



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2008/2009 – 2nd Year Examination – Semester 3

IT3203 Software Engineering 1

PART 2 – Structured Question Paper

21st March, 2009

(ONE HOUR)

To be completed by the candidate

BIT Examination Index No: _____

Important Instructions:

- The duration of the paper is 1 (One) hour.
- The medium of instruction and questions is English.
- This paper has 3 questions and 11 pages.
- Answer any 2 of the questions (50 marks each) only.
- All questions carry equal marks
- Write your answers in English using the space provided in this question paper.
- Do not tear off any part of this answer book.
- Under no circumstances may this book, used or unused, be removed from the Examination Hall by a candidate.
- Note that questions appear on both sides of the paper.
If a page is not printed, please inform the supervisor immediately.

Questions Answered

Indicate by a cross (×), (e.g.

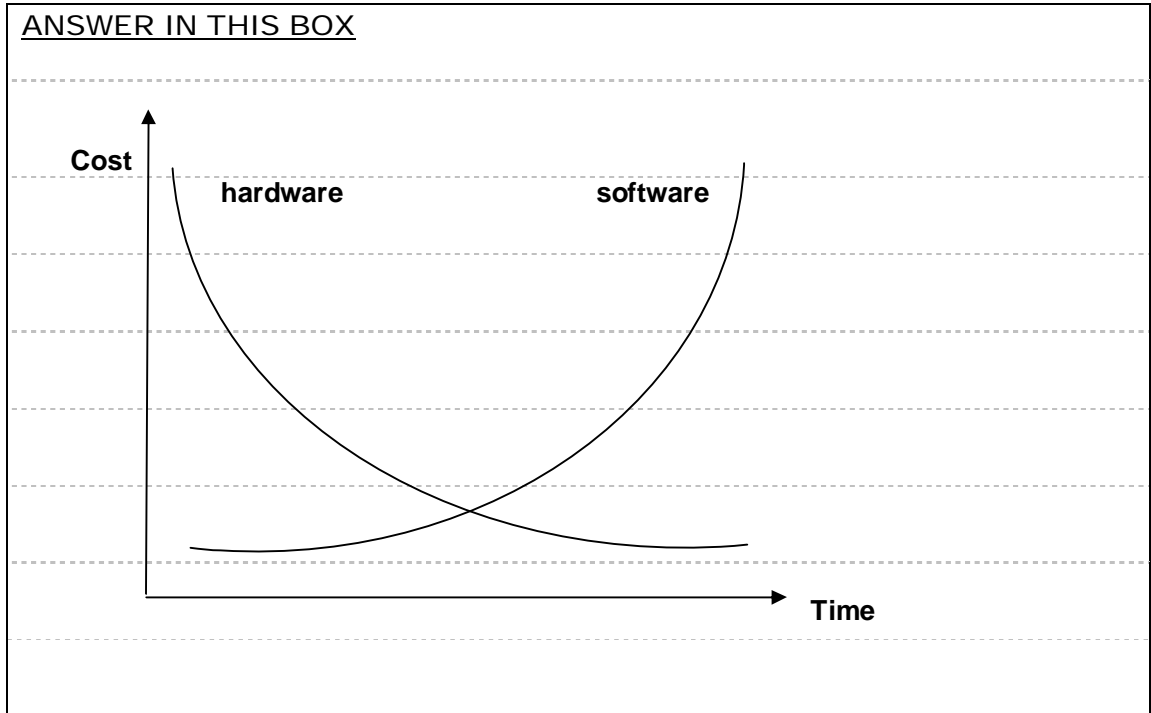
×

) the numbers of the questions answered.

To be completed by the candidate by marking a cross (×).	1	2	3
To be completed by the examiners:			

- 1) (a) Draw a graph to show how costs of hardware and software have changed over time.

(06 marks)



Answer parts (b) to (f) based on the following description.

Suppose that you have been hired as a software engineer to work on a life support system which will be used in intensive care units of hospitals.

- (b) What is the most important quality attribute the system should possess?

(04 marks)

ANSWER IN THIS BOX

Dependability/reliability/safety

- (c) Justify your answer in part (b) above.

(04 marks)

ANSWER IN THIS BOX

A failure in the system may endanger the life of the patients.

- (d) Suppose your manager says that all the requirements of this embedded software are clearly specified by the hardware vendor and we have to think of a suitable model to follow. What process model do you think you should recommend based on the information given? Why?

(08 marks)

ANSWER IN THIS BOX**Waterfall model.****It is used when the requirements are complete and clearly understood.**

- (e) List the major milestones and the corresponding deliverables pertaining to the model you recommended in part (d) above.

(20 marks)

ANSWER IN THIS BOX

Milestones	Deliverables
1. requirement analysis	1. requirement specification
2. design	2. design specification
3. coding	3. software
4. testing	4. test results
5. maintenance	5. maintenance report

(f) Do you think it will be easier to manage the project by using the model you recommended in part (d)? Give 2 reasons to justify your answer.

