

INF1511

May/June 2017

VISUAL PROGRAMMING I

Duration 2 Hours

70 Marks

EXAMINERS :

FIRST

MS E LEUS

SECOND

MRS A MATHEW

Closed book examination

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This examination question paper consists of 16 pages.

The examination paper is divided into two sections, namely section A and section B.

Please answer only one section.

- Section A, which covers Python, is for students who registered for the subject in 2017
- Section B, which covers Delphi, is for students who are writing a supplementary or special examination

Instructions:

- Answer all the questions in the answer book.
- Answers in pencil will not be marked
- The marks are provided in brackets next to the questions
- Enjoy!

Duration. 2 hours

Marks: 70

[Please Turn Over]

Section A**Question 1****[20 Marks]**

Question	Option	Answer
1. Which statement is true about Python?	1	In Python there is no need to define variable data type.
	2	Python is a compiled language.
	3	Python does not support object-oriented programming.
	4	A Python variable name can start with a digit.
2 With what do comments in Python begin?	1	#
	2	//
	3	*
	4	None of the above
3 What will the output of the following statement be? x=3.5 print("The value of x is %d" %x)	1	Python will throw an error, as x is a float variable and %d is the format code for integer.
	2	The value of x is 3.
	3	The value of x is 3.5.
	4	The value of x is %d %x.
4. What will the output of the following statement be? print("Bye", "See you soon'")	1	Bye,See you soon'
	2	ByeSee you soon!
	3	Bye See you soon!
	4	None of the above.
5. What is the format code for an integer variable?	1	%d
	2	%e
	3	%f
	4	%c
	5	%x

[Please Turn Over]

Question	Option	Answer
6. What will the output of the following statement be? <code>print("20/10")</code>	1	0
	2	2
	3	20/10
	4	None of the above.
7 Which function will return the data type of an object?	1	<code>datatype()</code>
	2	<code>type()</code>
	3	<code>object()</code>
	4	<code>data()</code>
8 <code>a=('dog', 'cat', 'mouse')</code> . Here, a is an example of a variable.	1	String
	2	List
	3	Tuple
	4	None of the above.
9. What will the output of the following statement be? <code>word="game"</code> <code>print(word[2])</code>	1	gam
	2	game
	3	m
	4	IndexError: string index out of range
10. What is the value of x in the following? <code>x = 6 in [4, 'yes', 'no', 6]</code>	1	true
	2	4
	3	3
	4	None of the above.
11. What will the output of the following statement be? <code>print(len("Welcome" + "Home"))</code>	1	10
	2	11
	3	Welcome Home
	4	WelcomeHome
	5	None of the above.
12 What will the output of the following statement be? <code>print("hey" * 3)</code>	1	hey*3
	2	heyheyhey
	3	invalid operation
	4	None of the above.

Question	Option	Answer
13. What is the output of the following code? <pre>stationery = ("book", "pen", "pencil") for i in range(len(stationery)): print(stationery[-1] , end=" ")</pre>	1	book pencil pen
	2	book pen pencil
	3	pencil pen book
	4	None of the above.
14. What does a pair of curly brackets as in x={ } create?	1	Set
	2	Sequence
	3	Dictionary
	4	None of the above.
15. Which is a valid built-in class attribute in Python?	1	<code>__bases__</code>
	2	<code>__doc__</code>
	3	<code>__name__</code>
	4	All of the above.
	5	Options 1 and 2.
16. Which is not a type of inheritance?	1	Single
	2	Double
	3	Multiple
	4	Multi-level
17. What will the output of the following be? <pre>class Car(object): make="Toyota" def __init__(self, m="Ford"): self.make=m c=Car("Honda") print(c.make)</pre>	1	Toyota
	2	Honda
	3	Ford
	4	None of the above.
18. What is it called when one class is derived from another single class?	1	Single inheritance
	2	Simple inheritance
	3	Multi-level inheritance
	4	Multiple inheritance
	5	None of the above.

