

2011

Programming Excel/VBA Part II

Lectured by Dr Olalla Castro Alvaredo Surgery hours: Wed. 11:00-12:30 Fri. 3:00-4:30

http://www.staff.city.ac.uk/o.castro-alvaredo/PROGRAMMING/programming.html

Recap:

- general intro to excel (anatomy of the window)
- absolute, relative and mixed referencing (A1,A\$1,A1\$,A\$1\$)
- functions (=F(...,....))

lookup tables (VLOOKUP,HLOOKUP)

- VBA editor
- user defined functions (UDF)
- codes involving lookup functions
- error messages
- declaration of constants
- declaration of variables
- select case (if blocks)

VBA Control Commands:

- What are control commands?
- If ... Then (already known)
- Select Case (already known)
- Do Loop (we will see it today)
- For ... Next (we will see it today)
- While ... Wend (will not see it this year)
- For each ... Next (will not see it this year)
- Goto (will see it later this term)
- With ... End With (will see it later this term)

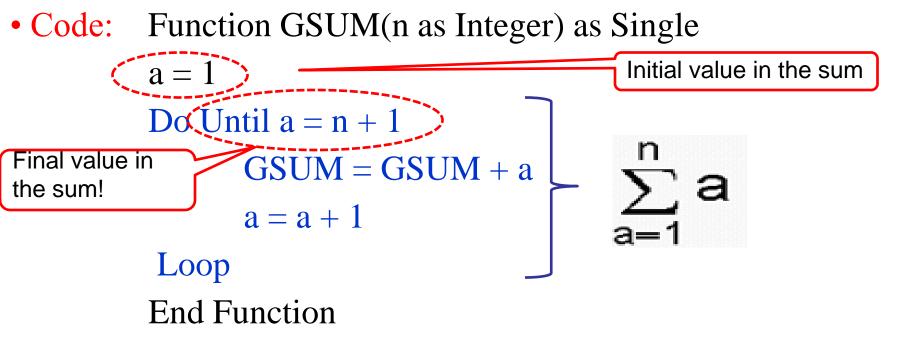


- Loops are mechanisms for repeating the same procedure several times, e.g. the same mathematical procedure, reading repeatedly rows or columns of a table, etc.
- There are two structures in VBA for this: Do ... Loop and For ... Next
- Do ... Loop is used when the loop terminates when a logical condition applies, e.g. a mathematical statement such as x<11 or the end of a data file is reached etc.

• Syntax: Do {While Until} condition
[statements]
[Exit Do]
[statements]
Loop

- In the DO WHILE ...LOOP the looping continues while the condition is true.
- In the DO UNTIL ...LOOP the looping continues <u>until</u> the condition is true.
- EXIT DO terminates the looping.
- Warning: Make sure you do not construct infinite loops. In case this happens use: Ctl + Break to abort
- Example: Write a function which checks the following identity:

$$\sum_{a=1}^{n} a = \frac{n(n+1)}{2}$$



What is actually happening inside the loop:

1) Start the loop with a=1

2) GSUM=GSUM+1

(this means that the new value of GSUM is the old value (0) plus 1, so now GSUM=1)

3) a=a+1

(this means that the new value of a is the old value (1) plus 1, so now a=2 and the loop closes and goes back to the beginning)

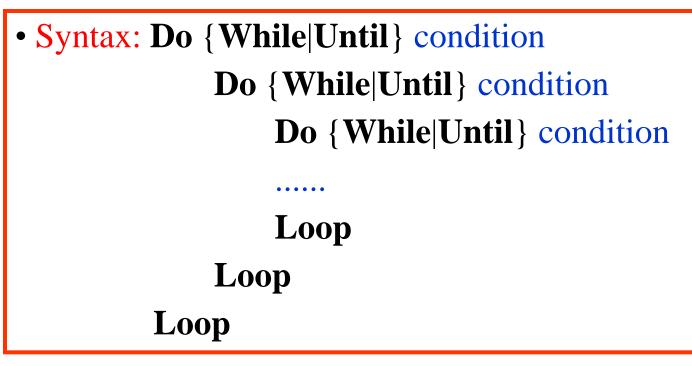
- 4) Everything gets repeated with initial values a=2 and GSUM=1.
- 5) Repetition continues until a=n+1 (this last value is not done!)

• Code: Function GSUM(n as Integer) as Single a = 1 Do Until a = n + 1 or (Do While a < n + 1) GSUM = GSUM + aa = a + 1Loop **End Function** gives for instance: $GSUM(112) \Rightarrow 6328 = 112 * 113/2$ • equivalently: Do

GSUM = GSUM + aIf a = n Then Exit Do a = a + 1Loop

• Nesting DO...LOOP: You can also nest DO...LOOP structures to

produce more complicated structures



• EXAMPLE: Let's verify the identity

 $\sum_{k=1}^{p}\sum_{n=1}^{k}n = \frac{1}{6}p(1+p)(2+p)$

Function NEST(p as Integer) as Single

k = 1 Function NESTSUM(p as Integer) as Single **Do Until** k = p + 1NESTSUM = p * (1 + p) * (2 + p) / 6n = 1 **End Function Do Until** n = k + 1NEST = NEST + nn = n + 1Loop k = k + 1Loop **End Function** NEST(p) = NESTSUM(p)

• For ... Next is used when you know in advance how many times

you want to iterate

• Syntax: For counter = first To last [Step step] [statements] [Exit For] [statements] Next [counter]

- \cdot counter: number which counts the loops
- first/last: initial/final value of counter
- \cdot step: increment by which the counter is changed in each iteration

• Code: Function GSUMNEXT(n as Integer) as Single For a = 1 To n (same output as GSUM) GSUMNEXT = GSUMNEXT + a Next a End Function 10^{-1} • Using now Step verify:

$$\sum_{a=1}^{n} 2a = n(n+1)$$

Code: Function GSUMNEXT2(n as Integer) as Single
For b = 2 To 2*n Step 2
GSUMNEXT2 = GSUMNEXT2 + b (here b=2a!)
Next b
End Function
gives for instance: GSUMNEXT2(112) ⇒ 12656 = 112*113

Announcement: Mathematics Students Labs

- •There is a small change to the Maths Labs this term.
- •Students in group 5, which went to room CG48 with Michelle Hickey last term, will now join group 3 and go to room EG07.
- •Students in EG07 will now have two tutors, Mr Cheng Zhang and Ms Michelle Hickey.
- •All the Labs will take place on Tuesdays 9-11, that is before the lecture (so no Labs in week 1!)