higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PRINCIPLES OF COMPUTER PROGRAMMING

(First paper)

NQF LEVEL 3

(10041023)

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
PRINCIPLES OF COMPUTER PROGRAMMING
NQF LEVEL 3
TIME: 2 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
2. Read all the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Use only a black or blue pen.
5. Write neatly and legibly.

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SECTION A

QUESTION 1

Various options are given as possible answers to the following questions. Choose the correct answer and write only the letter (A–D) next to the question number (1.1–1.10) in the ANSWER BOOK.

1.1 Which of the following VB.NET statements will correctly resize an array called *intArrResults* to an upper bound of 20?

A `ReDim Preserve(20)intArrResults()`
B `ReDim Preserve 20 intArrResults()`
C `ReDim Preserve intArrResults(20)`
D `ReDim Preserve intArrResults=20`

1.2 An … can only occur when the `Option Strict` switch is set to `Off`.

A implicit conversion
B explicit conversion
C implicit declaration
D explicit declaration

1.3 The … search is a searching algorithm used in a sorted array for finding an element's position by repeatedly dividing the search interval in half.

A sort
B quick
C random
D binary

1.4 Which combinations of the following statements (i–iv) about the Visual Basic statement `Dim strArrBuildings(10, 20) As String` are correct?

i The statement is a dimension statement.
ii Shows an example of a two-dimensional array.
iii Shows an example of a dynamic array.
iv Shows an example of a rectangular array

A i, ii only
B i, ii, iv
C ii, iii, iv
D iii, iv only

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1.5 Which combination of the following options is examples of event procedures of a VB.NET *ComboBox* control?

i Click
ii Move
iii Resize
iv Activate

A i, ii, iii
B ii, iii, iv
C i, iii, iv
D i ii, iv

1.6 Which ONE of the following VB.Net datatypes uses 16 bytes of memory?

A Integer
B Short
C Decimal
D Long

1.7 `Math.Ceiling(24.4)` will produce an answer of …

A 24
B 24.5
C 25
D 24.3

1.8 In SQL, the `GROUP BY` statement is used with the … statement to arrange identical data into groups.

A `UPDATE`
B `INSERT`
C `SELECT`
D `DELETE`

1.9 The VB.NET class … is used to read data from a string buffer.

A `Buffered Stream`
B `File Stream`
C `Binary Reader`
D `String Reader`

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1.10 A/an … key, in the context of relational databases, is a column or group of columns in a table that links to a column or group of columns in another table.

A primary
B alternate
C candidate
D foreign

(10 × 1) **[10]**

QUESTION 2

Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'True' or 'False' next to the question number (2.1–2.10) in the ANSWER BOOK.

2.1 The default access modifier for a `Sub` procedure is `Public`

2.2 The VB.Net String function `Substring()` returns a new string in which all occurrences of a specified character or string in the current string are replaced with another specified character or string.

2.3 The SQL `COUNT()` function returns the number of rows that matches a specified criterion..

2.4 In VB.NET the `FileMode.Append` enumerator opens an existing file and puts the cursor at the end of the file, or creates the file, if the file does not exist.

2.5 An endless loop is also referred to as an infinite loop.

2.6 A nested loop is where one loop is put inside another loop.

2.7 An input mask allows you to sanitise a database's input.

2.8 The VB.NET statement `Delete` will delete an array.

2.9 The `Integer.TryParse()` function returns an integer value.

2.10 The VB.NET MOD operator returns the remainder when one number is divided by another.

(10 × 1) **[10]**

QUESTION 3

Complete the following sentences by filling in the missing word or words. Write only the word or words next to the question number (3.1–3.5) in the ANSWER BOOK.

3.1 … are the occurrence of some or other condition that changes the normal flow of program execution.

3.2 A language that has been developed specifically for querying and manipulating data in database systems is known as ….

3.3 … programming is an approach in which code is written to respond to events.