Question	Option	Answer
<p>19. What does the following class definition represent?</p> <pre>class Rand(Currency): def __init__(self, x, y): Shape.__init__(self, x, y)</pre>	1	A single inheritance where class currency inherits class Rand.
	2	A single inheritance where class x inherits class y.
	3	A single inheritance where class Rand inherits class currency.
	4	There is no inheritance.
<p>20. What is it called when a derived class has more than one base class?</p>	1	Multiple inheritance
	2	Multi-level inheritance
	3	Single inheritance
	4	None of the above.

Question 2**[20 Marks]**

2.1 What is the difference between literals and variables? Give an explanation and example of each term. (4)

2.2 Provide the output for the following program:

```
#print.py
print (1)
print('Flight departure: \
Monday 1 January')
print('''Welcome aboard!
Enjoy your flight!''')
```

 (4)

2.3 The following code displays the Lambda function. Rewrite the code to show a normal function definition (4)

```
g = lambda x: x * 3
g(4)
```

2.4 Write the code for a program that reads the content from the file information.txt (4)

2.5 Input widgets in PyQt programs are used for interacting with the user. Give two examples of input widgets and provide an explanation of each. (4)

Question 3**[30 Marks]****3.1. Recursion:**

- a) Define recursion (2)
- b) What condition must be included in the function and why? (2)
- c) Fill in the blank:
Recursion is implemented with the help of a structure known as _____. (1)
- d) Provide the code for a program that calculates and prints the sum of the first 20 natural numbers by using recursion. (5)

3.2. Inheritance:

- a) Define inheritance. (1)
- b) Discuss three types of inheritance by describing and drawing a visual representation of each type. (9)

3.3 Descriptors:

- a) Define descriptors. (1)
- b) List the three methods used to manage instance attributes (3)
- c) Describe the two descriptor types and state what methods each type implements (6)

Section B**Question 1****[20 Marks]**

Question	Option	Answer
1. Which statement is valid to change the colour of Form1 to Yellow?	1	Form1.Color = clYellow;
	2	Form1.Color := Yellow;
	3	Form1.Color = clYellow;
	4	Form1.Color = Yellow;
	5	None of the above.
2. What is the property of a button that is associated with the creation of accelerator key?	1	Name
	2	Caption
	3	Color
	4	Cursor
	5	Font
3. Which statement calls the Clear method of an Edit component named edtName?	1	edtName := Clear;
	2	edtName(Clear);
	3	edtName. Clear();
	4	edtName Clear,
	5	edtName := Clear();
4. Which statement is a valid declaration for a string variable?	1	var myName = String;
	2	var myName : String[15],
	3	var myName : Char
	4	Options 1 and 2.
	5	All of the above
5. Which statement is valid for division by 2 if the variable Num1 = 10.5 and the result is stored in variable ans?	1	ans := Num1 DIV 2;
	2	ans := Num1 MOD 2;
	3	ans := Num1 / 2 ;
	4	None of the above.

[Please Turn Over]

Question	Option	Answer
6 Which statement is valid for declaration of a constant?	1	Const Rate 2 50;
	2	Const Num = 100,
	3	const myName = 'Linda Miller',
	4	None of the above
7 Which statement is a valid declaration for the variable Num1 that can be used to store a real or floating point number?	1	var Num1 Float
	2	var Num1 Integer
	3	var Num1 Single
	4	var Num1 Currency
	5	Options 3 and 4
8 Which of the following is the method of a common dialog box that opens it?	1	Execute
	2	Open
	3	Except
	4	Show
	5	None of the above
9. Which is a valid Delphi statement?	1	Error = ShowMessage('Invalid'),
	2	Firstname := InputBox('User Input', 'Enter firstname:', '');
	3	Options 1 and 2.
	4	None of the above.
10 If Num is an integer variable and Num := random(5), what are the possible values of Num?	1	1, 2, 3, 4,5
	2	0,1, 2, 3, 4
	3	0, 1,2, 3, 4, 5
	4	None of the above
11 What is the output of the following code snippet? sum := 0; for count := 1 downto 5 do sum := sum + count; ShowMessage('The value of sum is '+ IntToStr(sum));	1	The value of sum is 257890
	2	The value of sum is 15
	3	The value of sum is 0.
	4	None of the above.

