CITY UNIVERSITY LONDON
Excel VBA Practical Test

20-th of January 2009

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. You may also bring this material in a USB key to the exam.

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) i) Write down the command line for a combination of Excel built-in functions which produces the following function

$$f(x) = \begin{cases} \sqrt{x^2 + 5x + 3} & \text{for} & -1 \le x < 0 \\ 3 & \text{for} & 0 \le x < 5 \\ |8 - x| & \text{for} & x \ge 5 \\ -1 & & \text{otherwise} \end{cases} \tag{1}$$

Use your function to compute $f(-8)$ and $f(10)$. Recall that the absolute value can be obtained in Excel by using the built-in function **abs (12.5 points)**.

ii) Write down the function (in a form similar to equation (1)) that is produced by the following combination of Excel built-in functions:

$$= \text{IF}(x >= 0, \text{IF}(x <= 4, x, (x + 4)/2), 0).$$

Produce a sketch of this function in your answer booklet **(12.5 points)**.

2) Consider the tables below and suppose that you enter the data on the first table into the range A4:B7 of your Excel worksheet and the data on the second table into the range C4:D7.

Country	Population
USA	293
Mexico	105
Canada	32.5

Country	Population
Brazil	184
Columbia	42.3
Argentina	39.1

The first table lists the three most populated North American countries and their populations (in millions) whereas the second table lists the three most populated South American countries and their populations (in millions).

Write a user defined function called **america** that takes as input the name of a continent and the name of a country and does the following:

- if the continent is North America or South America and the country is in one of our tables, the function should return the population of the corresponding country,

- if the continent is neither North America nor South America, the function should return the message: "pick another continent",

- if the continent is North America or South America, but the country is not in one of our tables, the function should return the message: "pick another country".

The function should employ a **VLOOKUP** structure and two nested **SELECT CASE** structures. Define the variable types of the input and output of the function and of any other variables you may use in your program **(25 points)**.

Turn over...

3) Write a user defined function called **book** that would help a librarian locate a book, given the book's reference number. The function should take the reference number of a book as input, and give its location as output, according to the following description:

- if the book reference number is between 1 and 99 (both values included), the function should return: "the book is in the basement",
- if the reference number is between 100 and 249 (both values included) or over 500, the function should return: "the book is in the main floor",
- if the reference number is between 250 and 500 (both values included), except for the values 300 to 400 (both values included), the function should return: "the book is in the upper floor",
- if the reference number is between 300 and 400 (both values included) then the function should return: "the book is in the archives"
- finally, for any other number the function should return: "wrong reference number"

The function should use an **IF** with **ELSEIF** structure. Define the variable types for the input and output of the function **(25 points)**.

4) i) Write a user defined function called **interval** which, given a date in the past as input, returns the number of years that have passed since that date **(7 points)**.

ii) The following table provides information about six of the strongest earthquakes of the 20th century: the upper row indicates the name of the country where they took place and the lower row the dates when they occurred.

Chile	Alaska	Russia	Ecuador	Japan	India
22/05/1960	28/03/1964	11/04/1952	01/01/1906	06/11/1958	08/08/1950

Suppose we write this table in the range B1:G2 of the Excel worksheet.

Write a user defined function called **quake** which, given the name of a country as input, returns the number of years since the earthquake took place. The function should employ an HLOOKUP structure that would read up the data from the table above. It should also make use of the function **interval** defined in part i) **(9 points)**.

iii) Write a user defined function called **quakeyear** that uses a **SELECT CASE** structure and, taking a date as input, does the following:

- if the value of the function **interval** for that date is between 58 and 39 (both values included), then the function should return: "there were several strong earthquakes in this decade".
- in any other case it should return: "we have no records for this decade"

(9 points)

For all three functions, define the variable types of the input and output of the function, as well as of any other variables you may use in your program.

Internal examiner: Dr. Olalla Castro-Alvaredo