

WST312 Stochastic Processes 2018

Introduction to VBA in Excel

The student is required to work through these notes by themselves.

AIM 1

1. Introduction to VBA Development in Excel

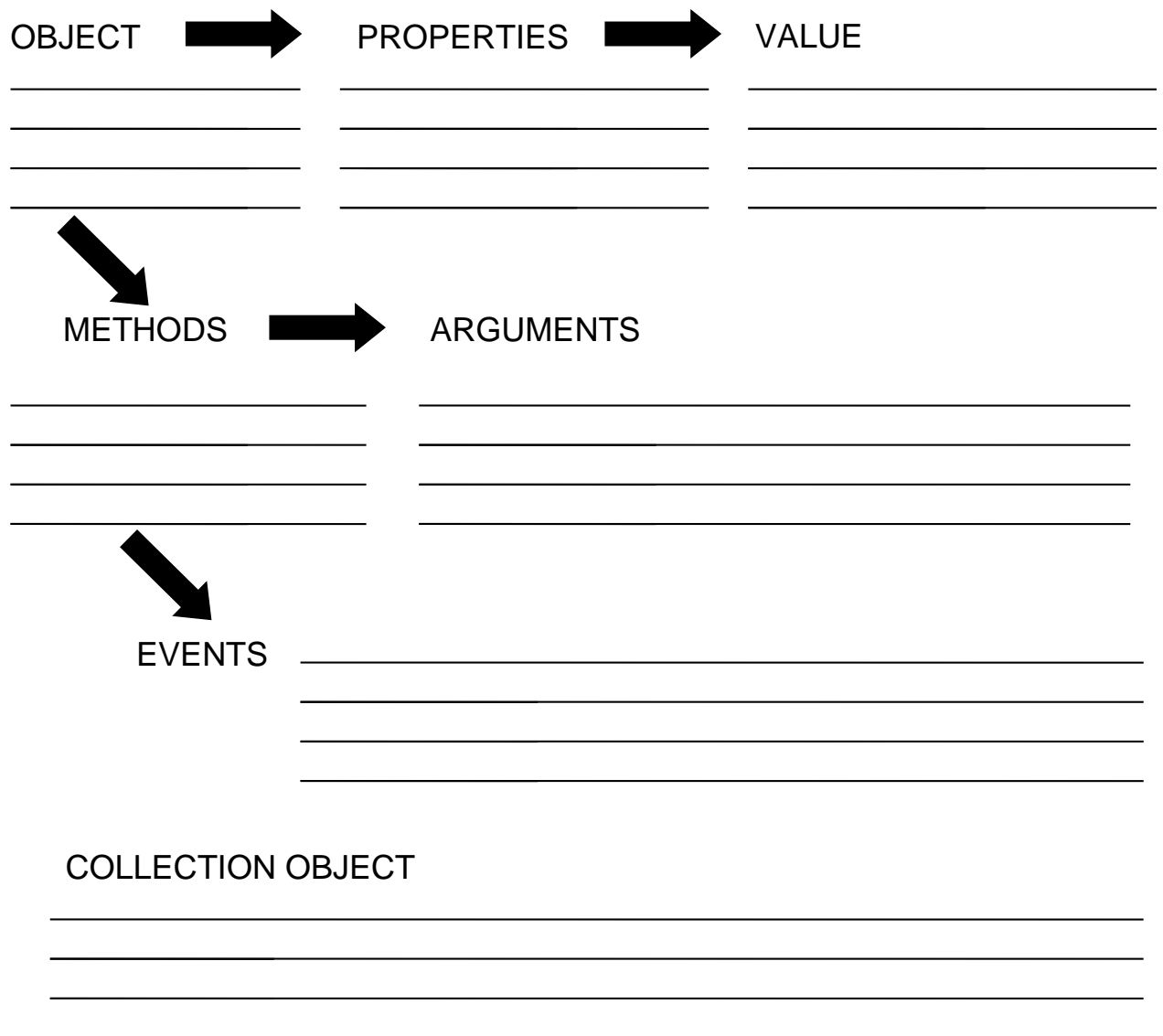
VBA (Visual Basic for Applications) is programming language that Excel uses and can be used to develop applications in excel.

Input → Calculations using Excel → Output

- a) Read through this chapter.
- b) Look at the examples mentioned in Chapter 1 (Example Applications) for yourself.

2. The Excel Object Model

- a) Read through chapter 2 (Introduction; Objects, Properties, Methods, and Events; Collections as Objects) and then fill in examples (from excel) and explanations/definitions below (on the lines left open) for each of the elements of the Excel Object Model. (NOTE: The Object Browser mentioned can be accessed from VBE – see chapter 3.)



b) Draw a (general) flow diagram of the hierarchy of objects in the Excel Object Model (Chapter 2 The Hierarchy of Objects).

c) Read through Chapter 2 Object Models in General and Summary for yourself.

3. The Visual Basic Editor (VBE)

All the work is done in the VBE.

