THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATION Diploma

SOFTWARE DEVELOPMENT ENVIRONMENTS

7th May 2003, 2.30 p.m.-4.30 p.m. Answer FOUR questions out of SIX. All questions carry equal marks. Time: TWO hours.

The marks given in brackets are **indicative** of the weight given to each part of the question.

1. A requirements analysis document contains the following, "After throwing five dice, decide whether all of them show a different number".

By using this requirements statement, demonstrate your understanding of the principle constructive steps of the traditional lifecycle process by providing:

a specification	(7 marks)
design, and	(8 marks)
coding	(10 marks)
	a specification design, and coding

You may use whatever notations and languages you feel appropriate.

- **2.** *a)* Many text editors have global search and replace facilities. Describe a programming situation where this facility might be used to good effect. (4 marks)
 - *b)* Instead of exact matches, many systems allow pattern matching. In this case the search is based on a pattern (or regular expression) using special characters e.g. '.', '?', '*', '+', '[]' and '\'. For a system with which you are familiar, list the special characters and explain the effect of these special characters in patterns.

(12 marks)

- *c)* Use your special characters to make patterns (regular expressions) that match:
 - *i*) any integer (any sequence of decimal digits)
 - *ii)* any variable name (any letter, optionally followed by letters and digits)
 - *iii)* any jpeg file name inside double quotes, e.g. "image.jpg"

(9 marks)

3. *a)* Construct a design that is structured using a combination of modularisation, sequencing, selection and iteration for Program 1 which is described below. The design can be in any notation, diagrammatic or text, but your answer must be clearly labelled to show the type of structures used in each part.

Program 1:

"Read in 10 positive numbers, noting the maximum value, and then go through all the numbers and for each one print '+' if it is greater than half the maximum and '-' otherwise" (18 marks)

b) Describe the syntax used to provide modularisation, sequence, selection and iteration in a programming language of your choice. (If your chosen language has more than one syntax for a particular control mechanism then you only need to describe ONE). (7 marks)

- 4. Describe the facilities available within a program development environment with which you are familiar that a) would facilitate the implementation of a large system by a team of programmers. (5 marks)
 - Discuss FIVE features often found in program development environments that assist individual *b*) programmers to develop code. (10 marks)
 - Errors are often evident when modules written by individual programmers are brought together to form the c) complete system. Indicate how the use of a debugger can assist in the process of identifying the location of these errors. (10 marks)
- 5. Compare and contrast TWO structured testing methods with which you are familiar, highlighting the a) advantages and disadvantages of each. (12 marks)
 - Using a method with which you are familiar, list a suitable set of test cases for the pseudo-code below. *b*) Candidates should also clearly explain how the test cases were derived.

```
Read values of x, y, a and b
if (x>y) then
   if (a<b) then
      c=0
   else
      c=99
else
   if (x==y) then
      c=50
   else
      c=25
Print c
```

(8 marks)

- Identify the advantages and disadvantages of a testing tool with which you are familiar. Provide an example c)of where it would be appropriate to use the tool. (5 marks)
- Identify FIVE factors used to indicate the quality of software. For each factor, indicate what would be 6. a) considered "high quality". (10 marks)
 - Standards can be used to ensure consistency of the code produced by different programmers. Describe how *b*) a coding standard with which you are familiar addresses the following aspects:
 - i) Naming of identifiers
 - The use of comments ii)
 - iii) Indentation
 - Most commercial software gets modified frequently after the initial development phase. Describe how the c) process of deciding which requests for changes will be implemented could be managed within an organisation that receives many requests for such updates. (9 marks)

(6 marks)