



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2004/2005 – 2nd Year Examination – Semester 4

IT4202: Software Project Management

PART 2 – Structured Question Paper with Model Answers

13th August, 2005
(TWO HOURS)

To be completed by the candidate

BIT Examination Index No: _____

Important Instructions:

- The duration of the paper is **2 (Two) hours**.
- The medium of instruction and questions is English.
- This paper has **4 questions** and **15 pages**.
- **Answer all 4 questions.** Question **1** carries **40 marks** and **other three** questions carry **20 marks each**.
- **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 (x), (e.g.

x

) the 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:				

CASE STUDY

“ColombaKade” is a famous hardware store for supplying building construction material in the South, and dealing with both wholesale and retail business. It has several branches in the Southern cities. Mr. Sudantha, who is one son of the founder of this organization, is the current managing director and he wants to expand business activities using Information and Communication Technology (ICT).

Mr. Sudantha presented his idea to the other Directors of the business at one of the recent Board Meetings of the Directors and they agreed to allocate some money to initiate the project. However, some Directors felt that this could be a waste of money and that there be a significant benefit to the business. Since Mr. Sudantha is a busy businessman, he appointed a small team to start the project. Mr. Lasith who is an assistant accountant, was appointed as the leader of the team and he was given two other members from new recruits. In addition, Mr. Sudantha will also help the team in evaluating and finalizing decisions.

The project team was instructed to use ICT in three directions: give publicity to the business operations since many foreign NGOs are working in the area to reconstruct tsunami affected houses, streamline internal management of all branches in order to share all resources and provide supply chain management through an e-business model.

- 1) (a) Who are the stakeholders of “ColombaKade ICT” project? (Name at least five groups) (05 marks)

ANSWER IN THIS BOX

Possible five groups:

Directors of the business, customers, suppliers, employees, local
government

- (b) Since the local government may provide some financial support to the project, Mr. Sudantha wanted to select someone from the accounts department as the manager of the project. Describe your views on the appointment of Mr. Lasith as the project manager considering the nature of work involved.

(08 marks)

ANSWER IN THIS BOX

Since this is a software project which is different from other projects, it is

important that the project manager knows or has some experience in the subject of
ICT.

Continued...

His skills in general management including the knowledge of financial evaluation techniques will be an advantage. He also should have some skills and knowledge in project management disciplines. In order to appoint him as a good project manager, the following qualities should be evaluated:

Organization and planning

Human relations

Oral and written communication

Technical knowledge

Resource management

- (c) Some others think that this is a meaningless project because of the nature of business in the “ColomboKade”. List arguments in favour of the project. In order to justify these arguments, a feasibility study should be carried out by Mr. Lasith and his team. What would be the structure of such a feasibility report in abstract terms?

(12 marks)

ANSWER IN THIS BOX

Arguments in favour:

It will provide new business opportunities due to publicity. Especially linking with NGOs involved in the construction of tsunami affected areas in the South will be beneficial.

There is better customer management since all branches will see customers' outstanding (credit/debit) balances.

Continued...

By sharing resources, it will be possible to maintain the business without disruption, especially, vehicles and employees.

There will be centralized accounting and hence reduction some of staff

It will help to maintain better reorder levels, monitor transactions at branches and supply them in advance.

Structure of feasibility report:

- **Introduction: identifies what the document is;**
- **Description of current situation**
- **Problem description**
- **Proposed development**
 - **business and financial aspects**
 - **technical aspects**
 - **organizational aspects**
- **Estimated costs**
 - **development costs**
 - **operational costs**
- **Envisaged benefits**
- **Recommendations**

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- (d) The following table describes the projected revenue and costs of the project during the next five years. Calculate the Net Present Value (NPV), Payback Period and Return on Investment (ROI). Assume that the interest rate is 10% per annum and is fixed during the project period.

	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue	0	2000	3000	4000	5000
Costs	5000	1000	1000	1000	1000

(15 marks)

ANSWER IN THIS BOX

NPV: 2316, Payback Period 5 years, ROI 31%

	A	B	C	D	E	F	G	H
1								
2	DISCOUNT RATE	10%	Years					
3		1	2	3	4	5	TOTAL	
4	COSTS	(\$5,000)	(\$1,000)	(\$1,000)	(\$1,000)	(\$1,000)	-9,000	
5	DISCOUNT FACTOR	0.91	0.83	0.75	0.68	0.62		
6	DISCOUNTED COSTS	-4,545	-826	-751	-683	-621	-7,427	
7								
8	BENEFITS	\$0	\$2,000	\$3,000	\$4,000	\$5,000	14,000	
9	DISCOUNT FACTOR	0.91	0.83	0.75	0.68	0.62		
10	DISCOUNTED BENEFITS	0	1,653	2,254	2,732	3,105	9,743	
11								
12	DISCOUNTED BENEFITS + COSTS	-4,545	826	1,503	2,049	2,484	2,316	← NPV
13	CUMULATIVE BENEFITS + COSTS	-4,545	-3,719	-2,216	-167	2,316	4,633	
14						↑		
15	ROI	31%				Payback in this year		