(08 marks)

ANSWER IN THIS BOX

Yes.

1. It is easier to trace the progress of the project.

2. Since there are distinct milestones and deliverables, the work can easily be divided among team members.

2) (a) Using a single sentence, define the term ‘stakeholder’ in the context of a software system.

(04 marks)

ANSWER IN THIS BOX

A party who has an interest in the system.

(b) Consider an auction website: <http://www.bitauctions.com>, which facilitates buying and selling rare books which are not frequently available in present day bookshops. Identify 2 stakeholders of the system from the facts given.

(04 marks)

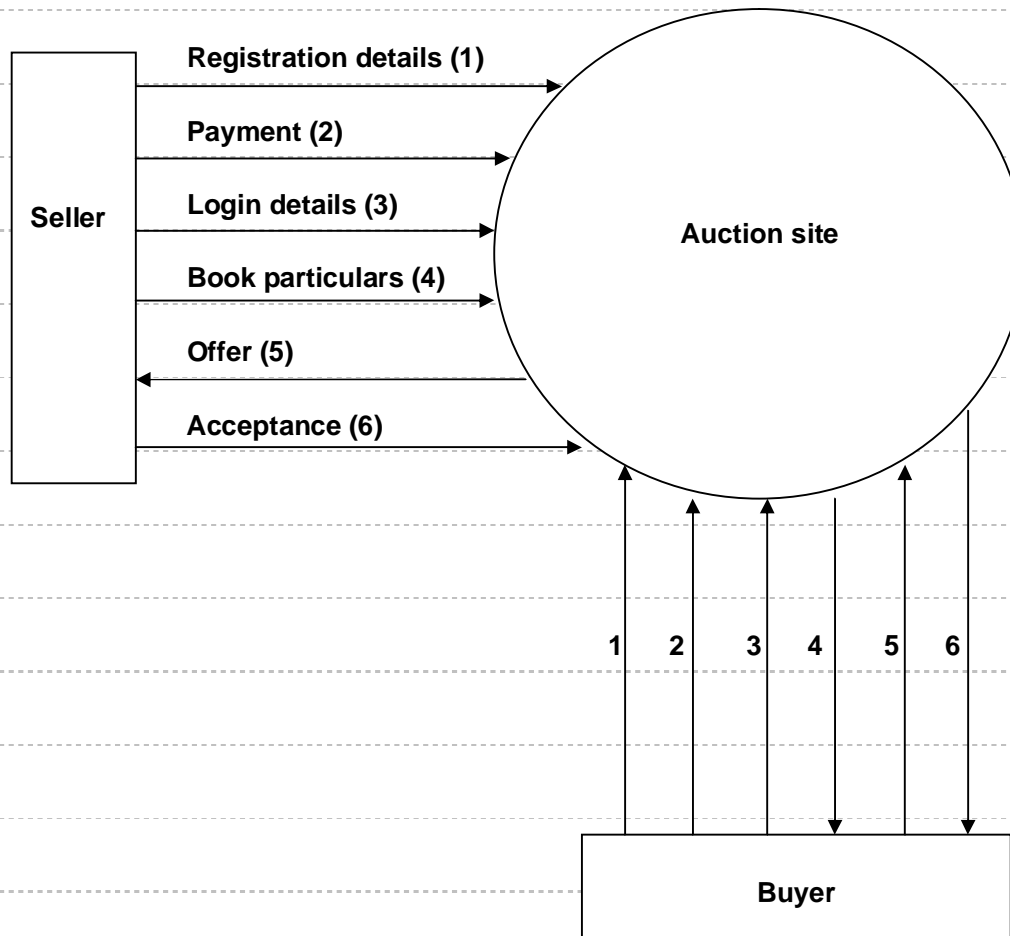
ANSWER IN THIS BOX

1. Seller.

2. Buyer.

- (c) Draw a context level DFD to illustrate the information flow between the stakeholders identified in part (b) above and the website. Assume that they have to register before using the system which involves paying a fee online. All users will have to enter login details (which they will receive offline) to use the system thereafter. When book particulars are given by a seller, the potential buyers can start bidding for it and the highest offer will be accepted and be notified.

(15 marks)

ANSWER IN THIS BOX

- (d) What are the 3 most important non-functional requirements *http://www.bitauctions.com* should possess to be successful in business? Justify your answers.

(09 marks)

ANSWER IN THIS BOX

1. Security

Transactions must be secured.

2. Accuracy

Transactions must be accurate.

3. Usability

A user-friendly interface attracts customers and retains them.

- (e) Can a DFD be used to document the non-functional requirements you identified in part (d) above? Justify your answer.

(04 marks)

ANSWER IN THIS BOX

No.

DFDs can only document functional requirements.

- (f) Based on the given facts, identify the 3 main sub-systems which make up <http://www.bitauctions.com>.