Question	Option	Answer
12. The data is passed from an event to its event handler through _____.	1	windows
	2	messages
	3	components
	4	parameters
13. What is the procedure used to set the length of a dynamic array?	1	Size
	2	Length
	3	SetFocus
	4	SetLen
	5	SetLength
14. Which option is a valid function declaration for a user- defined function CalcProfit?	1	function CalcProfit(Sprice, Cprice double) , double,
	2	function CalcProfit(Sprice, Cprice : double) double;
	3	Options 1 and 2
	4	None of the above.
15. What keyword in Delphi is used to raise the user's own exceptions?	1	try
	2	except
	3	execute
	4	finally
	5	raise
16. What is the index of the first item in a ListBox?	1	0
	2	1
	3	-1
	4	user specified

Question	Option	Answer
17 Which statement is the valid declaration for a constant array?	1	const Limit: array[1 5] of integer := {4,6,8,10,12};
	2	const Category array[2 4] of String={'Cooking','Sewing','Knitting'},
	3	var const Score array of integer[1 .5] = {1,2,3,4,5},
	4	None of the above.
18 Which of the input values for Canvas Ellipse will produce a circle?	1	200, 200, 200, 200
	2	100, 120, 340, 440
	3	100, 200, 300, 400
	4	None of the above
19. Of which data type must the index of an array be?	1	Real only
	2	Integer only
	3	String only
	4	Boolean only
	5	Any data type, it really does not matter
20 Which statement is true?	1	The index of a dynamic array always starts at zero
	2	A component like ListBox can be passed as a parameter in a user-defined procedure
	3	Any while do loop can be implemented by using a for loop
	4	All of the above.
	5	Options 1 and 2.

Question 2**[20 Marks]**

- 2.1 Name two container components in Delphi (2)
- 2.2 Name two components in Delphi that can be used for input (2)
- 2.3 Name two visual components in Delphi (2)
- 2.4 Name two non-visual components in Delphi (2)
- 2.5 Write down the conditional statement to do the following task
If the variable `Mark` has any value from 75 to 100 (both included), set `lblResult`'s
Caption to Distinction (2)
- 2.6 What is a system event? Give an example (2)
- 2.7 What is an array in Delphi? (2)
- 2.8 What is a method in Delphi? Give an example (2)
- 2.9 What are the two main types of parameters for a procedure? Differentiate between the two. (4)

Question 3

[30 Marks]

- 3.1 Consider the following interface and the code for click event of button `btnAdd`. The program is not giving the desired output as can be seen from figure 2. Correct the code given (2)

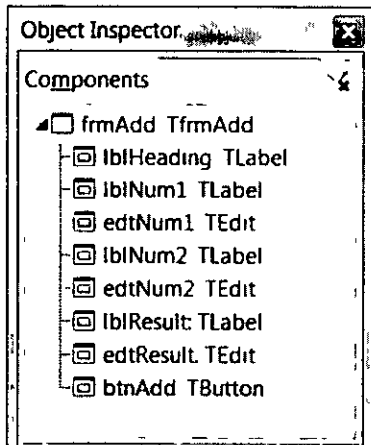


Figure 1

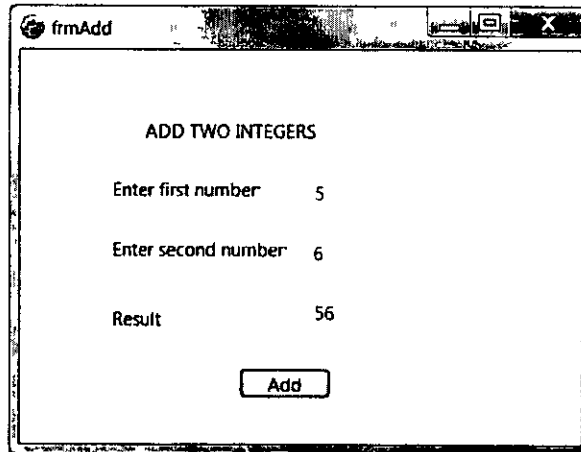


Figure 2

```

procedure TfrmAdd.btnAddClick(Sender: TObject);
begin
    edtResult.Text := edtNum1.text + edtNum2.text;
end;
    
```