3.4 A … control is a graphical control element used to visualise the progression of an extended computer operation, such as a download, file transfer, or installation.

3.5 The VB.NET compiler uses the … statement to determine the variable's data type and other information.

(5 × 1) **[5]**

QUESTION 4

Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–I) next to the question number (4.1–4.5) in the ANSWER BOOK.

COLUMN A		COLUMN B	
4.1	A VB.NET program will not compile if this type of error is detected	A	run-time
4.2	The method of managing simultaneous operations on a database	B	Luhn
4.3	An example of a cryptographic algorithm	C	report
4.4	Can be used to insert data into a MS Access database table	D	concurrency
4.5	Contains various classes that provide trigonometric and logarithmic functions	E	query
		F	syntax
		G	`System.Math`
		H	SHA-2
		I	`System.Trig`

(5 × 1) **[5]**

TOTAL SECTION A: 30

SECTION B

QUESTION 5

5.1 Study the diagram labelled as FIGURE 1 below and answer the questions:

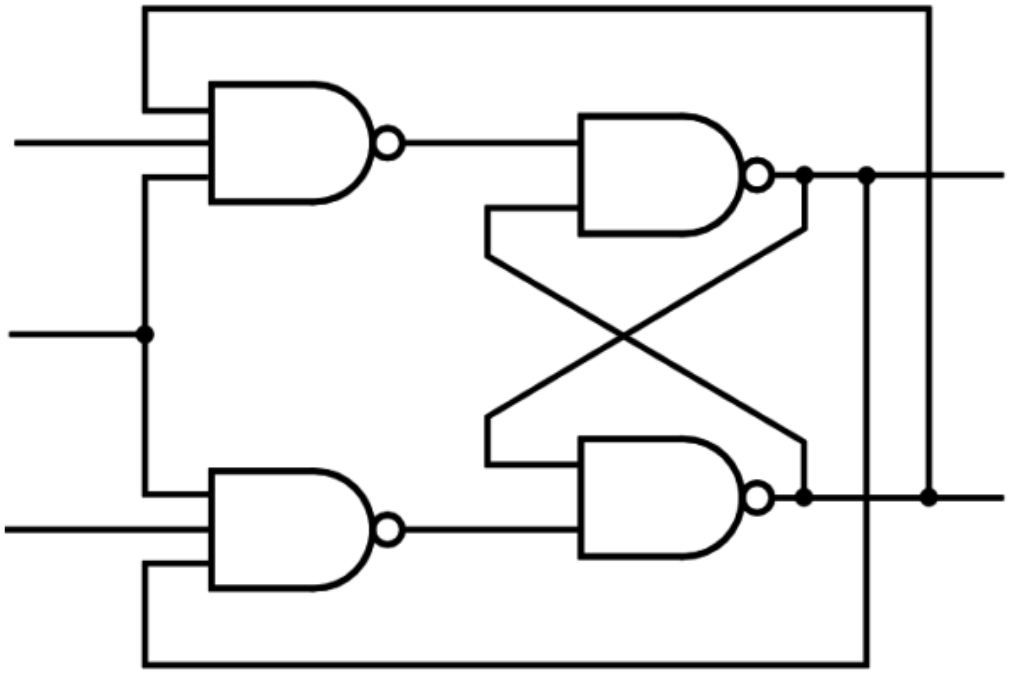

FIGURE 1
INTEGRATED CIRCUIT SYMBOL

5.1.1 Identify the TWO names given to the integrated circuit depicted in FIGURE 1. (2)

5.1.2 List TWO purposes of the circuit depicted in FIGURE 1. (2 × 2) (4)

