-box testing method that divides the input domain of a program into classes of data from which test cases can be derived. |
| (e) Black-box testing needs access to source code and involves analyzing a program to determine the selection of the test cases. |

22) Consider the following table which contains statements related to levels of testing.

COLUMN X		COLUMN Y	
(1)	Unit Testing	(A)	is a “live” application of the software in an environment that cannot be controlled by the developer.
(2)	Alpha Testing	(B)	the process of testing individual components in the system.
(3)	System Testing	(C)	is particularly important for object-oriented and component-based development.
(4)	Interface Testing	(D)	is a systematic technique for constructing the software architecture while at the same time conducting tests to uncover areas associated with interfacing.
(5)	Beta Testing	(E)	is conducted at the developer’s site by end-users for software that is developed as a product to be used by many customers.
(6)	Integration Testing	(F)	involves Recovery Testing, Security Testing, Stress Testing and Performance Testing.

How should a statement from Column **X** be matched with a statement from Column **Y**?

(a) 1 & B,	2 & E,	3 & F,	4 & D,	5 & A,	6 & C
(b) 1 & B,	2 & A,	3 & F,	4 & D,	5 & E,	6 & C
(c) 1 & F,	2 & E,	3 & B,	4 & D,	5 & A,	6 & C
(d) 1 & B,	2 & E,	3 & F,	4 & C,	5 & A,	6 & D
(e) 1 & F,	2 & A,	3 & B,	4 & C,	5 & E,	6 & D

- 23) Which of the following are valid reasons for a company to go for a re-engineering approach rather than introducing a new system?

(a) Associated risk with re-engineering is lesser than re-developing software.
(b) To quickly get resources to overcome an immediate problem.
(c) An existing system can be re-engineered successfully for a lesser cost than the cost of re-implementation.
(d) Extent to which an existing system can be improved by re-engineering is unlimited.
(e) A re-engineered system is always more maintainable than a newly developed system.

- 24) Identify the most suitable descriptions for (A) Version, (B) Release and (C) Variant from following (i), (ii) and (iii).

- (i) An instance of a system that is distributed to customers.
- (ii) An instance of a system which is functionally identical to other instances, but designed for different hardware/software configurations.
- (iii) An instance of a system that differs, in some way, from other instances.

(a) (A)- (ii)	(B)-(iii)	(C)-(i)
(b) (A)- (i)	(B)-(iii)	(C)-(ii)
(c) (A)- (ii)	(B)-(i)	(C)-(iii)
(d) (A)- (iii)	(B)-(i)	(C)-(ii)
(e) (A)- (iii)	(B)-(ii)	(C)-(i)

- 25) Consider the following table which contains a classification of Computer Aided Software Engineering (CASE) systems.

COLUMN X		COLUMN Y	
(1)	Tools	(A)	Support process phases or activities such as specification, design, etc. They normally consist of a set of tools with some greater or lesser degree of integration.
(2)	Workbenches	(B)	Support all or at least a substantial part of the software process.
(3)	Environments	(C)	Support individual process tasks such as checking the consistency of a design, compiling a program and comparing test results.

How should a statement from Column X be matched with the appropriate category from Column Y?

(a)	1 & A,	2 & B,	3 & C
(b)	1 & B,	2 & A,	3 & C
(c)	1 & C,	2 & A,	3 & B
(d)	1 & C,	2 & B,	3 & A
(e)	1 & A,	2 & C,	3 & B