- 3.2. Correct the following program that calculates commission on the sales amount entered by the user. For sales above R80 000 the commission is 40%, for sales above R40 000 but less than or equal to R80 000, the commission is 20%, and for sales less than or equal to R40 000, the commission is 10%. The given code has errors and hence it is showing the wrong value for commission in the interface (figure 4). The expected value for sales of R81 000 is R32 400. Correct the code for the click event of `btnCalc` and write the complete corrected procedure in your answer book. (5)

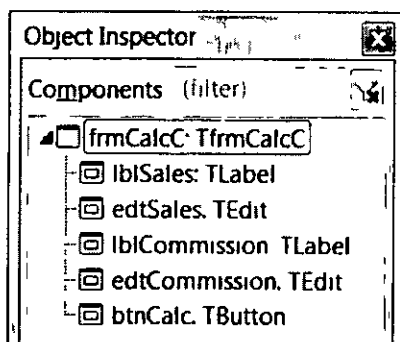


Figure 3

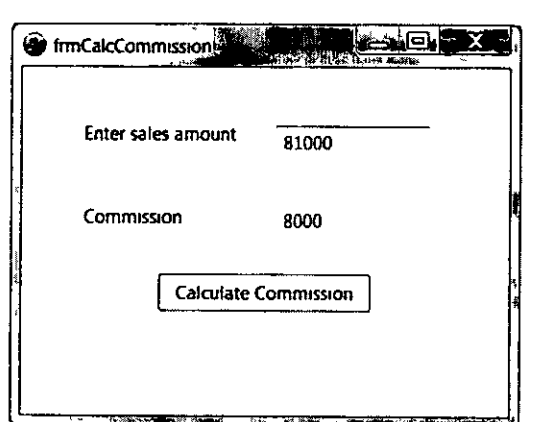


Figure 4

```

procedure TfrmCalcC.btnCalcClick(Sender: TObject);
var SalesAmount, Commission : Float; //declaring variables
begin
  SalesAmount := StrToFloat(edtSales.Text);
  //calculating commission
  if SalesAmount > 80000.00 then
    Commission := 80000 * 40 /100;
  if SalesAmount > 40000.00 then
    Commission := 40000 * 20 /100;
  if SalesAmount <= 40000.00 then
    Commission := 39999 * 10 /100;

  edtCommission.text := FloatToStr(Commission);
end;

```

- 3 3 Given that you have corrected the code in question 3 2, modify the program to use a user-defined procedure CalcCommission which is called from the btnCalcClick event handler

Complete the following code for the event handler and the procedure CalcCommission Assume that the declaration for the procedure is made in the private section of the form's type definition. Write the complete code for both the procedures in your answer book (6)

```

//Procedure definition
procedure TfrmCalcC.CalcCommission( // fill in parameters);
begin
  //fill in the necessary code
  ... ..
end;

//Event handler
procedure TfrmCalcC.btnCalcClick(Sender: TObject); var
... .. //declare variables
begin
  SalesAmount := StrToFloat(edtSales.Text);
  Commission := 0.0;
  //call to the procedure CalcCommission
  .. .. //fill in the statement
  edtCommission.text := FloatToStr(Commission);

end;

```

- 3 4 Change the user-defined procedure you added in question 3 3 to a function named CalcCommission. Write the function definition and the code for event handler btnCalcClick in your answer book Assume that the declaration for the function is made in the private section of the form's type definition. (4)