5.2 Study the diagram labelled as FIGURE 2 below and answer the questions:

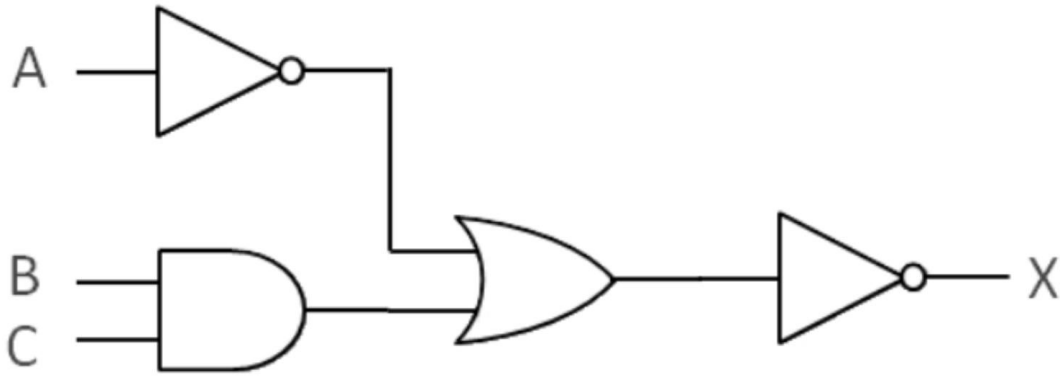

FIGURE 2
LOGIC DIAGRAM SYMBOL

5.2.1 Identify the number of inputs in the logic gate, depicted in FIGURE 2. (1)

5.2.2 Translate the logic diagram shown in FIGURE 2 to a Boolean expression. (3)

[10]

QUESTION 6

6.1 Read the following sentence and answer the questions below.

A variable is a value that can change, depending on conditions or information passed to a program.

6.1.1 Explain the term *constant*. (2)

6.1.2 The table below lists the data type name, variable prefix and an example of the data that can be stored with various data types in VB.Net.

Complete the following table in your ANSWER BOOK by writing only the word or words next to the question number (6.1.2a–6.1.2c) in the ANSWER BOOK.

Data type	Prefix	Example of Data
String	6.1.2 (a)	“December”
6.1.2 (b)	Chr	“d”
Boolean	Bln	6.1.2 (c)

TABLE 1
VB.NET DATA TYPES

(3)

6.1.3 List FOUR different numeric data types used in VB.Net. (4)

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6.2 Study the diagrams labelled as FIGURE 3, FIGURE 4 and FIGURE 5 below and answer the questions.

