
CITY UNIVERSITY LONDON

Programming Excel VBA Test II

Group A

May 2010

This is an open book test. You may use your lecture notes as well as task- and solution-sheets from lab-sessions. No books or calculators will be allowed into the exam.

Write down your answers to all questions in the answer booklet provided.

Full marks will be obtained for correct answers to all four questions. Each questions carries 25 marks.

To avoid possible accusations of cheating close all applications except Microsoft Excel and the Visual Basic Applications editor before starting this exam.

Students may use the Excel or VBA help functions but should not use any online help option.

Time: You have 90 mins to complete this test.

Turn over...

1) Consider the following identity:

$$\sum_{k=1, k \text{ odd}}^{2n+1} (2k + 3) = (1 + n)(5 + 2n). \quad (1)$$

where the sum runs over all odd values of k from 1 to $2n + 1$.

- Write, for a given value of n , a VBA code for a user defined function to evaluate the left hand side of equation (1). The code should use a FOR...NEXT loop structure. **(10 marks)**
- Modify your code now to write a subroutine such that, when run, reads the value of n from cell A1 in the Excel Worksheet, computes the same sum as above and writes its value in cell A2 of the Excel Worksheet. **(10 marks)**
- Write down a user defined function which computes the right hand side of equation (1). **(5 marks)**

2) Write a VBA code for a subroutine called **basic** which simulates a very basic calculator which only carries out addition, subtraction, multiplication and division. The structure of the programme should be the following:

- When run your program should start by opening an InputBox with title “Input” and prompt “Enter a number different from zero:”
- After this, the program should open another InputBox with the same title as before and prompt “Enter here another number different from zero:”
- Next, your programme should open a third InputBox with title “Operation” and prompt “Enter here the name of the operation:”. Depending on your answer, your programme should produce one of the following five outcomes:
 - i. If you enter “addition” your programme should add the two numbers you entered at the beginning and display the result in a MsgBox. The MsgBox should have title “Result” and prompt “The sum is” & x , where x is the value of the sum. The MsgBox should have an OK button and no icon.
 - ii. If you enter “subtraction” your programme should subtract the two numbers and display the result in a MsgBox. The MsgBox should have title “Result” and prompt “The difference is” & x , where x is now the value of the difference. The MsgBox should have an OK button and no icon.
 - iii. If you enter “multiplication” your programme should multiply the two numbers and display the result in a MsgBox. The MsgBox should have title “Result” and prompt “The product is” & x , where x is now the value of the product. The MsgBox should have an OK button and no icon.
 - iv. If you enter “division” your programme should divide the two numbers and display the result in a MsgBox. The MsgBox should have title “Result” and prompt “The quotient is” & x , where x is now the ratio of the numbers. The MsgBox should have an OK button and no icon.
 - v. Finally, if you enter anything different from the four operations above, your programme should open a MsgBox with title “Error” and prompt “This is not a valid operation!”. The MsgBox should have only an OK button and a Warning Query Icon. When you click OK, the programme should automatically send you back to the third InputBox so that you are asked again to name the operation that should be carried out.

(25 marks)

Turn over...

3) Write the code for a subroutine called **matrix** which given a 2 by 2 matrix A , computes the new matrix $B = A + A^2$, where A^2 means the product of the matrix A with itself. The program should have the following structure:

- It should read the matrix A from cells A1:B2 of the Excel Worksheet.
- It should use two nested DO ... LOOP with WHILE structures for the computation of the product A^2 .
- When run, it should write the resulting matrix B in cells E1 : F2

(20 marks)

Use the program to compute $A + A^2$ for

$$A = \begin{pmatrix} 1 & 2 \\ -1 & 1 \end{pmatrix}$$

(5 marks)

4) Write a VBA code for a subroutine that is associated to the change in value of a SpinButton (see example in page 4, Lecture 8). The spin button should be called **Spin** and take integer values between 1 and 10 in steps of 1. The subroutine starts with the command line:

Private Sub Spin_Change()

and ends as usual with

End Sub

The UserForm where the SpinButton sits, should contain also two TextBoxes, named **TBox1** and **TBox2**.

Complete the code for which the first and last line were given above, so that the value of the TextBox called TBox1 is given by the the cube of the value of the SpinButton and the value of the TextBox called TBox2 depends on the value of TBox1 as follows:

- If the value of TBox1 is larger than 10, then the value of TBox2 should be the message: "Spin is larger than 2"
- Otherwise the value of TBox2 should be the message: "Spin is smaller than 3".

(20 marks)

Provide a rough sketch of how the UserForm would actually look when the programme is run and the SpinButton has value 4.

(5 marks)

Internal examiner: Dr. Olalla Castro-Alvaredo