- 3.5 Write a program that inputs a string and a character from the user and then counts the number of times the character appears in the string. The count should be case insensitive. For instance, see the interface (figure 6). Use figures 5 and 6 and the procedure outline for guidance (7)

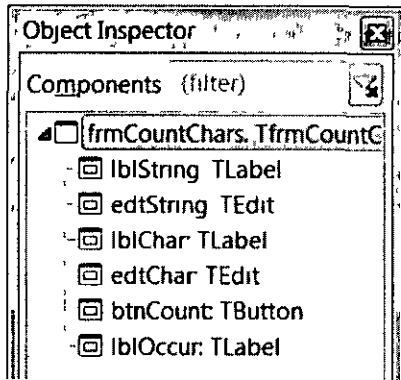


Figure 5

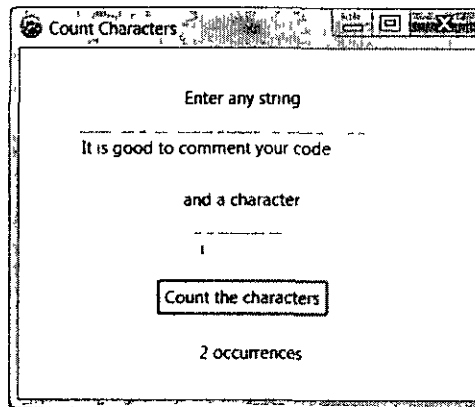


Figure 6

```

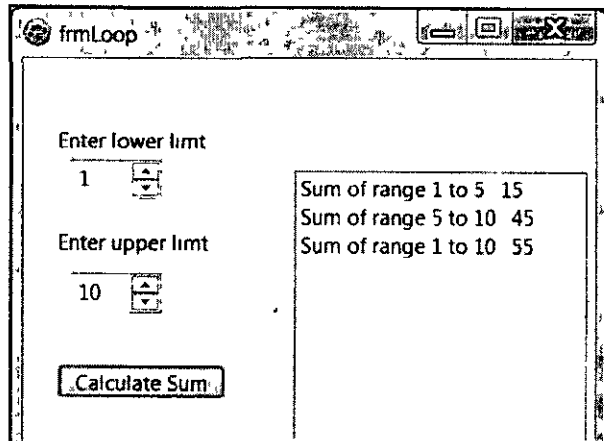
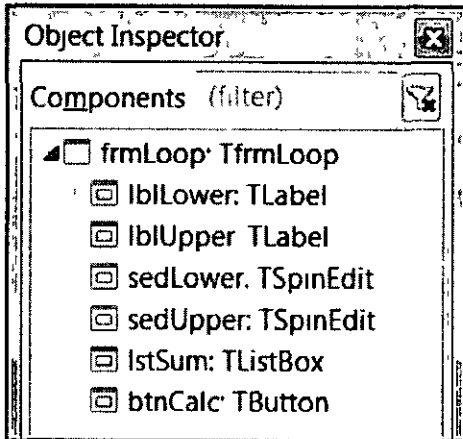
procedure TfrmCountChars.btnCountClick(Sender: TObject);
//initialise variables
. . . . .
begin
    // read in sentence and character from user interface, and
    // assign it to variables
    . . . . .

    // initialise the number of occurrences to zero
    . . . . .

    //use a loop construct to traverse the sentence and count the
    //occurrence
    . . . . .
    // display the number of occurrences to the user
    . . . . .
end;

```

- 3.6 Write a program that calculates the sum of a series of integers. The user should enter the lower limit and upper limit. The sum should be added to a list box **only** if a proper range is entered. If the lower limit and the upper limit are the same, display a message 'No range specified, lower limit is same as upper limit'. If the lower limit is greater than the upper limit display a message 'Lower limit higher than upper limit'. Use the following interface and procedure for guidance (6)



```
procedure TfrmLoop.btnCalcClick(Sender: TObject);
//variable declaration
.....
begin
.....
end;
```