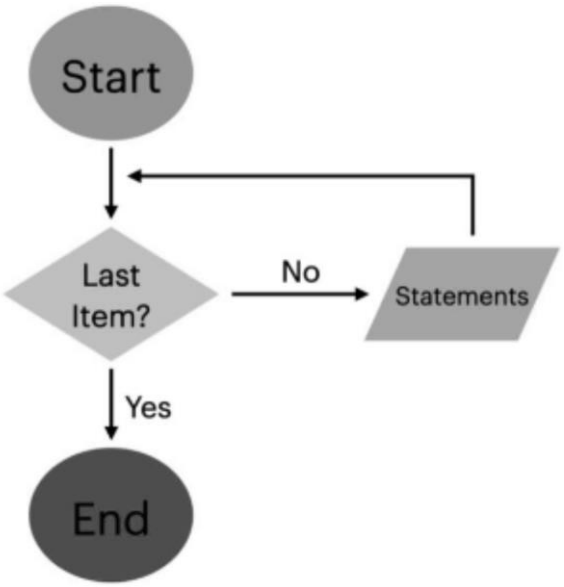

FIGURE 3
LOOP FLOWCHART 1

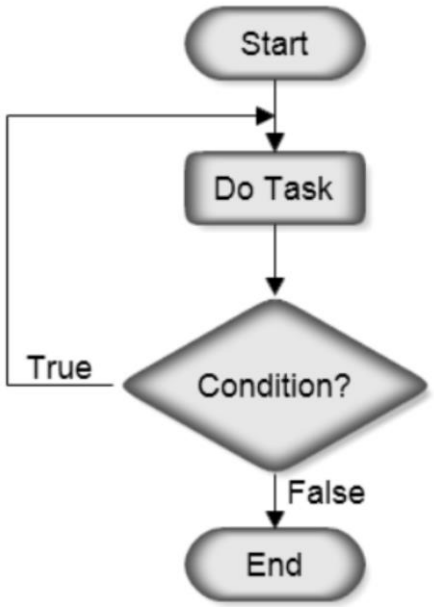

FIGURE 4
LOOP FLOWCHART 2

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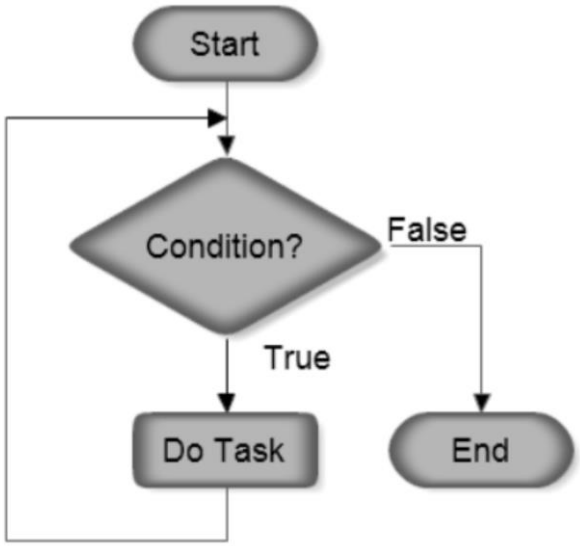

FIGURE 5
LOOP FLOWCHART 3

FIGURES 3, 4 and 5 represent a programming control structure known as a loop.

6.2.1 Define the term *loop*. (2)

6.2.2 Identify EACH type of loop that is represented by FIGURES 3, 4 and 5 respectively. (3)

6.2.3 Identify ONE other type of loop that is not represented in the diagrams above. (1)

6.2.4 Differentiate between the loop represented by FIGURE 4 and FIGURE 5 respectively. (2 × 2) (4)

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6.3 Study the diagram labelled as FIGURE 6 and answer the questions.

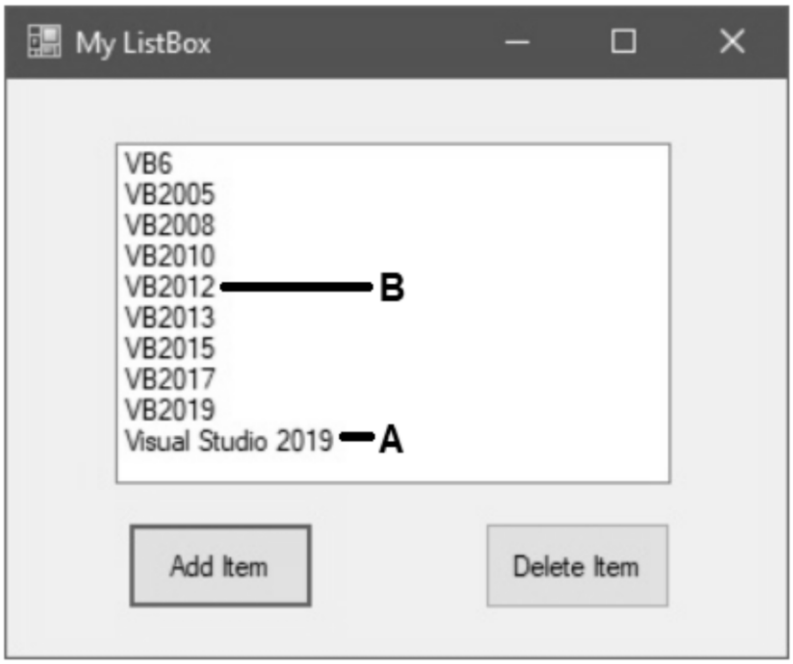

FIGURE 6
LISTBOX CONTROL

NOTE: Assume the name of the list box control is *MyListBox*.

