

AS/A Level Applied Information and Communication Technology 9713

Unit 14: Spreadsheets

Recommended Prior Knowledge

Students will require a basic knowledge of and some practical skills in data analysis, modelling and in the use of spreadsheet facilities. In preparation for this module it is recommended that the material from IGCSE IT (syllabus 0418) has been covered, especially the whole of section 14 (Data Analysis).

This should include the following:

- creating a model layout
- entering text
- entering numeric data
- entering formulae
- using functions
- selecting subsets of data (AND and OR)
- adjusting numeric data format and cell sizes
- saving model layout and formulae
- printing the data model displaying formulae
- printing the test model displaying values
- printing extracts

In preparation for this module you could cover the following topics: handling passwords to gain access to the operating system, applications software and data. They will also require a basic knowledge of file management techniques including:

- creating, renaming, deleting and access to directories/folders
- browsing a directory or folder
- creation of different file types

Context

This sub-unit can be studied on its own or in conjunction with other practical units. There is no requirement to study any other units prior to this one.

Outline

This sub-unit covers the following areas:

The use of spreadsheet software to:

- create a data model as specified by keying data with 100% accuracy and by importing data
- check data entry
- manipulate rows and columns
- manipulate windows
- name cells and ranges
- rearrange cells and/or manipulate their contents
- enter formulae to meet requirements
- enter functions to meet requirements
- test the data model
- adjust the page layout
- format rows, columns and cells
- enhance and emphasise cells
- adjust row, column and cell sizes so that all data, labels or formulae are visible
- select subsets of data using more than one criterion
- sort the data using one criterion or two criteria
- use the display features of the package to produce an electronic or printed report with selected data only
- export the data into a format that can be used in a different package.
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Candidates will also need to:

- manually verify data entry
- understand the purpose of validation and verification
- understand the need for corporate house styles and apply these to data models

AO	Learning outcomes	Suggested Teaching activities	Learning resources
14a(i)	Create a data model as specified by keying data with 100% accuracy and by importing data	<p>Revise the design of a sensible model layout so that additional data can be added where appropriate without restructuring the model. Revise and review the use of editing skills like: cut, copy, paste, drag and drop, fill and formulae replication. Ensure that students have a sound understanding that the spreadsheet model can be multi-layered spreadsheets in a single workbook.</p> <p>Understand the importance of entering data into the model with 100% accuracy.</p> <p>Teach importing data into a spreadsheet model using data files from the specific spreadsheet or using generic file types including .csv format. Importing the data could include from a source data file or from another open spreadsheet or table within an open document. Students will need to practice this skill with a variety of different files.</p>	<p>Exercises that can be teacher marked or peer marked in order to practise and reinforce 100% accuracy in all data entry. Peer marking is suggested to try and ensure students can carefully verify data entry.</p> <p>Prepared spreadsheet files, documents containing tables and prepared generic data files in .csv format.</p>
14a(ii)	Check data entry	Revision on the students' understanding of the purpose of both validation and verification. Revise methods of validating and verifying data and selecting the right method for different applications.	<p>Exercises in data entry and manual verification of the data entered.</p> <p>Exercises in setting and testing validation rules applied to individual cells.</p>
14a(iii)	Manipulate rows and columns	Teach the insertion and deletion of both rows and columns into/from a spreadsheet model. Learn to move rows and columns, resize them to show all data and to hide rows and columns. Teach how to protect rows and columns in order to prevent users from inserting, deleting or formatting rows and columns.	Exercises in inserting, deleting and manipulating rows and columns.

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14a(iv)	Manipulate windows	<p>Teach students how to split windows and restore the windows in order to view/work on two remote parts of a spreadsheet at the same time.</p> <p>Teach the students how to freeze and unfreeze window panes in order to view important cells whilst scrolling through other elements of the spreadsheet.</p>	<p>Prepare large spreadsheets with more than one screen width and one screen depth of data so that students split and restore windows.</p> <p>Prepare a very large single spreadsheet in order to freeze panes for scrolling. This may be the same spreadsheet as above.</p>
14a(v)	Name cells and ranges	<p>Ensure students have an understanding of the function of named cells and ranges. Revise and practice how to name cells and ranges of cells. Explain how to use these cell ranges instead of defining absolute cell referencing within replicated formulae.</p>	<p>Prepare exercises in naming individual cells and ranges of data.</p>
14a(vi)	Rearrange cells and/or manipulate their contents	<p>Teach the manipulation of strings by splitting strings into two or more cells, joining strings held in two or more cells, extracting values and/or substrings from strings using features like value, mid, left, right and length in order to determine the number of characters in a string. This should also include the concatenation of cells.</p> <p>Teach how to protect individual cells as well as rows and columns. Students are to use prepared exercises to protect areas of the spreadsheet, then use peer testing to ensure that the protection works.</p>	<p>Prepare exercises in string extraction, manipulation and concatenation.</p> <p>Prepare exercises for students to protect rows, columns and cells.</p>
14a(vii)	Enter formula/e to meet requirements	<p>Discuss the structure of formulae and develop the use of formulae to perform calculations, including: add, subtract, multiply, divide, indices. Students need to practice the use of these formulae for a variety of different case studies.</p> <p>Revise the order of mathematical operations (as used within the software) and the importance of parenthesis (brackets) in ensuring that formulae work as expected.</p>	<p>Prepare exercises to enable students to practise the use of a variety of formulae in a wide range of case studies.</p>

