NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCE
COMPUTER SCIENCE DEPARTMENT
JUNE EXAMINATIONS 2004

SUBJECT: SOFTWARE ENGINEERING CONCEPTS
CODE: SCP1205

INSTRUCTION TO CANDIDATES

This Question paper consists of seven Questions.
Each Question carries 20 Marks.
Answer any Five Questions

Time: 3 hours

QUESTION ONE

a) Unlike Hardware, Software does not wear and tear, it deteriorates. Explain this statement with the aid of appropriate bathtub curves. [6]

b) Software development has been described to be in a crisis. Discuss this statement highlighting the symptoms, causes and possible remedies to the software crisis. [10]

c) Briefly describe the attributes of a well-engineered software product. [4]

QUESTION TWO

a) Briefly describe the spiral model outlining its advantages, limitations and application areas. [10]

b) Explain the difficulties of using natural language and a rapid prototype for describing requirements [8]

c) What is the importance of the requirements specification document? [2]

QUESTION THREE

A computer is being used to monitor an industrial plant. The computer periodically inputs readings from instruments in the plant. Some of the reading requires conversion to normal units of measurement (e.g. micro volts into degrees C). The computer checks each of the readings against permissible values. Alarm reports are displayed on a VDU screen when a value is outside its valid range.

a) Draw a context diagram and a level 1 Data Flow Diagram for the above problem [15]

b) What benefits would a development team derive from switching from function-oriented design to Object Oriented Design? [5]

QUESTION FOUR

a) Unlike the Basic COCOMO, the Intermediate COCOMO results in a realistic estimate of the project effort and duration. Explain. [6]

b) Opponents of the COCOMO model have argued that it is too subjective. What do you say? Why? [4]

c) Estimate the Effort, Duration and Number of people to work on a software project with an estimated 33 300 lines of code assuming the semi-detached mode. [10]

QUESTION FIVE

a) Define the terms:
   i. Risk
   ii. Risk Management [4]

b) Outline the risk management process. [6]

c) A visible software Engineering Paradigm results in maintainable software. Explain this statement with particular reference to the waterfall and the throwaway prototype models. [8]

d) What is the rationale behind Brooke's law? [2]

QUESTION SIX

a) Define the following terms:
   i. Work Breakdown Structure
   ii. Milestone [2]
   iii. Deliverable [2]
   iv. Critical Path [2]
   v. Activity Network [2]

b) Consider the set of activities, their durations and dependencies below:

Task	Duration	Dependencies
T1	8	
T2	15	
T3	15	T1
T4	10	
T5	10	T2, T4
T6	5	T1, T2
T7	20	T1
T8	25	T4
T9	15	T3, T6
T10	15	T5, T7
T11	7	T9
T12	10	T11

Using the critical path method, draw the activity network marking clearly the critical path. [12]

QUESTION SEVEN

a) Distinguish between
   i. Verification and Validation [2]
   ii. Stress testing and Bottom up testing [2]
   iii. Alpha testing and Beta testing [2]

b) With the aid of a diagram, give a brief outline of the of the testing process [8]

c) Briefly describe four factors that affect the maintainability of software. [6]

END OF QUESTION PAPER

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
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DECEMBER EXAMINATIONS 2004

SUBJECT: **INTRODUCTION TO COMPUTERS**
(MATHS, RADIOGRAPHY,PHYSICS AND COMPUTER SCIENCE)

CODE: **SCS1101**

INSTRUCTIONS TO CANDIDATES

a) This paper consists of TWO Sections
b) Answer **ALL** questions from Section A and any two(**2**) questions from Section B.

[3 hours]

SECTION A

QUESTION 1

a) Outline the features of third and fourth generation computers? [4]

b) Explain with a block diagram the working of a microcomputer. [4]

c) Define the following terms with two examples for each:
i) high level language
ii) assembly language
[2]

QUESTION 2

a) What is meant by a primary memory and a secondary memory? Give at least two examples for each. [4]

b) Explain what is meant by a computer virus. How do you prevent them or cure the computer virus?
[2]

c) Outline the differences between single-user operating systems and multi-user operating systems. Give examples of each. [2]

d) Write the procedure to logon to Windows NT operating system. [2]

QUESTION 3

a) i) What is data communications? [1]

ii) With the aid of a diagram describe a simple data communications system model. [5]

b) Give brief notes on each of the following data communications terminology:

i) modem

ii) multiplexer

iii) intelligent terminal

iv) server

[4]

QUESTION 4

a) What is the output of the following program?

```
#include <stdio.h>
#include <conio.h>

main() {
        int a=4, b=8, c=10;
        printf("a*b/c*b = %d", a*b/c*b);
        printf("(a*b+c)-10/c=%d", (a*b+c)-10/c);
        printf("(a+b)*c/b+c)=%d",(a*b)*c/b+c));
    return 0;
}
```

[3]

b) Distinguish between an identifier and a keyword, give two examples of each. [2]

c) Write a C program to compute the sum, product and average of four real numbers. [3]

d) Write the two Relational and two Logical operators supported by 'C'. [2]

QUESTION 5

a) Explain the need for a centralized database in an organization. Give three disadvantages of centralized data. [8]

b) State the role of the DBMS. [2]

QUESTION 6

a) Bring out the comparison between an Interpreter and a Compiler? [4]

b) Explain the functions getch() and putchar() with an example. [6]

SECTION B:

Answer any TWO questions from this section.

QUESTION 7

a) What is an array and a function? Give examples. [6]
b) Write a program in 'C' to convert a string **"this is a test"** to uppercase. [6]
c) Write a 'C' program to find the sum of two **three-dimensional** matrices. [8]

QUESTION 8

Mqabuko Observatory have a thermometer which records temperatures as degrees Fahrenheit(°F). They wish a program that prints a table of temperatures where the first column is degrees F, the second column is the corresponding degrees Celsius(°C) and all temperatures are printed as whole numbers. The conversion formula is:

$$C = 5/9(F-32)$$

Help Mqabuko to solve this problem.

a) Show the program design (pseudocode). [6]

b) Write the program. [14]

QUESTION 9

Write a program to locate the price of an item in a table of item numbers and prices. The program must store the pricing table in two arrays, one for the item numbers and one for the prices. The program must read an item number and a value that represents the quantity of the items purchased, then locate the item's price table and compute the cost.

NB: Use the binary search method.

[20]

END OF QUESTION PAPER

GOOD LUCK!