



UNIVERSITY OF COLOMBO, SRI LANKA



UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING
(Successor to the Institute of Computer Technology (ICT), University of Colombo)



DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)
Academic Year 2004/2005 – 3rd Year Examination – Semester 5

IT5201: Project Management & Software Quality Management
Structured Question Paper
19th March 2005
THREE HOURS

To be completed by the candidate

BIT Examination Index No: _____

Important Instructions:

- The duration of the paper is **3 (Three) hours**.
- The medium of instruction and questions is English.
- This paper has **4 questions** and **18 pages**.
- **Answer ALL questions. Each of the four questions carries 25 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.
- **Non-programmable Calculators may be used.**

Questions Answered

Indicate by a cross (X), e.g.

X

 the question numbers of the questions answered.

To be completed by the candidate by marking a cross (x).	1	2	3	4	
To be completed by the examiners:					

This case study has been sent to you earlier. Corrections have been indicated here in bold form. The questions 1b(ii),(iii),(iv),(vi), 2a(i),2b(i),(ii),3b(i),3c(i),(ii),4a(i),4b(i),(ii) of this question paper are based on this case study.

CASE Study

MarvellIT is a new Information Technology solutions provider based in Colombo. Its business is providing total information technology solutions to clients. This involves providing hardware and software solutions to clients. It has the grand vision of becoming a key information technology player in Sri Lanka by 2010.

MarvellIT is managed by a Managing Director and consists of three teams: Projects, Accounts and Marketing. The Projects Team deals with all implementation issues with regard to Projects. The Accounts Team deals with the finances in the organization and the Marketing Team deals with marketing the solutions provided by MarvellIT. The three teams are headed by the Project Manager, the Accountant and the Marketing Manager respectively who report to the Managing Director.

You have been appointed the first Project Manager at MarvellIT to manage its projects. One of your first tasks is to recruit people to your Project Team.

You have selected as your first project an Information Technology solution for Kandy College, a private educational institute in Kandy, having 1,500 full time and 1,000 part time students. Two modules are needed: a student information system and a staff payroll system. The student information system will manage the processing of student marks and staff payroll will be a payroll system for the staff at Kandy College numbering 105. A small computer network needs to be set up at Kandy College by MarvellIT. MarvellIT must provide the computers and the networking equipment. **An internet center is also to be set up at Kandy College by MarvellIT. However, Kandy College has dropped this requirement for the time being.**

You also hope to start a mobile phone based project (**named BESTPATH**) to give the quickest paths between any two points in the city of Colombo. When the mobile phone user keys in his destination, the system should give the quickest path to it based on the traffic situation on the ground. This project is expected to get a ready market and be very beneficial to MarvellIT in its long term goals. The project could be done as a joint venture with a mobile phone operator. The mobile phone operator can provide the location of the user to the system which in turn can do the path search.

MarvellIT has successfully entered into a contract with a mobile phone operator. The mobile phone operator will provide the user interface (front-end) to the user while the back-end will be supplied by MarvellIT. When given a destination, the front-end will access the back-end software system providing it with the source location and destination location of the user. Then the back-end will compute the quickest path based on the traffic data stored in the system together with the distances database which contains the distances between different locations in Colombo. Then the computed quickest path is passed back to the front-end .

MarvellIT has also successfully negotiated with the Police Department for the supply of dynamic traffic information on selected roads in Colombo. The Police Department is to supply MarvellIT a parameter related to the traffic on each selected road, every thirty minutes, from 0800 to 1800 hours, Monday to Saturday.

You must also start a Quality Management System for the projects at MarvellIT.

- 1) (a) (i) When doing a software project, there are several approaches to take. Given in the answer box are a few of them. Match them with correct descriptions given below:

- A. Where there is no existing system, the users can often get a better idea of what might be useful to them by trying out the intermediate products of this model.
- B. There is a sequence of activities working from top to bottom.
- C. A model of one or more aspects of the projected system is produced. It is constructed and tested quickly and inexpensively to test out assumptions.
- D. The limited scope for iteration in this model is in fact one of the strengths of this process model: with a large project, one would need to avoid reworking tasks previously thought to be completed.
- E. Involves breaking the application down into small components, which are then implemented and delivered in sequence.
- F. The possibility of changes in requirements is reduced because of the shorter time span between the design of a component and its delivery.

