
CITY UNIVERSITY LONDON

Excel VBA Practical Test

Group A (Solution)

This is an open book exam. You may use your lecture notes as well as task- and solution-sheets from previous lab-sessions.

Write your answers in the booklet provided.

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

To avoid possible accusations of cheating close all other applications except Excel before starting this exam.

Time: You have 90 mins to complete this test.

Turn over

1) (25 points) Verify the following identity:

$$\sum_{k=1}^n (k+3)(k+5) = \frac{1}{6}n(115 + 27n + 2n^2) . \quad (1)$$

- Write, for a given value of n , two different versions of a VBA code to create a user defined function (UDF) to evaluate the left hand side of equation (1). One version of the code should use the DO ... LOOP structure with the UNTIL command. The second version should use the FOR ... NEXT structure.
- Write a user defined function depending on n , which reproduces the right hand side of this equation.
- Use the Excel spreadsheet to compute the values of the three functions for $n = 11$ and $n = 80$.
- Write down the VBA code for all three functions and report also the values for $n = 11$ and $n = 80$.

Function SUMA1(n)

8

$k = 1$

Do Until $k = n + 1$

SUMA1 = SUMA1 + $(k + 3) * (k + 5)$

$k = k + 1$

Loop

End Function

Function SUMA2(n)

8

For $k = 1$ To n

SUMA2 = SUMA2 + $(k + 3) * (k + 5)$

NEXT k

End Function

Function RHSA(n)

5

RHSA = $n * (115 + 27 * n + 2 * n^2) / 6$

End Function

The values of all three functions for $n = 11, 80$ are

$$\text{SUMA1}(11) = \text{SUMA2}(11) = \text{RHSA}(11) = \mathbf{1199}$$

and

$$\text{SUMA1}(80) = \text{SUMA2}(80) = \text{RHSA}(80) = \mathbf{201000}$$

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2) (25 points) Consider the following set of data

x-values:	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5
y-values:	14	19	34	50	81	116	160	223	300	389

- Assuming that the points are linearly correlated, meaning that ideally they all lie on the line $y = \alpha x + \beta$, use the Excel built-in functions Slope and Intercept to determine α and β .
- Use the Excel built-in functions Linest to determine the square of the regression coefficient.
- Assume now a correlation of the form $y = \xi x^3 + \gamma x^2 + \delta x + \eta$ and determine the coefficients ξ, γ, δ and η by adding a trendline into an XY-chart. Determine also the square of the regression coefficient.
- Report all your numbers up to precision of four decimal places.

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- $\alpha = 80.6303$ and $\beta = -123.4485$.

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- $r^2 = 0.9012$.

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- $2.1305x^3 + 0.1515x^2 + 4.331x + 6.6303$ and $r^2 = 0.9998$.

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- 3) (25 points) Use the Excel spreadsheet to record a Macro. When you run your macro it should fill cells C15 to L22 with the red colour, cells E10 to J14 with the blue colour, cells E23 to E24 and J23 to J24 with the black colour and the cell B21 with the grey colour. Call the macro “ferrari” and design it such that it can be activated with Ctrl + c.
- View the VBA code of the recording you have produced and write down the code. Write down also all the comments the Macro recorder produces.
 - Without recording a new macro, indicate which lines in your Macro would have to be modified and how if instead of the initial grey colour we wanted to fill cell B21 with the black colour (leaving the rest of the Macro unchanged).

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Sub ferrari()
' ferrari Macro
' Macro recorded 2006-03-06 by (name of student)
'
' Keyboard Shortcut: Ctrl+c
Range("C15:L22").Select
    With Selection.Interior
        .ColorIndex = 3
        .Pattern = xlSolid
    End With
Range("E10:J14").Select
    With Selection.Interior
        .ColorIndex = 41
        .Pattern = xlSolid
    End With
Range("E23:E24").Select
    With Selection.Interior
        .ColorIndex = 1
        .Pattern = xlSolid
    End With
Range("J23:J24").Select
    With Selection.Interior
        .ColorIndex = 1
        .Pattern = xlSolid
    End With
Range("B21").Select
    With Selection.Interior
        .ColorIndex = 48 (change to .ColorIndex = 1 to answer 2nd part)
        .Pattern = xlSolid
    End With
End Sub

```

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4) (25 points) Write a VBA code for a subroutine named “MockOyster” which simulates the process of topping up your Mock-Oyster card in the machine at the Angel tube station.

- When executed your program should produce a MsgBox with a “Yes”, “No” and “Cancel” button, which states “Welcome to Angel! Do you want to top up your Mock-Oyster card?”. Depending on the answer, your program should produce a new MsgBox, with an “OK” button only, but of different types and with different prompts:
- When the “Yes” button is selected your program should produce a MsgBox with a warning message icon with message “Sorry, your Mock-Oyster card is no longer valid! For more information please contact the information desk”.
- When the “No” button is selected your program should produce a MsgBox with a warning query icon and message “Sure? You just have 20p on your card!”. Here by using a GOTO instruction you should make your program go back to the beginning (the first point above).
- When the “Cancel” button is selected your program should produce an OKOnly MsgBox with message “Thanks for travelling with Mock-Oyster!”
- All your message boxes should carry the title “Mock Transport for London”.
- Use variables to assign the text to the Title and Prompt parameters in MsgBox, such that for instance you only have to type “Mock Transport for London” once in your program. Declare all your variables.

Sub MockOyster()

Dim mes, m1, m2, m3, m4 As String

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mes = “Mock Transport for London”

m1 = “Welcome to Angel! Do you want to top up your Mock-Oyster card?”

m2 = “Sorry, your Mock-Oyster card is no longer valid! For more information please contact the information desk”

m3 = “Sure? You just have 20p on your card!”

m4 = “Thanks for travelling with Mock-Oyster!”

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ret = MsgBox(Prompt:=m1, Buttons:=3, Title:=mes)

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If ret = 6 (or ret=vbYes) Then	4
ret = MsgBox(Prompt:=m2, Buttons:=48, Title:=mes)	3
ElseIf ret = 7 (or ret=vbNo) Then	
ret = MsgBox(Prompt:=m3, Buttons:=32, Title:=mes)	3
GOTO 2	3
ElseIf ret = 2 (or ret=vbCancel) Then	
ret = MsgBox(Prompt:=m4, Buttons:=0, Title:=mes)	3
End If	
End Sub	

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