NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCE
COMPUTER SCIENCE DEPARTMENT
DECEMBER 2002 EXAMINATIONS

SUBJECT: SOFTWARE PROJECT MANAGEMENT
CODE: SCS4204

Instructions to candidate:

1. This question paper consists of seven (7) questions, answer any five (5).
2. All questions have equal marks

3 HOURS

QUESTION ONE

a) Examine the fragment of a statement of requirements shown below. Identify the functional requirements and the constraints.

The monitoring system should monitor and display the temperatures in a series of reactors, detect any hazard conditions from these temperatures which indicate a reactor malfunction and periodically write temperature data to a database which is used to provide information about the day-to-day running of the reactors. Since other systems have already been implemented on the host computer only 60K of memory is available for this system.

All the file handling that the system performs should be implemented by means of calls on operating system procedures. The system should also periodically archive the temperature database to magnetic tape or else the file store used for the database would become exhausted. [14]

b) What benefits can be derived from using project management software at each of the following stages.

i. Activity planning

ii. Software estimation

[6]

QUESTION TWO

a) The main parameters for a PERT network are the duration of each task, the amount of resource it requires, the earliest date it can be started and its relationship to other tasks. Suggest some events outside the project manager's control whose effects can be examined by changing the parameters of a PERT network. [7]

b) Social loafing is a problem that students often encounter when carrying out group assignments. What steps can participants in a group take to encourage team members to pull their weight together. [5]

c) List the products created by the Step Wise planning process. [8]

QUESTION THREE

a) Students on a course are required to produce a written report on an IT-related topic each term. If you wanted to create a model to estimate how long it should take a student to complete such an assignment, what measure of work content would you use? Some reports might be more difficult to produce than others, what factors might affect the degree of difficulty? [10]

b) Consider the following application areas. Which would you expect to be the riskiest in terms of software development?

i. A statistics package.

ii. The controlling software for a commercial airliner.

iii. An invoicing system for the local bank.

Give your reasons [6]

c) Under what circumstances may it be less risky for the developer to consult an external agency than to avoid doing so? [4]

QUESTION FOUR

a) An employee of a training organization has the task of creating case study exercises and solutions for a training course which teaches a new system analysis and design method. The person's work plan has a three-week task "learn new method". A colleague suggests that this is unsatisfactory as a task as there are no concrete deliverable or products from the activity. What can be done about this? [8]

b) Following is an activity schedule showing total float for each activity.

Activity	Duration (Weeks]	Earliest Start date	Latest Start date	Earliest Finish date	Latest Finish date	Total float
A	6	0	2	6	8	2
B	4	0	3	4	7	3
C	3	6	8	9	11	2
D	4	4	7	8	11	3
E	3	4	7	7	10	3
F	10	0	0	10	10	0
G	3	10	10	13	13	0
H	2	9	11	11	13	2

Calculate the free float and interfering float for each of the activities shown in the activity network. [4]

c) Is it better for a larger proportion of effort to be expanded towards testing or towards conducting reviews? Give reasons. [8]

QUESTION FIVE

a) Describe two circumstances where the business plan and the staffing levels should not be rigidly adhered to when deciding whether to take on a new project. [8]

b) Classify each of the following metrics as a predictor metric or a result metric. For each result metric, suggest a predictor metric which might have been used to predict it.

i. The number of person-hours expended on a project.

ii. The number of IF statements in a program unit.

iii. The size of the functional specification for a system.

iv. The number of defects in a program unit discovered during system testing.

v. The complexity of a system design.

vi. The amount of effort expended during maintenance.

[12]

QUESTION SIX

a) Why is a software project manager at a disadvantage when it comes to the initial planning of a project compared to project managers in other engineering disciplines? [5]

b) What items of software support should the support requirements specification contain? [9]

c) It is common with software systems development projects for the size of the system to gradually increase (scope creep). Think of reasons why there is a tendency to scope creep. [6]

QUESTION SEVEN

a) Management involves the following activities:
Planning, organizing, staffing, directing, monitoring, controlling, innovating and representing.

Juju Phili is the manager of a software development section. On Tuesday at 1000 hours he and his section heads have a meeting with their group manager about the staffing requirements for the coming year. Juju has already drafted a document bidding for staff. This is based on the work planned for his section for the next year. The document is discussed at the meeting. At 1400 hours Juju has a meeting with his senior staff about an important project his section is undertaking. One of the

programming staff has just had a road accident and will be in hospital for some time. It is decided that the project can be kept on schedule by transferring another team member from less urgent work to this project. A temporary replacement is to be brought in to do the less urgent work but this may take a week or so to arrange. Juju has to phone the personnel manager about getting a replacement and the user for whom the less urgent work is being done to explain that it is likely to be delayed.

Identify which of the eight management responsibilities listed above Juju was responding to at different points during his day. [16]

b) Would the sizes of program units from a previous, similar project, and the time taken to unit test those units be useful data for the project manager? Explain your answer. [4]

END OF QUESTION PAPER

GOOD LUCK!