## UNIVERSITY OF COLOMBO, SRI LANKA

### UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

**BIT**

**DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)**
*Academic Year 2005/2006 – 2nd Year Examination – Semester 4*

## IT4202: Software Project Management
### PART 2 - Structured Question Paper
**5th August 2006**
*TWO HOURS*

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**To be completed by the candidate**

BIT Examination Index No: _____

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**Important Instructions:**

- The duration of the paper is **2 (Two) hours**.

- The medium of instruction and questions is English.

- This paper has **3 questions** and **12 pages**.

- **Answer ALL 3 questions**. Question **1** carries **50 marks** and the **other two** questions carry **25 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.

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**Questions Answered**

Indicate by a cross (✗), e.g  ✗   the question numbers of the questions answered.

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

**The question 1 of this question paper is based on this case study.**

## Case Study

You have been appointed the IT Officer of a government department. The department has no IT division at present. Several computers, bought at different times, are being used for office work at different locations in the department. There are some computers which have minor defects but not been repaired. There is a new computer that had been granted by a donor but not used at all. The department has 50 employees.

You have been asked to manage a project to make a payroll system for the department and also to make a website for the department. You may buy hardware required for this project only after making efficient use of the existing hardware in the department. For that, you must investigate the present usage of computers in the department and make the usage efficient by reducing wastage and duplication. You also have to investigate the feasibility of repairing the defective computers and get them repaired if feasible. You may decide to recruit staff on contract basis to work on the project. You plan to use open-source software for the development platform and thus there is no cost involved in obtaining them. However, these platform software need to be installed in the computers. The department already has an internet connection.

This project needs to be finished by 5th November 2006. The budget that has been allocated for this project is Rs. 200,000.

1)  (a) List the criteria that must be met for the success of this project.

(03 marks)

**ANSWER IN THIS BOX**

**No wastage of computers in the department.**

**A working payroll system.**

**A working website.**

**Completion by 5th November 2006.**

**Budget not to exceed Rs.200000.**

(b) Complete the following table for the project. In the **Activity** column, list the level-1 Work-breakdown-structure activities. In the **Duration** column, list the activity duration in weeks. In the **Precedents** column indicate the other activities which must be performed before the corresponding activity on the row can start. (Note: Your answer may or may not use all the rows in the table)

**(12 marks)**

**ANSWER IN THIS BOX**

| Activity | Duration | Precedents |
|---|---|---|
| A. Evaluate current usage of computers | 1 | - |
| B. Repair defective computers | 4 | - |
| C. Make plan for efficient computer usage | 1 | A,B |
| D. Payroll design | 4 | - |
| E. Payroll code | 2 | C,K |
| F. Payroll test | 6 | E |
| G. Web design | 4 | - |
| H. Web code | 2 | G,L |
| I. Web test | 6 | H |
| J. Buy hardware | 3 | C |
| K. Install payroll platform software | 1 | J |
| L. Install web platform software | 1 | J |
|  |  |  |
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|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

(c) Draw an activity network diagram for this project.

**(10 marks)**

**ANSWER IN THIS BOX**

(d) Describe the method to find the critical path in the above diagram.

**(04 mark)**

**Do a forward pass through the network to compute the earliest dates at which**

**activities and the project itself can be computed. Then do a backward pass to**

**calculate the latest date at which each activity may be started without delaying**

**the end date of the project. The path through the network that defines the**

**duration of the project is the critical path.**

(e) Describe the method to create the resource plan for this project using a bottom-up approach.

**(03 marks)**

**List the resources (labour, equipment, materials, space, and services) which**

**will be required along with the expected level of demand. This can be done**

**by considering each activity in turn and identifying the resources required.**

(f) How would you estimate the cost of this project?

**(05 marks)**

> **ANSWER IN THIS BOX**
>
> **From the resource plan I would compute the cost for each resource. Then I**
>
> **would add them to get the cost for the total project. I would have to keep in**
>
> **mind that the budget allocated for this project is Rs. 200,000. Thus I would**
>
> **have to make adjustments in the work breakdown structure and the network**
>
> **diagram to cater to this constraint and keep the cost below Rs. 200,000.**
>
> **I can get expert opinion also to validate the cost estimate that I compute.**

(g) Write a short note on making a budget for this project. What is the importance of a budget?

**(05 marks)**

> **ANSWER IN THIS BOX**
>
> **Budgeting involves allocating the project cost estimate to individual work**
>
> **items. These work items are based on the work breakdown structure for the**
>
> **project. Budget helps cost control in a project. It can be used to produce a cost**
>
> **baseline for measuring project performance.**
>
> **When making the budget, it is good to add some extra funds as compensation**
>
> **costs to cover unexpected situations, staff overtime, etc.**

(h) Comment on risk management of this project.