(06 marks)

ANSWER IN THIS BOX

1. Registration

2. Authentication

3. Bidding

- (g) It is a fact that a good design makes maintenance easier. List a design principle which helps this to be achieved.

(04 marks)

ANSWER IN THIS BOX

Modular design/encapsulation/information hiding

- (h) Certain agile methods like extreme programming pay less attention to rigorous design. Comment on the types of systems agile techniques are unsuitable for.

(04 marks)

ANSWER IN THIS BOX

For systems in which reliability is a concern

- 3) (a) State the term used to describe the total amount of code produced by a programmer in a unit time frame.

(04 marks)ANSWER IN THIS BOX**Programmer productivity/efficiency.**

- (b) Consider the following languages: Java, C, COBOL, ADA, Pascal and Visual Basic.

Which language most closely matches with each of the following description?

(12 marks)ANSWER IN THIS BOX

Description	Language
1. Used in business applications	COBOL
2. Used to teach programming	Pascal
3. Used to develop prototypes	Visual Basic
4. Used in military applications	ADA
5. Used to program hardware	C
6. Used to program network applications	Java

- (c) Suppose you are about to perform a black box test on a procedure which takes 2 ordered lists of non-negative integers of length 5 and merges them to create another ordered list. If you were to check the input handling of this procedure, what are the main equivalence classes you would consider? Give a sample test input belonging to each class you identified.

Note: an equivalence class is a set which contains values which have a similar impact on the behavior of the system.

(12 marks)

ANSWER IN THIS BOX

Valid classes

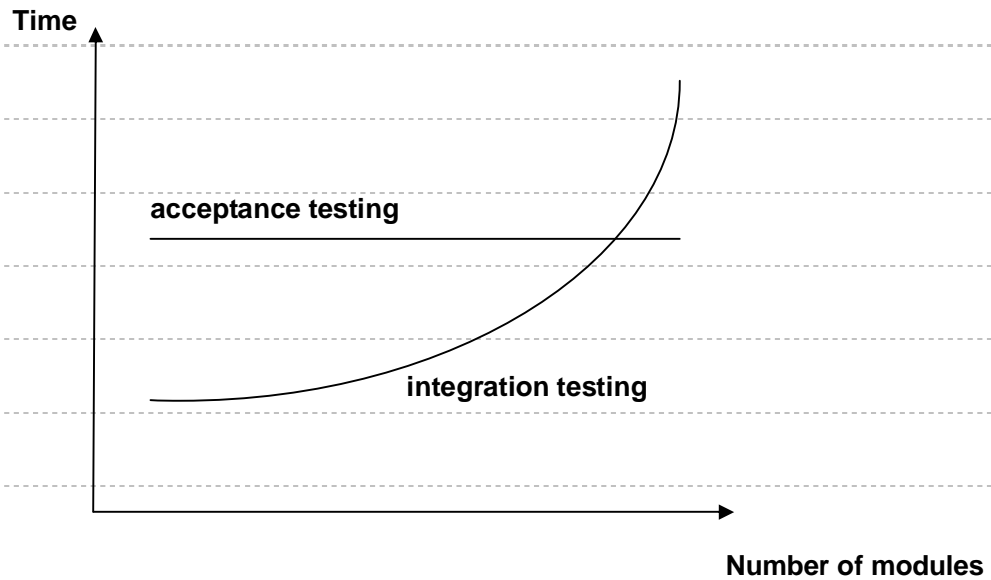
Class	Sample input
a list of 5 ordered non-negative integers	[1, 2, 3, 4, 5]

Invalid classes

Class	Sample input
an empty list	[]
a list of unordered non-negative integers	[3, 10, 7, 1, 2]
a list of less than 5 ordered non-negative integers	[1, 2, 3]
a list of more than 5 ordered non-negative integers	[1, 2, 3, 4, 5, 6]
a list of negative integers	[-1, -2, -3, -4, -5]
a list of real values	[1.23, 4.768, 0.005]
a list of characters	[q, w, e, t, y]
a list of strings	[qwerty, asdf, zxcv, abcdefg]

- (d) Sketch 2 curves to show how you think the time taken for integration and acceptance testing will vary with the number of modules.

(06 marks)

ANSWER IN THIS BOX

- (e) Give reasons for your sketches.

(08 marks)

ANSWER IN THIS BOX

1. Acceptance testing curve

The number of behavioral tests to be done to get user acceptance will not increase by increasing the number of modules.

2. Integration testing curve

When the number of modules increase, the number of interfaces each module has to interact increases as well.

- (f) List 4 main factors which may have contributed to typical high maintenance costs of software built a long time ago?

(08 marks)

ANSWER IN THIS BOX

1. Lack of product knowledge/Unavailability of the authors/Poor documentation/Lack of staff skills
2. Outdated technology.
3. Poor structure.
4. Shift of contractual responsibility.
