

KASNEB

DICT LEVEL II

PROGRAMMING CONCEPTS

TUESDAY: 23 May 2017.

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) Define the following terms:

- (i) Programming language. (2 marks)
- (ii) Program. (2 marks)
- (iii) Assembly language. (2 marks)
- (iv) Machine code. (2 marks)

(b) The table below shows Visual Basic non-numeric data types:

Data Type	Storage	Range
String (fixed length)	Length of string	1 to 65,400 characters
String (variable length)	Length + 10 bytes	0 to 2 billion characters
Date	8 bytes	January 1, 100 to December 31, 9999
Boolean		
Object		
Variant (numeric)		
Variant (text)		

Required:

Complete the table by filling in the blank cells.

(4 marks)

(c) The user interface below is used for error handling:

The user interface consists of a window titled "Error handling" with standard Windows window controls. It contains the following elements:

- txt_Firstnumber: A text box containing "10".
- txt_Secondnumber: A text box containing "0".
- Answer: A text box.
- Calculate: A button with a dashed border.
- Error: A label.
- A message box at the bottom with the text: "You attempted to divide a number by zero!".

Labels on the left side of the window are connected to their respective controls by dashed lines: txt_Firstnumber to First Number, txt_Secondnumber to Second Number, and Answer to Answer. Labels on the right side are connected to their respective controls: Calculate to Calculate, and Error to Error-handler label.

Required:

Using the named controls above, write a program to divide two numbers. The program should output the result if the second number is not equal to zero otherwise it will display an error message, "You attempted to divide a number by zero". (8 marks)

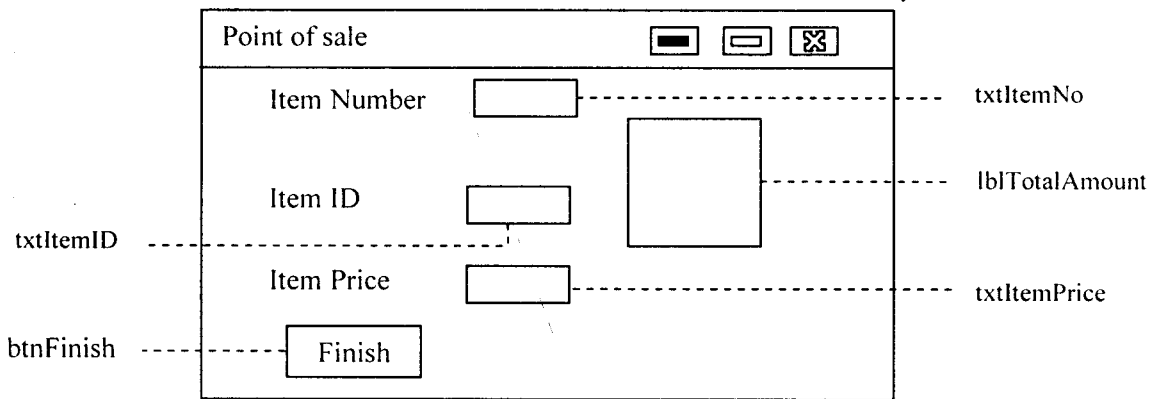
(Total: 20 marks)

QUESTION TWO

(a) Briefly describe the programming paradigms below:

- (i) Declarative paradigm. (1 mark)
- (ii) Imperative paradigm. (1 mark)

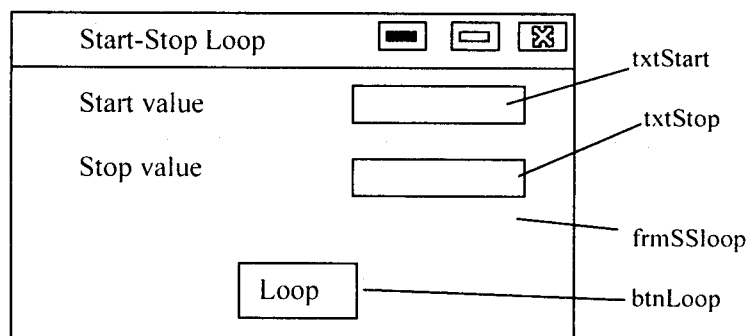
- (iii) Functional paradigm. (1 mark)
- (iv) Event driven paradigm. (1 mark)
- (b) State the functions of each of the following types of software maintenance:
 - (i) Adaptive. (1 mark)
 - (ii) Corrective. (1 mark)
 - (iii) Perfective. (1 mark)
 - (iv) Preventive. (1 mark)
- (c) The graphical interface below shows a simple design of a point of sale system. A scanner captures item number, item ID and item price and populates the interface appropriately.