**(08 marks)**

**ANSWER IN THIS BOX**

**As any other project, this project also involves risk. I would first list the risks which can occur in this project. Then I would rank them in the order of importance. I would then plan for risk reduction concentrating mostly on the most important (critical) risks.**

**A key risk that would bother me is the constraint on time and cost on this project. The project may not finish by 5th November 2006 due to the budget ceiling constraint. Although it would have been good to have two parallel**

**developments for the payroll and web site, it would require at least an analyst/programmer for each. Thus paying them decent salaries require funds. Else they may leave at the middle of the project. To keep to the time deadline, we may need more employees that will further stretch our budget. Thus, to counter these risks, I will ask the management either for an increase in the budget, or an increase in time.**

**Some other risks and strategies:**

**Personnel shortfalls: Staffing with top talent, career development**

**Also, I will have good change control and configuration management procedures**

**in place. Further, I will make each employee maintain some information about the work he is doing so that in the event of his absence, we will still be aware of his work details.**

2) (a) Outline the steps that you will follow when you recruit new staff for the projects which you manage.

**(10 marks)**

ANSWER IN THIS BOX

**1. Create a job specification for the job (requirements of the job)**

**2. Create a job holder profile for the job (e.g., qualities, qualifications, education, and experience required)**

**3. Obtain applicants (e.g., through advertisement)**

**4. Examine CVs (should be read carefully and compared with the job holder profile. They have to be eligible for the job.)**

**5. Interviews etc., (e.g., aptitude tests, examination of samples of previous work; may need more than one interview session with an applicant)**

**6. Other procedures (e.g., Contacting the references)**

(b) What is *resource levelling?*

**(05 marks)**

ANSWER IN THIS BOX

**Resource levelling is to smooth the resource histogram and**

**reduce the maximum demand for a resource by delaying the start**

**of some activities.**

(c)  Write a short note on *source selection* in procurement management.

**(10 marks)**

**ANSWER IN THIS BOX**

This involves evaluating bidder's proposals, choosing the best one,

negotiating the contract, and awarding the contract.  Organizations should

use a formal proposal evaluation form when evaluating suppliers.

Stakeholders in the procurement process should be involved in selecting

the best supplier for the project.  Suppliers can be short listed and then

evaluated in detail.

The process of evaluation may include:

scrutiny of the proposal documents;

interviewing suppliers' representatives;

demonstrations;

site visits;

practical tests.

When a delivered product is to be based on an existing product, a

demonstration may be arranged. However, the customer should produce a

schedule of what needs to be demonstrated, ensuring that all the

important features are seen in operation.

The selection decision should be made impartially and on merit.

The final legal format of a contract, will require some legal expertise.

Once the selection is done, not only the successful candidate, but the

unsuccessful candidates should also be told of the decision. They should

be given clear and objective reasons as to why their proposals did not find

favour.

3) (a) McCall's *quality factors* reflect the external view of software that users would have. Outline how the quality factors listed below can be achieved. E.g., A way to achieve the quality factor *efficiency* is to use good algorithms.

**(5 marks)**

**ANSWER IN THIS BOX**

| Quality Factor | Ways to achieve |
|---|---|
| Reliability | **Error tolerance, Completely correct algorithm** |
| Usability | **Operability, training, communicativeness** |
| Maintainability | **Simplicity, modularity, self-descriptiveness** |
| Portability | **Modularity, self-descriptiveness, independence** |
| Functionality | **Accurate algorithms, completeness, security** |

(b) Write your views on quality

**(…arks)**

**ANSWER IN THIS B**

**Quality is very important in a project. Quality management involves quality planning, quality control, quality assurance, and quality audits. Quality planning is identifying which quality standards are relevant to the project and how to satisfy them. Quality control involves monitoring specific project results to ensure that they comply with the relevant quality standards and identifying ways to improve quality. Quality assurance involves periodically evaluating overall project performance with regard to quality. Quality audits involve reviews of quality management activities to improve performance on current or future projects. I would make sure that all the quality management activities are done.**

(c) Describe *change control.*

**(10 marks)**

**ANSWER IN THIS BOX**

Change in project documents must be controlled. For controlling changes, a *change control system* can be used. It is a formal, documented process, that describes when and how official project documents may be changed. It also describes people authorised to make changes, the paperwork required, and any automated or manual systems the project will use. A change control system often includes a change control board, configuration management, and a process for communicating changes.

A change control board is a formal group of people responsible for approving or rejecting changes in a project.

Configuration management ensures that the descriptions of the project's products are correct and complete, and concentrates on the management of technology by identifying and controlling the functional and physical design characteristics of products and their support documentation.

Communicating the changes is also important. The project manager and his staff must develop a system for notifying everybody affected by a change in a timely manner.

(d) Frederick Brooks, in his famous text book "The Mythical Man-month" recommends to use the
following rule to schedule a software task:

One-third (1/3) of the time: planning
One-sixth (1/6) of the time: coding
One-fourth (1/4) of the time: component test and early system test
One-fourth (1/4) of the time: system test

Comment on that recommendation especially with regard to the scheduled time for testing.

**(05 marks)**

**ANSWER IN THIS BOX**

**This can be a good rule as testing is the most mis-scheduled part of**

**programming. Failure to allow enough time for testing, could be disastrous. In**

**this rule, one half of the project duration is spent on testing which is good.**

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