6.3.1 State the prefix that will be used when naming a *ListBox* control. (1)

6.3.2 Provide the VB.NET code that will INSERT the text indicated by label A. (2)

6.3.3 Provide the VB.NET code that will REMOVE the text indicated by label B. (2)

6.3.4 List TWO differences between a *ComboBox* control and a *ListBox* control. (2 × 2) (4)

6.3.5 Identify an *event procedure* in VB.NET that can be used to determine when the selected item in the *ListBox* is changed. (2)
[30]

QUESTION 7

7.1 Study the following scenario and answer the questions.

The lecturer of 'Principles of Computer Programming' at Mzansi TVET College, developed the following VB.Net program. The user interface (UI) of the program is shown in FIGURE 7.



FIGURE 7
USER INTERFACE

When the *Load* button (indicated by label A) is clicked a CSV text file is read. The contents of the text file are shown in FIGURE 8 below.

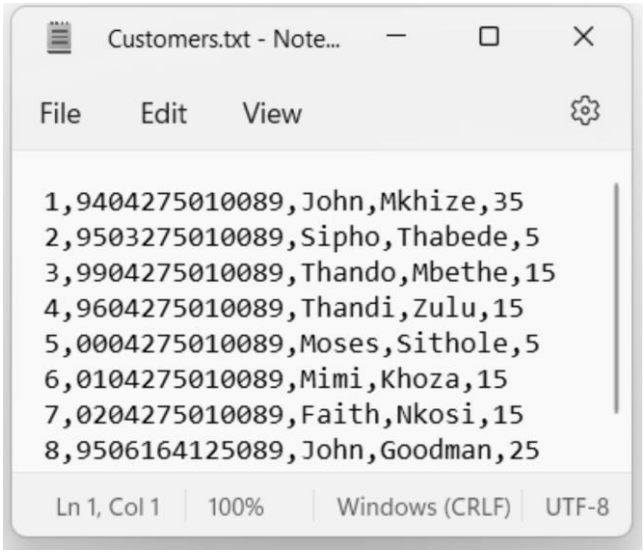

FIGURE 8
CSV TEXT FILE

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After the button is clicked the text file is loaded into the list box control, as shown in FIGURE 9 below.