- Required:**
- (i) Explain two events associated with the control 'btnFinish'. (4 marks)
 - (ii) Explain two properties that can be set to control 'lblTotalAmount'. (4 marks)
 - (iii) Write Visual Basic code that will pick the price in the textbox txtItemPrice and add it to the existing price in the lblTotalAmount. (4 marks)
- (Total: 20 marks)**

QUESTION THREE

- (a) Describe the following terms as used in Visual Basic Programming:
 - (i) Me. (1 mark)
 - (ii) Form. (1 mark)
 - (iii) Groupbox. (1 mark)
 - (iv) ComboBox. (1 mark)
 - (v) ListBox. (1 mark)
- (b) The Visual Basic interface below is a start-stop loop of numbers that increments by one.

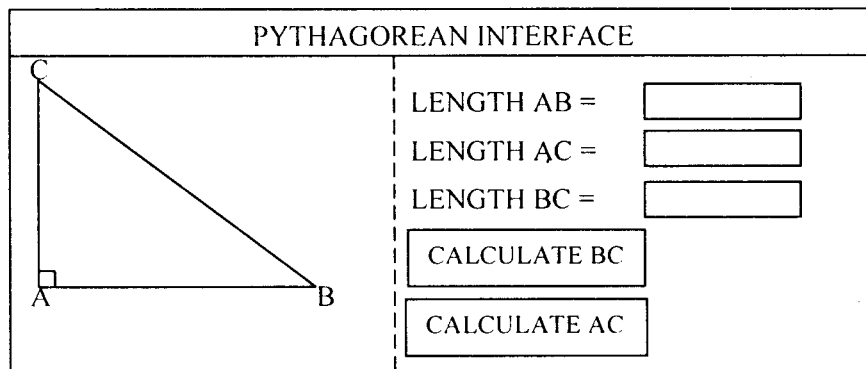


Required:

- (i) Write a Visual Basic IF statement to validate if the input entered in "txtStart" and "txtStop" boxes are numbers. Ensure that an appropriate message is displayed to inform the user if the values are numbers or not. (3 marks)
 - (ii) Using a FOR...NEXT loop, write Visual Basic code to execute the loop. Ensure that the input is converted into numbers and incorporate a message that informs the user of the current loop index. (5 marks)
 - (iii) Write Visual Basic code to change the background colour of the form 'frmSSloop' control to gray at run time. (2 marks)
 - (iv) Draw a flow chart of the problem as described in (b) (i) and (ii) above. (5 marks)
- (Total: 20 marks)**

QUESTION FOUR

- (a) Explain three phases of a compiler. (6 marks)
- (b) Distinguish between the following terms as used in Visual Basic:
 - (i) "Methods" and "modules". (2 marks)
 - (ii) "Source code" and "object code". (2 marks)
 - (iii) "Design mode" and "break mode". (2 marks)
- (c) Given the value of any two sides of a right-angled triangle, one can be able to calculate the unknown side using the pythagorean interface shown below.



Note: $AB^2 + AC^2 = BC^2$

Required:

Write Visual Basic code to accomplish the following tasks:

- (i) Calculate and display the length of line BC, given the lengths of lines AB and AC. (5 marks)
 - (ii) To clear text boxes AB, AC and BC. (3 marks)
- (Total: 20 marks)**

QUESTION FIVE

- (a) Explain the following types of documentation as used in programming:
 - (i) Design specifications. (2 marks)
 - (ii) Technical designs. (2 marks)
 - (iii) User manuals. (2 marks)
- (b) Enumerate four steps one should follow when developing an algorithm. (4 marks)

(c) Write a Visual Basic program to generate the number pattern shown below:

FORM 1							
1							
1	2						
1	2	3					
1	2	3	4				
1	2	3	4	5			
1	2	3	4	5	6		
1	2	3	4	5	6	7	
1	2	3	4	5	6	7	8

(4 marks)

(d) The table below shows a grading system:

GRADE	COMMENT
A	High Distinction
A-	Distinction
B	Credit
C	Pass
D	Fail

Required:

Using a CASE control structure, write a Visual Basic program that would display the appropriate comment based on the input grade.

(6 marks)

(Total: 20 marks)

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