KASNEB

DICT LEVEL II

PROGRAMMING CONCEPTS

WEDNESDAY: 18 November 2015. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question.

ALL programs written should be in Visual Basic programming language.

QUESTION ONE

(a) Enumerate two advantages and two disadvantages of interpreted languages. (4 marks)

(b) In relation to Visual Basic programming language, differentiate between "declaration" and "executable" statements. (4 marks)

(c) Data types used in programming languages could be divided into two categories: scalar and structured data types.

Describe four scalar data types. (8 marks)

(d) Explain the effect of executing the following Visual Basic segments of code:

    (i)   Private Sub Form_load ( )
    load textbox1.text = " "
        textbox1.visible = True
    End Sub (2 marks)

    (ii)   Sentence = Trim (txtSentence.Text) (2 marks)

(Total: 20 marks)

QUESTION TWO

(a) Define the following terms as used in programming:

    (i)   Variable. (2 marks)

    (ii)   Constant. (2 marks)
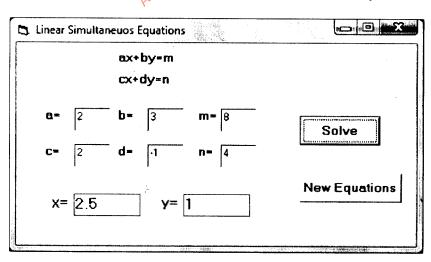
    (iii)   Syntax. (2 marks)

(b) Outline six stages of program development. (6 marks)

(c) A program is required to solve systems of two linear simultaneous equations as shown in the user interface below:

Required:

(i)   Assuming that a, b, c, d, m and n are known, write Visual Basic code function to solve the simultaneous equations using the following formulae:

$$x = \frac{((b \times n) - (d \times m))}{((b \times c) - (a \times d))}$$

$$y = \frac{((a \times n) - (c \times m))}{((a \times d) - (b \times c))}$$

Ensure that you round off solutions to two decimal places.   (6 marks)

(ii)   The "New Equations" button allows a user to clear the text boxes in order to input values for a new set of simultaneous equations.

Write a sub procedure to carry out the above function.   (2 marks)
     (Total: 20 marks)

QUESTION THREE

(a)   Explain the following programming terms:

    (i)   Procedural abstraction.   (2 marks)

    (ii)   Stepwise refinement.   (2 marks)

(b)   State four variable naming conventions used in Visual Basic.   (4 marks)

(c)   Write an algorithm to compute the roots of a quadratic equation $ax^2 + bx + c = 0$ where a, b and c are known using the formula:

$$x = \frac{-b \pm \sqrt{d}}{2a} \qquad \text{given that } d = b^2 - 4ac$$
     (6 marks)

(d)   The grading system of a school was as follows:

- Greater than or equal to 90 marks is "Excellent".
- Greater than or equal to 80 marks is "Very good".
- Greater than or equal to 60 marks is "Good".
- Greater than or equal to 50 marks is "Fair".
- Less than 50 marks is "Fail".
- Any other value is "Error in grade".

Required:
Implement this grading system using the select case control structure.   (6 marks)
     (Total: 20 marks)

QUESTION FOUR

(a)   Describe in each case, three features of the following programming approaches:

    (i)   Procedural programming.   (6 marks)

    (ii)   Object-oriented programming.   (6 marks)

(b)   Highlight four characteristics of Visual Basic programming language.   (4 marks)

(c)   Write Visual Basic code that loads a form and allows a user to input any integer number, "n". The code uses relational algebra to determine if the number input is greater than 100. The code outputs the message "The number is greater than 100" if true and the message "The number is less than 100" if false.   (4 marks)
     (Total: 20 marks)

QUESTION FIVE

(a)   Identify five types of controls used in Visual Basic integrated development environment (IDE) .   (5 marks)

(b)   Citing an example in each case, explain three types of programming errors.   (9 marks)

(c)   A segment of code is required to calculate the cumulative total in a list of six integer numbers.

Write a Visual Basic code segment that will allow a user to input the numbers from the list and compute the cumulative total. Ensure that the output is displayed as shown in the sample table below:

Number	Total
40	40
70	110
50	160
73	233
26	259
80	339

                                                                                (6 marks)
                                                                                (Total: 20 marks)

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