Alt+F11

Tools -> Macro -> VBE

a) Open VBE and follow through Chapter 3. Take note of where the **Code** is written, where the **Project Explorer**, the **Properties** window and the three **Toolbars** are. Explore the toolbars.

b) Explore the **Object Browser**.

c) Read Chapter 3 The Immediate and Watch Windows.

What is the **Immediate Window** used for?

What is the **Watch Window** used for?

d) Work through The First Program example yourself in Excel.

e) Read through Chapter 3 Intellisense and Color Coding and case. What code is highlighted in the following colours:

Blue:

Green:

Black:

Red:

f) Read Chapter 3 Finding Subs in the VBE for yourself.

g) Do Exercise 4 of Chapter 3.

AIM 2: Chapter 4 – Recording Macros

We can record a Macro while performing a task in Excel i.e. VBA code will be automatically generated for you as you perform a task.

a) What Excel tasks cannot be recorded and must be done by 'hard' coding?

Read the section on *Recording A Macro*.

b) Give the menu commands for recording a Macro.

c) What are the options for storing the Macro? Which option is best?

d) Open the Record Macro Dialog Box, store your file in *Personal Macro Workbook* and name it *FirstMacroRecording*. Click OK.

- Now in cell A1 type =**rand()**. Press Enter.

- Draw the formula down to cell A20.

- Click the 'Stop Recording' button.

NB. ONLY do these tasks – Excel will record ANYTHING else you do as well!

Now in a new worksheet, add a button and run this Macro. Include a print screen of the output and of your VBA code (the code will be in the VBE – you may have to click the ‘Show Code’ button.)

e) Do exercises 4.1, 4.2, 4.3, 4.4, and 4.6 in *Recorded Macro Examples*. Include a print screen of the output and the recorded code of each exercise.

f) Read through the exercises 1 – 8 and provide in point form examples of other useful tasks that could be recorded as a Macro.

AIM 3: First Half of Chapter 5 (finally some REAL stuff!)

1. **Read *Introduction and Subroutines*.** There are a number of terminology concepts here but basically:

Subroutine = **Sub** = Macro = Procedure = any set of code that performs a particular task

- a) Look forward into Chapter 10 and find out what a **function subroutine** is.
- b) What do they define as a **program**? Can the program be in 1 module or must it be in individual modules?
- c) Describe what names for a Sub are allowed.
- d) What are the ‘()’ for after the Sub’s name? What are they used for?
- e) What are the different ways to run a Sub?

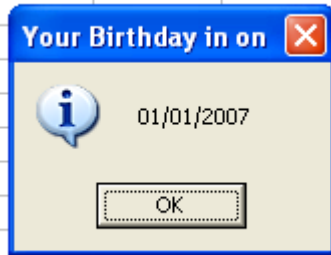
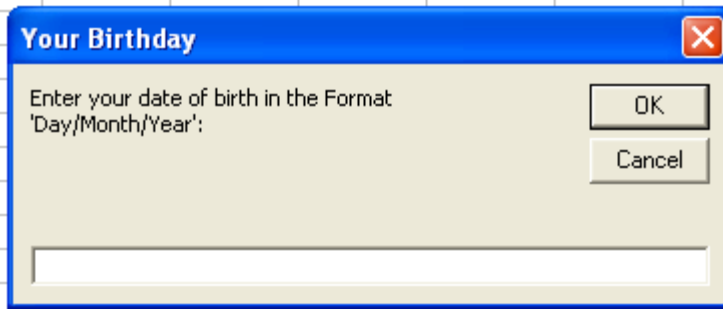
2. **Read *Declaring Variables and Constants*.**

- a) Explain where and how you declare variables and give reasons why it is necessary.
- b) Give 9 variable types as well as actual examples of each.
 - c) Explain what **Option Explicit** does. Why is it useful?
 - d) Name and discuss Object Variables compared to standard variables.
- e) Explain why you would make use of a **Constant** and explain with an example how you would define one.

3. **Read *Built-In Constants*** What are the three types of built-in constants available? Where are they each found? Give an example of each (other than those in section 5.4).

4. **Read *Input Boxes and message Boxes with Yes and No Buttons*.**

- a) Write a sub that would output the following:



Indicate in your code which is your **result** variable.

- b) How would you handle long sentences in the code for Message and Input boxes?
- c) When do you and when do you not use parentheses?
- d) Do exercise 5.1 for yourself.

5. Read *Using Excel Functions in VBA*. How would you use functions from Excel in your VBA code? Are there any pitfalls to making use of them?

AIM 4: Continuing Chapter 5

- 1) Read *Comments* and include comments in the following code on the solid lines. Make sure you write the comments correctly. Why are comments important?

Sub GetProductName()

Dim product as String _____

Product = InputBox("Enter the product's name:") _____

MsgBox "The product's name is " & product & ".", vbInformation _____

End Sub

- 2) Read *Indenting*
- 3) Read *Strings*. What is used to concatenate String variables?

How is this used for a String that extends over 2 or more lines?

How would you format a date to the form dd/mm/yyyy if it is inputted for example in the form 3 March 2010?

What would the following commands return?