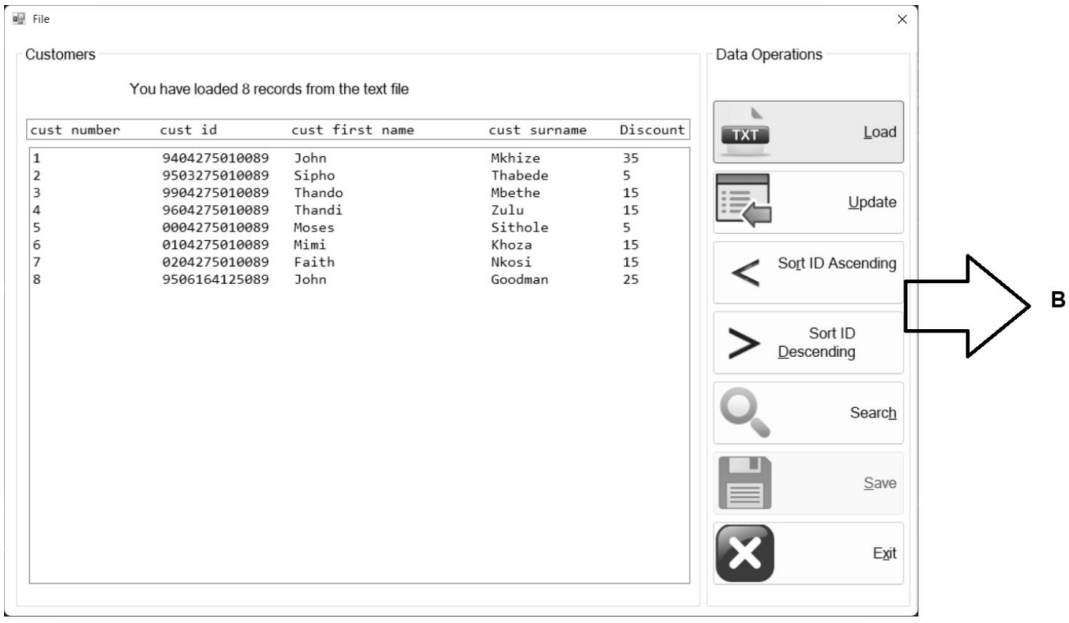

FIGURE 9

7.1.1 The user interface (FIGURE 9) provides a sorting functionality for the data indicated by label **B**.

Identify any TWO different sorting algorithms. (2)

7.1.2 What is a *CSV* file? (2)

7.1.3 The lecturer has told you that for the above program to work, there has to be a reference to a VB.NET Namespace.

Identify the Namespace that contains types used for reading and writing to data streams and files. (2)

7.2 Study the following snippet of code and answer the questions.

```
1  Private Sub ReadFile()
2          'Set file reader properties of text file
3          fileReader = New StreamReader("customers.txt")
4
5          Dim LinesInFile As String = ""
6
7          Try
8
9              While Not fileReader.EndOfStream
10
11                 LinesInFile = fileReader.ReadLine
12
13                 Dim parts() As String = LinesInFile.Split(",")
```

7.2.1 Identify the TYPE of single-dimensional array declared at line 13. (1)

7.2.2 Explain the purpose of the *StreamReader* keyword in line 3. (2)

7.2.3 Give the purpose of the VB.NET keyword in line 7. (1)
[10]

QUESTION 8

8.1 Study the diagram labelled as FIGURE 10 and answer the questions.

```
mysql> SELECT * FROM STUDENT;
+-----+-----------+-------+---------+--------+-------+
| RNO | NAME      | CLASS | SECTION | GENDER | MARKS |
+-----+-----------+-------+---------+--------+-------+
|  11 | ATHANG    |    12 | A       | MALE   |    90 |
|  12 | ATHARVA   |    12 | B       | MALE   |    80 |
|  13 | ANJALI    |    12 | C       | FEMALE |    78 |
|  14 | MEENA     |    12 | C       | FEMALE |    48 |
|  15 | MEENAKSHI |    12 | B       | FEMALE |    53 |
|  16 | SUSHIL    |    12 | B       | MALE   |    40 |
|  17 | SUMEDH    |    12 | A       | MALE   |    69 |
|  18 | LUMBINI   |    12 | A       | FEMALE |    77 |
|  19 | LOKESH    |    12 | B       | MALE   |    88 |
|  20 | SUJATA    |    12 | A       | FEMALE |    98 |
+-----+-----------+-------+---------+--------+-------+
10 rows in set (1.04 sec)
```

FIGURE 10
DATABASE TABLE

8.1.1 Explain the purpose of a database table. (2)

8.1.2 Give TWO reasons why a database is a far better storage structure than a text file. (2 × 2) (4)

8.1.3 Suggest a field name that can be used as the primary key of the database table (FIGURE 10). (1)

8.1.4 Identify the name of the data TABLE shown in FIGURE 10. (1)

8.1.5 Identify the names of ANY TWO data attributes shown in FIGURE 10. (2)

8.1.6 What maximum limit could you as a programmer set for the size of the field name *Marks*? (1)

8.1.7 Give a reason for your answer in QUESTION 8.1.6. (1)

8.1.8 Suppose you wanted to insert a new record into the database table (FIGURE 10).

Provide the SQL statement that would add the following record.

22	THABISO	12	B	MALE	88

(4)

8.2 Consider the following statement:

One supplier can supply more than one product, but each product can only be supplied by one supplier.

8.2.1 What type of database relationship exists between the Supplier and the Product?

8.2.2 Explain the purpose of database relationships.

(2 × 2) (4)

[20]

TOTAL SECTION B: 70
GRAND TOTAL: 100

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