CITY UNIVERSITY LONDON
Excel VBA Practical Test

Group B

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.

1) (25 points) Verify the following identity:

$$\sum_{k=1}^{n} 5^k = 5(5^n - 1)/4 \ . \tag{1}$$

- Write, for a given value of n, a VBA code to create a user defined function (UDF) to evaluate the left hand side of equation (1). The code should use the DO ... LOOP structure with the UNTIL command.

- 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 two functions for $n = 10$ and $n = 13$.

- Write a macro or subroutine which computes the right hand side of the equation (1) and writes the result in cell C3 of the active worksheet. The macro should read the value of n from cell B1 of the active worksheet.

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

x-values:	10	11	12	13	14	15	16	17	18	19
y-values:	4	11	21	30	51	76	108	145	188	225

- Assuming that the points are linearly correlated, meaning that ideally they all lie on the line $y = ax + b$, use the Excel built-in functions Slope and Intercept to determine a and b.

- Use the Excel built-in functions Linest to determine the square of the regression coefficient.

- Assume now a correlation of the form $y = a_6x^6 + a_5x^5 + a_4x^4 + a_3x^3 + a_2x^2 + a_1x + a_0$ and determine the coefficients $a_1, a_2, a_3, a_4, a_5, a_6$ and a_0 by adding a trendline into an XY-chart. Determine also the square of the regression coefficient.

Turn over ...

3) (25 points) Write the code for a macro or subroutine which given a 4 by 4 matrix B computes its trace.

- The program should read the matrix B from cells B1:E4 of the Excel worksheet.
- The program should use a DO ... WHILE loop structure in order to compute the trace.
- When the program is run it should open a MsgBox with a single "OK" button. The MsgBox should have title "Programming Part II Exam" and display as message the value of the trace.

Hint: Recall that the trace of a matrix B is the number obtained by adding up the diagonal entries of B. That is, for

$$
B = \begin{pmatrix} b_{11} & b_{12} & b_{13} & b_{14} \\ b_{21} & b_{22} & b_{23} & b_{24} \\ b_{31} & b_{32} & b_{33} & b_{34} \\ b_{41} & b_{42} & b_{43} & b_{44} \end{pmatrix} \quad \Rightarrow \quad \text{Trace}(A) = b_{11} + b_{22} + b_{33} + b_{44}.
$$

4) (25 points) Write a VBA code for a subroutine named "Login" which simulates the process of login into City's computer system.

- When executed your program should produce a MsgBox with an "OK" and a "Cancel" button. The MsgBox should carry the message "Please press OK if you remember your password. Otherwise, press Cancel". Depending on your answer, the program should do one of the following:
- If you press "Cancel" your program should produce a MsgBox with a critical message icon and message "Please contact computer services!". This MsgBox should have a single "OK" button.
- If you press the "OK" button in the first MsgBox, your program should produce an InputBox with message "Enter your password below:".
    - If you enter the password "city" in the InputBox and press "OK", your program should open a new MsgBox with an information message icon. The MsgBox should display the message "Welcome to City Space!" and have a single "OK" button.
    - If you enter any other password or select "Cancel" in the InputBox, the program should go back to beginning. This should be achieved by employing a GOTO instruction.
- All Input- and MsgBoxes should carry the title "City University London".

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