

NCC EDUCATION

**INTERNATIONAL DIPLOMA
IN
COMPUTER STUDIES**

PROGRAMMING METHODS

JUNE 2008 – Local Exam

SECTION A

Answer all questions from this section.

SECTION B

Answer any 2 questions from this section.

Time: 1½ hours

Clearly cross out surplus answers.

Failure to do this in Section B will result in only the first two answers being marked.

**Any reference material brought into the examination room must be handed
to the invigilator before the start of the examination.**

SECTION A
ANSWER ALL QUESTIONS IN THIS SECTION

- | | Marks | | | | | | | | | | | | |
|--|--------------|-------------|-------------|---------|------|-------------|---------|-----|------|------------|--------|----|--|
| QUESTION 1 | 4 | | | | | | | | | | | | |
| Explain the differences between First Generation Languages and Fourth Generation Languages. | | | | | | | | | | | | | |
| QUESTION 2 | 4 | | | | | | | | | | | | |
| Based on the following table, identify the applicable data type for variables Staff ID, Name, Salary and Taxable respectively. | | | | | | | | | | | | | |
| <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 15%;">Staff ID</th> <th style="width: 25%;">Name</th> <th style="width: 20%;">Salary (\$)</th> <th style="width: 40%;">Taxable</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">3929</td> <td style="text-align: center;">John Martin</td> <td style="text-align: center;">4500.00</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td style="text-align: center;">3204</td> <td style="text-align: center;">Ruth Danny</td> <td style="text-align: center;">956.50</td> <td style="text-align: center;">No</td> </tr> </tbody> </table> | Staff ID | Name | Salary (\$) | Taxable | 3929 | John Martin | 4500.00 | Yes | 3204 | Ruth Danny | 956.50 | No | |
| Staff ID | Name | Salary (\$) | Taxable | | | | | | | | | | |
| 3929 | John Martin | 4500.00 | Yes | | | | | | | | | | |
| 3204 | Ruth Danny | 956.50 | No | | | | | | | | | | |
| QUESTION 3 | 4 | | | | | | | | | | | | |
| Describe the purpose and usage of the Unified Modelling Language (UML). | | | | | | | | | | | | | |
| QUESTION 4 | 4 | | | | | | | | | | | | |
| Give TWO advantages and TWO disadvantages of using UML. | | | | | | | | | | | | | |
| QUESTION 5 | 4 | | | | | | | | | | | | |
| List FOUR attributes of good documentation. | | | | | | | | | | | | | |
| QUESTION 6 | 4 | | | | | | | | | | | | |
| Explain the similarities and the differences between a variable and a constant in a program. | | | | | | | | | | | | | |
| QUESTION 7 | 4 | | | | | | | | | | | | |
| Write down FOUR purposes of documentation. | | | | | | | | | | | | | |
| QUESTION 8 | 4 | | | | | | | | | | | | |
| Briefly describe the main features of <i>Object-oriented languages</i> . | | | | | | | | | | | | | |
| QUESTION 9 | 4 | | | | | | | | | | | | |
| Clearly define the differences between an Array and a Linked List . | | | | | | | | | | | | | |
| QUESTION 10 | 4 | | | | | | | | | | | | |
| Explain the difference between a class and an object . | | | | | | | | | | | | | |

Total 40 Marks

SECTION B
ANSWER ANY TWO QUESTIONS

- | | |
|--|-----------|
| QUESTION 11 | |
| a) List and explain five levels of <i>testing</i> . | 10 |
| b) State THREE reasons why robust and reliable software is needed. | 6 |
| c) Explain the differences between: | |
| i) Functional languages and Logic programming | 4 |
| ii) Abstract classes and Concrete classes | 4 |
| iii) Encapsulation and Abstraction | 4 |
| d) What is a <i>programming language</i> ? | 2 |

Total 30 Marks

QUESTION 12**Marks**

- a) Provide a table showing how the following values in an array would be sorted into ascending order using an *insertion sort*. **5**
 20 3 4 32 1 6
- b) Binary search is a method to significantly reduce search times when dealing with larger arrays. Given the following incomplete binary search pseudo-code, kindly provide the missing statements: **9**

Use variables start, end, middle OF TYPE Integer
 found OF TYPE Boolean
 key_required OF TYPE String
 key_name(10): ARRAY OF String

start:=1

end:=10

found:=false

REPEAT

missing statement 1

 IF key_required = key_name[middle]

 THEN found := TRUE

 ELSE IF key_required < key_name[middle]

 THEN *missing statement 2*

 ELSE *missing statement 3*

 ENDIF

UNTIL *missing statement 4*

- c) Briefly explain the following programming constructs with the aid of Jackson Structured Programming (JSP) diagrams: **4**
- i) Sequence **4**
 - ii) Selection **4**
 - iii) Iteration **4**
- d) List and explain FOUR duties of the Database Administrator. **4**

Total 30 Marks**QUESTION 3**

- a) Name and briefly explain FIVE types of UML diagrams. **10**
- b) Draw a use-case diagram for a company's Order System where a client places an order with a salesperson and, once the order is confirmed, an account clerk issues an invoice to the client. **11**
- c) A system was developed to store name, ID, salary and date of birth of members of staff. This system allows staff records to be updated, searched, deleted and added. Draw a class diagram for the staff member class. **5**
- d) Name TWO examples of Third Generation Languages and TWO examples of Object-oriented Languages. **4**

Total 30 Marks**END OF PAPER**