

FIT1013 – Week 1: Calculating Data with Formulas and Functions

Learning Outcomes:

- Understand the principles of spreadsheets
- Utilise the basic Excel formulas to analyse data
- Understand Error values in Excel
- Perform what-if analysis to further analyse data
- Understand the differences between values and cell references



Tasks

- Introduction to unit – 30 minutes
- Weekly Objectives – 5 minutes
- The basic concepts of workbook, and principles of spreadsheets – 15 minutes
- Basic Excel formulas to analyse data – 15 minutes
 - Explore application help on Functions (i.e. F1, Help tab, Insert Function)
 - Working with DATE functions
 - Working with COUNT functions
 - Working with financial functions (e.g. PMT)
- Error values in Excel – 10 minutes
- What-if analysis – Goal Seek – 15 minutes
- Excel cell references – 15 minutes
- Post-class activities

1. Introduction to unit

- Staff details
- Workshops
- Applied Sessions
- Consultations
- Resources
- Assessments

FIT1013: why is it useful?

- Excel knowledge assumed in many BIS core and elective units.
- Expertise in spreadsheet modelling and programming is prescribed by IBL sponsors as essential knowledge for students on placement
- Spreadsheet modelling is the most widely used tool for Business modelling

Excel & Access:

Useful business tools for

- Storing and manipulation of data
- Data analysis and visualization
- Decision Support
- Problem solving
- Presentation/reporting

Excel 2019 and Access 2019

- Excel – the most widely used DSS software.
- Access/Excel + VBA enables
 - Database
 - from an Excel tables and list/s
 - or from an Access database
 - (other databases....)
 - Data Analysis
 - using pre existing analysis tools – e.g. Scenario Manager, Charts, data tables, pivot tables, Excel functions, Goal seek, Solver
 - Using user defined functions
 - Using VBA
 - Interface and automation
 - built using VBA

3. The basic concepts of workbook, and principles of spreadsheets

The screenshot shows a spreadsheet titled "Wingait Farm" with the following structure and annotations:

- Section 1: Corn Yield Calculator**
 - Row 1: Title "Wingait Farm" (A1)
 - Row 2: Title "Corn Yield Calculator" (A2)
 - Row 4: "Total Corn Crop (acres)" (A4) with value "137" (B4). An annotation "size of the farm in acres" points to this cell.
- Section 2: Sample Plot**
 - Row 6: Title "Sample Plot" (A6)
 - Row 7: "Number of Rows" (A7) with value "6" (B7).
 - Row 8: "Row Width (ft.)" (A8) with value "2.5" (B8). An annotation "dimensions of the sample plot" points to this cell.
 - Row 9: "Row Length (ft.)" (A9) with value "294" (B9).
 - Row 10: "Sample Area (acres)" (A10) with a formula bar showing the calculation.
- Section 3: Agricultural Constants**
 - Row 6: Title "Agricultural Constants" (D6). An annotation "constants used in agricultural calculations" points to this section.
 - Row 7: "Square Feet in an Acre" (D7) with value "43,560" (E7).
 - Row 8: "Standard Corn Moisture Content" (D8) with value "15.50%" (E8).
 - Row 9: "Pounds of Corn in a Bushel" (D9) with value "56" (E9).
 - Row 10: "Market Price per Bushel" (D10) with value "\$3.85" (E10).
- Section 4: Corn Weight**
 - Row 12: Title "Corn Weight" (A12)
 - Row 13: "Sample Weight (lbs.)" (A13)
 - Row 14: "Moisture Content" (A14)
 - Row 15: "Dry Weight (lbs.)" (A15)
 - Row 16: "Market Weight (lbs.)" (A16)

The spreadsheet interface includes a tab bar at the bottom with "Documentation", "Yield" (selected), "Yield History", "Growth", and "Explanation of Formulas". The status bar at the bottom left says "Ready".

Activity

What are the benefits of documenting contents of a workbook?

True/False:

- Every workbook should be accessible to its intended users.
- You should never use jargon or unusual terms in a workbook

4. Basic Excel formulas to analyse data

- Quick way to calculate summary data
- Every function follows a set of rules (syntax) that specifies how the function should be written
- General syntax of all Excel functions:
 - *FUNCTION(argument 1, argument2, ...)*
- Square brackets indicate optional arguments:
 - *FUNCTION(argument1, [argument2=value2, ...])*
- An argument can be any type of value including text, numbers, cell references, or even other formulas or functions
- Functions can be placed inside another function, or **nested**; nested functions must include all parentheses