- 2) (a) Define a suitable Work Breakdown Structure (WBS) for the “ColombaKade ICT” Project. Extend at least two level-one items to the level-three (i.e. work package level).

(12 marks)

ANSWER IN THIS BOX

(This is an open question and the answer could vary from one to the other.
A model answer is given below.)

1.0 Project Initiation**1.1 Organization structure of team****1.2 Project Team selection****1.3 Develop scope statement****2.0 Develop IT Infrastructure****2.1 Identify resource requirement****2.1.1 Develop IT strategic plan****2.1.2 Identify resource priorities****2.1.3 Prepare action plan****2.2 Acquire resources****2.2.1 Call for quotations****2.2.2 Select suitable suppliers****2.2.3 Purchase equipments****2.3 Implement resources****2.3.1 Recruit suitable technical staff****2.3.2 Prepare the background****2.3.3 Carry out installation****3.0 Develop a website for ColombaKade****3.1 Identify requirements****3.1.1 Define user requirements****3.1.2 Define content requirements****3.1.3 Define system requirements****3.1.4 Define server requirements**

Continued...

3.2 Design the Website**3.2.1 Identify specific content to host****3.2.2 Design structure****3.2.3 Do page design****3.2.4 Verify design****3.3 Develop the Website****3.3.1 Install necessary tools****3.3.2 Obtain web space****3.3.3 Develop components****3.3.4 Integrate components****3.4 Test and evaluate the website****3.4.1 Test site from different browsers and different connections****3.4.2 Carry out evaluation using a questionnaire****3.4.3 Identify and correct development & Design errors****3.5 Support and maintenance****3.5.1 Provide training for staff to maintain it****3.5.2 Prepare maintenance plan for the website update****3.5.3 Monitor website maintenance****4.0 Develop Management Information System for ColombaKade****5.0 Develop online e-Business Portal****6.0 System Evaluation/Roll out****7.0 Support**

Continued...

- (08 marks)**

<u>ANSWER IN THIS BOX</u>	
Risks	Contingencies
R1. Project team members may leave	Provide suitable incentives both monetary and training opportunities Recognize their work Increase team size and employ some part time team members to learn project Legal bonds for special training if any

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R2. Incapable project team	Select/recruit suitable members who have
	IT knowledge
	Outsource difficult tasks
	Use external consultant
R3. Team may not identify requirements properly	Categorize and document all
	requirements
	Evaluate requirements using (a)
	prototype(s)
R4. Project output may not be significant	Verify using external consultant
R5. Directors may not be willing to invest a large amount for IT project	Prepare a specific scope statement and
	objectives to achieve
	Evaluate cash flow analysis using a third
	party
R5. Directors may not be willing to invest a large amount for IT project	Identify and present indirect and long term
	benefits
	Prepare an investment plan - stage wise
	Convince Directors using project sponsor
R5. Directors may not be willing to invest a large amount for IT project	and external consultants
	Present the contribution to business
	objectives due to this investment
	Obtain local government support (IT loans)

Continued...

- 3) (a) Suppose Mr. Lasith has provided the following brief description about the website for the ColombaKade and requested you to prepare the cost estimate for setting up the website.

“The main page of the website should contain a photo of the head office. A frame based structure should be used to present the content. A menu bar will be used to access different web pages placed. One page is allocated to present information about Board of Directors of the organization. Dynamic pages should be developed to list prices of items of different categories (both retail and wholesale prices).”

Which technique would you use for the cost estimation? Give Reasons.

What are the components which can be used to calculate object points in a web page? How do you calculate total number of object points in a website? State your assumptions in the answer.

Based on the description about the ColombaKade website, calculate the total effort in the person-months using COCOMO II early prototyping formula. Assume 20% can be supplied using exiting components and the productivity rate is 12. State your assumptions to explain/justify the object points calculation.

Hint: *COCOMO II Early prototyping formula*

$$PM = \frac{NOP * \left(1 - \frac{\% reuse}{100}\right)}{PROD}$$

PM is the effort in person-months, NOP is the number of object points and PROD is the productivity rate.