(05 marks)

ANSWER IN THIS BOX	
1. Waterfall model:	B, D
2. Software Prototyping:	A, C
3. Incremental Delivery	E, F

- (ii) The numbered blanks in the following paragraph have to be filled using the words labelled A, B, C given thereafter. (Each word may be used for more than one blank.)

Where uncertainty is high in a project, then a/an (...1...) approach is to be favoured. An example of uncertainty would be where the user requirements are not clearly defined. Where the requirements are relatively certain, but there are many complexities, as with a large embedded system needing a large amount of code, then a/an (...2...) approach might be favoured. Where deadlines are tight, then either a/an (...3...) or (...4...) is favoured over a/an (...5...) approach, as both tactics allow at least something to be delivered at the deadline.

- A. waterfall
- B. incremental
- C. evolutionary

(02 marks)

ANSWER IN THIS BOX

1	C	2	B
3	B/C	4	B/C
5	A		

- (iii) Select the suitable words from among A, B, C, D, E, F, G for the numbered blanks of the following paragraph.

Usually there are three successive processes which bring a new system into existence. The first process is the *feasibility study*. It is an investigation into whether a prospective (...1...) is worth starting. The (...2...) about the requirements of the proposed application is gathered. The probable development and operational (...3...), along with the value of the (...4...) of the new system are estimated. The second process is called *planning*. It is performed if the feasibility study produces results which indicate that the prospective project appears (...5...). The third process is *execution*. This phase often contains (...6...) and (...7...) sub-phases.

- A. beneficial
- B. design
- C. information
- D. costs
- E. project
- F. implementation
- G. benefits

(02 marks)

ANSWER IN THIS BOX

1: E	2: C	3: D
4: G	5: A	6: B
7: F		

- (b) (i) "A general statement of objectives is sufficient to begin work on a software project". Do you agree with that statement? Comment.

(02 marks)

ANSWER IN THIS BOX

No. A formal and detailed description of the customer requirements is needed before the project commences.

- (ii) Assume that you want to estimate the effort of the Kandy College Payroll project using the COCOMO model. Give the steps which you would follow.

(04 marks)

ANSWER IN THIS BOX

1. Estimate the total delivered lines of code.
2. Determine the effort constants based on the type of the project.
3. Substituting values for lines of code and effort constants in a formula.

- (iii) Describe a mechanism that you would use to obtain a rough validation of the above estimate.

(01 mark)

ANSWER IN THIS BOX

1. Ask experts.
2. Compare with similar completed projects.

- (iv) Following are the estimated activity durations and precedence requirements in the Kandy College project:

Activity	Duration (weeks)	Precedents
A. Do the Student Information System (SIS) requirement analysis.	1	-
B. Design the Student Information System.	1	A
C. Implement the Student Information System.	2	B
D. Do the Payroll System requirement analysis.	1	-
E. Do the Payroll System design.	1	D
F. Do the Payroll System implementation.	2	E
G. Payroll/SIS hardware acquisition	5	-
H. Payroll/SIS hardware implementation	1	G
I. Payroll system testing	1	F, H
J. SIS system testing	1	C, H

Draw a task network for the Kandy College project. What is the critical path? What is the significance of the critical path?

(06 marks)

ANSWER IN THIS BOX

Critical path is: **G H I or G H J**

Continued..

The significance of the critical path is:

Delaying the activities on it will delay the whole project

(v) The creation of a project schedule comprises of four main stages which are given below:

- A. Resource allocation
- B. Creating an ideal activity plan (plan of when each activity would ideally be undertaken were resources not a constraint)
- C. Schedule production (publish the project schedule indicating the planned start and completion dates and a resource requirements statement for each activity)
- D. Activity risk analysis (is aimed at identifying potential problems)

Order the stages A, B, C, D in the correct sequence.

(01 mark)

ANSWER IN THIS BOX

B D A C

(vi) There are a few options which are available to the BESTPATH project for dynamic traffic data entry. Cooperation with the Police Department is one. Having a set of hardware sensors on roads to monitor traffic is another. Renting space in tall buildings each with a good view of the roads and employing people to monitor traffic is another. Explain how you can do option analysis to select a suitable option for implementation.