Some Excel Functions

Function	Description
AVERAGE(<i>number1</i> [, <i>number2</i> ,...])	Calculates the average of a collection of numbers, where <i>number1</i> , <i>number2</i> , and so forth are numbers or cell references
COUNT(<i>value1</i> [, <i>value2</i> ,...])	Counts how many cells in a range contain numbers, where <i>value1</i> , <i>value2</i> , and so forth are either numbers or cell references
COUNTA(<i>value1</i> [, <i>value2</i> ,...])	Counts how many cells are not empty in ranges <i>value1</i> , <i>value2</i> , and so forth including both numbers and text entries
INT(<i>number</i>)	Displays the integer portion of <i>number</i>
MAX(<i>number1</i> [, <i>number2</i> ,...])	Calculates the maximum value of a collection of numbers, where <i>number1</i> , <i>number2</i> , and so forth are either numbers or cell references
MEDIAN(<i>number1</i> [, <i>number2</i> ,...])	Calculates the median, or middle, value of a collection of numbers, where <i>number1</i> , <i>number2</i> , and so forth are either numbers or cell references
MIN(<i>number1</i> [, <i>number2</i> ,...])	Calculates the minimum value of a collection of numbers, where <i>number1</i> , <i>number2</i> , and so forth are either numbers or cell references
RAND()	Returns a random number between 0 and 1
ROUND(<i>number</i> , <i>num_digits</i>)	Rounds <i>number</i> to the number of digits specified by <i>num_digits</i>
SUM(<i>number1</i> [, <i>number2</i> ,...])	Adds a collection of numbers, where <i>number1</i> , <i>number2</i> , and so forth are either numbers or cell references

Activities

- Explore application help on Functions (i.e. F1, Help tab, Insert Function)
- Working with DATE functions
- Working with COUNT functions
- Working with financial functions (i.e. PMT)

5. Error values in Excel

Error Value	Description
#DIV/0!	The formula or function contains a number divided by 0.
#NAME?	Excel doesn't recognize text in the formula or function, such as when the function name is misspelled.
#N/A	A value is not available to a function or formula, which can occur when a workbook is initially set up prior to entering actual data values.
#NULL!	A formula or function requires two cell ranges to intersect, but they don't.
#NUM!	Invalid numbers are used in a formula or function, such as text entered in a function that requires a number.
#REF!	A cell reference used in a formula or function is no longer valid, which can occur when the cell used by the function was deleted from the worksheet.
#VALUE!	The wrong type of argument is used in a function or formula. This can occur when you reference a text value for an argument that should be strictly numeric.

Activities

- Explore different types of error values in Excel.
- How to resolve them?

6. What-if analysis – Goal Seek

The screenshot displays the Microsoft Excel interface with the 'Wingait Farm' spreadsheet open. The 'Data' tab is selected in the ribbon. The spreadsheet contains the following data:

Wingait Farm		Agricultural Constants	
Corn Yield Calculator			
Total Corn Crop (acres)	137		
Sample Plot			
Number of Rows	6	Square Feet in an Acre	43,560
Row Width (ft.)	2.5	Standard Corn Moisture Content	15.50%
Row Length (ft.)	294	Pounds of Corn in a Bushel	56
Sample Area (acres)	0.20	Market Price per Bushel	\$3.85
Corn Weight			
Sample Weight (lbs.)	1922		
Moisture Content	16.30%		
Dry Weight (lbs.)	1609		
Market Weight (lbs.)	1904		
Yield			
Sample Bushels	34		
Bushels per Acre	168		
Total Yield (bushels)	23,002		
Projected Market Revenue	\$ 88,559.40		

The **Goal Seek** dialog box is open, showing the following settings:

- Set cell: **\$B\$23**
- To value: **\$100,000**
- By changing cell: **\$B\$4**

The **Goal Seek Status** dialog box is also open, indicating:

- Goal Seeking with Cell B23
- Found a solution.
- Target value: 100000
- Current value: \$100,000.00

Activities

- How many acres of corn crops needed if your projected market revenue is \$100,000?

7. Excel cell references

- Workbooks can include data entered in cells that are then referenced in formulas to perform calculations on that data.
- Types of cell references
 - Relative References
 - When a formula includes a cell reference, Excel interprets it as being located relative to the position of the current cell.
 - Absolute
 - A fixed reference – one that always references the same cell no matter where it is moved – is called an absolute reference.
 - Mixed
 - A mixed reference contains both relative and absolute references

Activities

- Explore each of type of references.

8. Post-class Activities

- Try these functions:
 - `Min()`, `max()`, `average()`, `sum()`,.....etc

Reference

- Carey, P. (2019). New Perspectives Microsoft Office 365 and Excel 2019 Comprehensive. Cengage.