Right("Today it is not raining.", 7)

Left("Today it is not raining.", 5)

Mid("Today it is not raining.", 17, 4)

Len("Today it is not raining.")

Left("Today it is not raining.", 12) & "snowing."

- 4) Read *Specifying Objects, Properties, and Methods*. How would you specify the following:
- Change the font of the cell A1 in the current worksheet to Bold:
 - Delete the data in the cells A1:D4 in the current worksheet:
 - Place the value contained in the variable 'Amount' into cell D4 in a worksheet named 'ThisWorksheet':
 - Change the alignment of cell A1 in the current worksheet to Center:
- 5) Read *With Construction*. Write code using **With** for (a), (b) and (d) in question 4.
- 6) Read *Other Useful VBA Tips*.
- How would you turn Screen Updating On?
 - Explain what the **Timer** function does and what it can be used for:
- 7) Read *Good Programming Practices* and name and describe 8 good programming practices.
- 8) Read *Debugging* and name and describe the three types of errors:

AIM 5: Chapter 6

- Read through and do the *Exercise* for yourself.
- Give examples (not from those on in *Important Properties and Methods of Ranges*) of code for the following properties of the Range Objects, explaining in each what the code does :

ADDRESS:

CELLS:

COLUMN:

CURRENTREGION:

ENTIRECOLUMN:

FONT:
FORMULA:
FORMULAR1C1:
HORIZONTALALIGNMENT:
INTERIOR:
NAME:
NUMBERFORMAT:
OFFSET:
ROW, ENTIREROW:
VALUE:

- 3) Give examples (not from those in *Important Properties and Methods of Ranges*) of code for the following Methods of the Range Objects, explaining in each what the code does :

CLEAR:
CLEARCONTENTS:
COPY:
PASTESPECIAL:
SELECT:
SORT:

- 4) Give 8 ways in which a Range can be referenced, explaining each one.
5) Work through the exercises in *Examples of Ranges with VBA* and add any examples you come across to questions 2 and 3 of this practical.
6) Do exercise 1 in the exercises. (Hint: if you are not sure about something, do it manually in excel while recording the macro and then edit the code as required.) Include a print screen of your output.

AIM 6: Chapter 7

- 7) 1. Read through *Introduction* and *Exercise*. Do exercise 7.1 for yourself. Attempt to write the code before you look in VBE.
8) 2. Page through the chapter and name the three logic operations that will be dealt with in Chapter 7.
9) 3. Read chapter 7. Give the (general) code for the following and explain each (clearly indicate the *conditions* and *statements*):
10) a) *If* statements
11) b) *If Else* statements
12) c) *ElseIf* statements
13) d) *Compound Conditions*
14) e) *Case* statement (also describe the possible keywords to use here)
15) f) A *For* Loop (explain the following as well: *Exit For*, counting backwards)
16) g) *For each* loops
17) h) *Do* loops (explain all 4 variations as well as *Exit Do* and when you would use *Ctrl-Break*)
18) 4. Do examples 7.1 (Single-Line If Construction) to 7.9 (Locating a Name in a List) for yourself.

AIM 7: Chapter 8

1. Do exercise 8.1 for yourself.
2. What are the three collections discussed in *Collections and Members of Collections* and what do they refer to?

3. Draw/give the hierarchy of the collections mentioned in (2) and discussed in *Collections and Members of Collections*.
4. Give examples of how to refer to each of the collections mentioned in (2).
5. What does the *Count* method do for these collections?
6. What does the *Add* method do for these collections?

Read *Examples of Workbooks in VBA* and answer the following.

7. What does the *Name* method do for these collections?
8. How do you *open* a Workbook?
9. How do you *close* a Workbook?
10. How do you *save* a worksheet and how do you *SaveAs* a worksheet?
11. What does the *Path* method do and give an example of how to apply it.
12. What does *< >* mean?
13. Do examples 8.5 (Displaying Information...) to 8.8 (Sorting Worksheets) for yourself.
14. What do the *Sort*, *Move* and *After* methods do? Give examples
15. Read *Displaying Properties...* to *More Properties...* and describe the properties that can be altered on a Chart.

AIM 8: Chapter 9

- a) Read *Introduction*, *Exercise* and *The Need for Arrays* for yourself.
 - b) Explain how you declare an array. Explain the three components included in the declaration.
 - c) What is *0-based indexing*?
 - d) How do you change from the default 0,1,2,3,... array indexing? Name two methods and explain the differences between them.
 - e) How would you declare an array if you don't know the size of it at the start of the programme? How do you include the size later on?
 - f) What is the *Preserve* statement and why would you need to make use of it in (e)?
 - g) What is a multi-dimensional array and how would you declare it?
 - h) Do examples 9.1 (Looking Up a Price) – 9.4 (Merging Lists) for yourself.
 - i) What do the *Rnd*, *Int*, *Randomize* and *RandBetween* methods do?
 - j) How do you declare an array function?
 - k) Do exercise 1.
 - l) Do exercise 7.
- Include your output for both (k) and (l).