(02 marks)

ANSWER IN THIS BOX

For each option, we can compute risks, costs and benefits.

Then we can compare the different options to select the best option.

- (iii) “Allocating extra resources to a project that cannot be completed on target, allows it to catch up with its project schedule”. Do you agree? Explain.

(01 mark)

ANSWER IN THIS BOX

No. adding more people may actually increase the time taken as the new people need to take time to understand the project. Also the existing people may need time to train the new people.

- (b) (i) Fill the following table on risk exposure assessment for the BESTPATH project. (Fill the labelled fields with a number ranging from 1 to 3. The risk with the highest likelihood is given 3 and one with the least likelihood is given 1. Also the risk likely to make the biggest impact is given 3 and that with the smallest impact is given 1)

(03 marks)

ANSWER IN THIS BOX

	Likelihood	Impact
Problems in getting dynamic traffic data	3	2
Staff illness	1	1
Front-end back-end linking problems	2	3

- (ii) Give a suitable equation for the importance of risk known as the *risk value* using the *Likelihood* and *Impact* terms.

(03 marks)

ANSWER IN THIS BOX

Risk Value = **Likelihood * Impact**

- (iii) For the risks given in the answer box, select suitable risk reduction techniques from the list given below:

- | | |
|----------------------------|-----------------------------------|
| A. Incremental prototyping | B. Staff training and development |
| C. Formal Specification | D. Multiple estimation techniques |
| E. Contractual agreements | F. Job matching |
| G. User Involvement | |

(05 marks)

ANSWER IN THIS BOX	
Development is technically too difficult.	B
Shortfalls in externally supplied components	E
Late changes to requirements	C
Developing the wrong user interface	G
Developing the wrong software functions	C, G, A
Personnel shortfalls	F
Unrealistic time and cost estimates	D

- (c) Select the suitable word from among A, B, C, D which follow for the numbered blanks in the following passage dealing with stress at the workplace.

It is sometimes necessary to put-in extra effort to overcome some (...1...) obstacle or to deal with an emergency, but if (...2...) working becomes a way of life, then there will be longer (...3...) problems. Good project management can reduce the dependence on (...4...) by the more (...5...) assessment of effort and time needed, based on the careful recording and analysis of the performance of previous projects.

- | | | | |
|--------------|-------------|--------|--------------|
| A. temporary | B. overtime | C term | D. realistic |
|--------------|-------------|--------|--------------|

(05 marks)

ANSWER IN THIS BOX				
1 A	2 B	3 C	4 B	5 D

- 3) (a) (i) Given that,
BCWS = Budgeted Cost of Work Scheduled,
BCWP = Budgeted Cost of Work Performed and
ACWP = Actual Cost of Work Performed,

give the equations for the following entities:

(05 marks)

ANSWER IN THIS BOX

Budget Variance	$ACWP - BCWS$
Schedule Variance	$BCWP - BCWS$
Cost Variance	$BCWP - ACWP$
Cost Performance Index	$BCWP / ACWP$
Schedule Performance Index	$BCWP / BCWS$

- (ii) Write a short note on planning and conducting a status review meeting.

(05 marks)

ANSWER IN THIS BOX

- (b) (i) Describe your plan to recruit people to your project team.

(05 marks)

ANSWER IN THIS BOX

- (ii) Can setting specific goals for the workers and providing them with feedback increase worker motivation? Explain.

(02 marks)

ANSWER IN THIS BOX

Yes. Then they know what they should be doing.

Also constructive feedback encourages them.

(iii) Comment on “task-oriented” and “people-oriented” management styles.

(02 marks)

ANSWER IN THIS BOX

(c) (i) Describe the types of maintenance that the BESTPATH system may require in the future.

(03 marks)

ANSWER IN THIS BOX

(ii) Give ways in which you can reduce the likely maintenance costs of the BESTPATH project.

(03 marks)

ANSWER IN THIS BOX

- 4) (a) (i) Describe the Quality Management System that you plan to develop for MarvelIT.

(13 marks)

ANSWER IN THIS BOX

Continued..

- (b) (i) Explain the change management procedure that you would implement at MarvellIT.

(05 marks)

ANSWER IN THIS BOX

(ii) Explain the version management procedure that you would implement at MarvellIT.

(04 marks)

ANSWER IN THIS BOX