(12 marks)

ANSWER IN THIS BOX

Analogy Method. Reason -

It is better to do the cost estimation using several (at least 2 or 3) techniques to verify whether we can reach a good estimate.

However, as a starting point, it can be first estimated using similar project details of a past for e-business website. An expert, who has some experience in developing similar websites, can also estimate the cost based on his past experience.

Assume that a webpage consists of several types of components.

Let O1 be the html content of a webpage, O2 an image, O3 an audio clip, O4 a menu bar with several menu items and O5 an active component developed using a scripting language. If the webpage consists of several frames, we can consider one frame as a web page. Different weights are allocated for these objects points depending on their complexity.

$N(O_i)$ = Number of Object Points with respect to O_i category.

$$\text{NOP} = \frac{\sum W_i * N(O_i)}{\sum W_i}$$

Assumption: a single weight is given for objects in the same category.

Continued...

Object	No. of	Weight	Total	Remarks/Assumptions
Point	Object	(1-5)		
	Points			
Menu	1	3	3	A single menu will appear in all pages; it will have 5 items
Pages	3*5	2	30	Static pages presenting details
Dynamic pages	10	4		Pages linked to a database and assumed to be 10 pages
Sales Database	5	5	25	Depending on the number of tables, object points are assumed; higher weight is given consider whole process of setting it up
Data input screen for the database	4	2	8	
Images	20	3	60	With respect to total number of pages.
Total			126	

PM = 8.4 (this answer is an open one and depends on the assumptions made)

- (b) If the website allows customers to place online orders and to settle their bills using credit cards, what are the key quality attributes which must be considered? Mr. Lasith has a poor knowledge about quality planning and needs your assistance. Describe what information is required as the input for the process and what the outputs would be of quality planning process.

(08 marks)

ANSWER IN THIS BOX

Security, usability, reliability and inter-operability (to support many browsers and different connection speeds)

The quality planning process can be summarized as follows.

<i>Inputs</i>	<i>Tools and techniques</i>	<i>Outputs</i>
Quality policy	Benefit/cost analysis	Quality Mgmt. plan
Scope statement	Benchmarking	Operational definitions
Product description	Flowcharting	Checklists
Standards & regulations	Design of experiments	Inputs to other processes
Other process outputs	Cost of Quality	

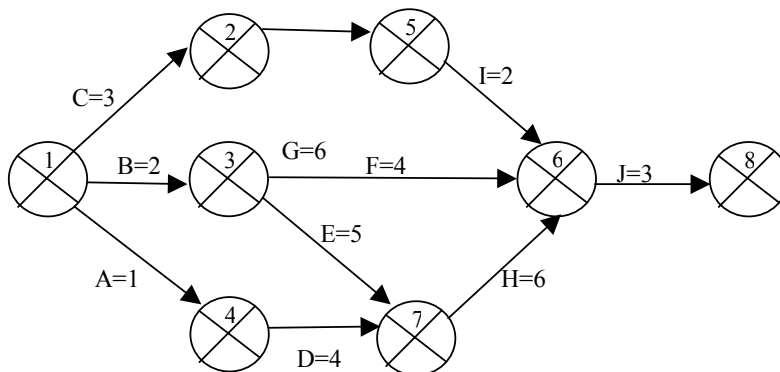
- 4) (a) What is the critical path in a project network? Why is it so important in the time management of a project?

(05 marks)

ANSWER IN THIS BOX

The longest time path of a project network is considered as the critical path. It is not possible to delay activities on the critical path since it will definitely affect the project completion date.

- (b) Calculate the Earliest Start (ES), Earliest Finish (EF), Latest Start (LS), Latest Finish (LF), Free Slack (FS) and Total Slack (TS) for the following network diagram. Project Start date is November 2nd which is a Monday. No work is done during weekends and there are also no holidays on workdays. Assume that the work starts in the morning of a day and finishes in the evening.



In the diagram, activity durations are given in days.

(15 marks)

ANSWER IN THIS BOX

Activity	Earliest Start (ES)	Earliest Finish (EF)	Latest Start (LS)	Latest Finish (LF)	Free Slack(FS) / Total Slack(TS)
A	2	2	4	4	0/2
B	2	3	2	3	0/0
C	2	4	4	6	0/2
D	3	6	5	10	2/2
E	4	10	4	10	0/0
F	4	9	13	18	7/7
G	5	12	9	16	0/2
H	11	18	11	18	0/0
I	13	16	17	18	2/2
J	19	23	19	23	0/0