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14a(viii)	Enter functions to meet requirements	<p>Develop an understanding of the function of absolute and relative cell referencing within formulae. Discuss the layout of, and plan the layout of worksheets with assigned areas for relative and absolute referencing and where named cells and ranges can be used to replace absolute cell referencing. Students need practice exercises involving replication with named cells and ranges and absolute and relative cell referencing.</p> <p>Teach the need for nested formulae, ensuring that the order of mathematical operations is correctly applied in the calculations.</p> <p>Teach the manipulation of date and time values, including extracting elements from these like the number of days or weeks between specified dates, or the number of minutes or seconds between specified times.</p>	<p>Prepare exercises involving the replication of formulae involving absolute and relative referencing as well as using named cells and ranges.</p> <p>Prepare practice exercises in the use of nested formulae .</p> <p>Prepare exercises in extracting specified date and time values from date and time values.</p>
		<p>Develop an understanding of commonly used spreadsheet functions like: sum (including calculating totals and sub-totals), average, maximum, minimum, integer, rounding, counting (unconditional and conditional counting), if, and lookup (using generic lookup as well as horizontal and vertical referencing). Develop an understanding of functions used to manipulate string values and date and time values. Practise the use of these functions in order to solve specified problems.</p>	<p>Prepare exercises in order to practise each function, progressing onto exercises where students solve problems using the most appropriate functions for the task.</p>
14a(ix)	Test the data model	<p>Develop an understanding of, and practise using nested formulae and functions, for example nested IF statements. Practise using nested formulae to solve problems with multiple functions or formulae.</p> <p>Revise the need for careful choice of test data. This must ensure that the test data tests every element of the spreadsheet model including testing all formulae, functions, named ranges and validation rules.</p>	<p>Prepare practice exercises in the use of nested formulae and functions (especially nested IF functions)</p> <p>Provide sample spreadsheet models, the purpose and expected results with a variety of formulae and functions for the students to check and see if they perform their given functions. Ensure that some of these models function</p>

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		<p>Discuss the use of test data, calculating and recording the expected output and mapping this against the actual output.</p> <p>Use practice exercises to develop data models and test that they produce the expected results.</p> <p>Choose test data and use this to test the models provided.</p>	<p>correctly and some have errors (formulae or functions which have correct syntax) but do not perform the stated purpose.</p> <p>Prepare sample questions with test data (both appropriate and inappropriate) to test calculations, formulae and functions.</p> <p>Prepare practice exercises to ensure that suitable testing can be done.</p> <p>Prepare models to enable the students to select the test data.</p>
14b	Adjust the page layout	<p>Students must understand the need for house styles and apply these to spreadsheets and workbooks.</p> <p>Candidates should be able to adjust the page layout in relation to their spreadsheet/workbook by setting the page size (for example A4, A5 or letter and the page orientation to landscape or portrait and be able to adjust the sheet as it is output using features like fit to page. Margins should be set and row and column headings should be renamed and made visible or invisible as specified. Colour schemes and house styles should be applied as appropriate.</p> <p>Teach the use of other page features like headers and footers, and automated text like file details, automated date and page numbering.</p>	<p>Practise exercises to manipulate the page layout, applying styles and different page settings.</p>
14c(i)	Format rows, columns and cells	<p>Revise the selection of data within the spreadsheet using highlighting to select specified rows, columns, cell/s, only as well as selecting the whole active spreadsheet.</p>	

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		<p>Use practice exercises to format cell/s as text, time in 12 hour and 24 hour clock, dates like short date and long date and numbers like: integer, percentage, decimal, fractions, specified number of decimal places, and a variety of different currency values. Teach formatting numeric values as text, text orientation with the text/data aligned horizontally or vertically. Align the cells both vertically (top, middle or bottom) and horizontally (left, centre or right) and set (or remove) text wrapping within a cell so that all data/labels/formulae are visible. Use conditional formatting to enhance cells.</p>	<p>Prepare practice exercises for formatting cells, aligning data within cells and for conditional formatting.</p>
14c(ii)	Enhance/emphasise cells	<p>Develop the use of display features to enhance text, like: using colours, shading, patterns to fill cells, bold, underscore, italic, different font styles (font face and point size), borders and colour highlighting. Merge cells together to improve page layout. Add comments to a cell.</p>	<p>Prepare exercises in merging cells and adding comments to cells.</p>
14c(iii)	Adjust row, column and cell sizes so that all data, labels or formulae are visible	<p>Refine skills in adjusting the row width and column height to ensure that all data and labels are fully visible. Re-adjust after changing to formulae view if necessary. Use 'best fit' features of the software if available.</p>	<p>Prepare exercises in adjusting row and column widths using the features of the software available.</p>
14d	Select subsets of data using more than one criterion	<p>Select subsets of data from provided spreadsheets or calculated lists using AND, OR, NOT, <, >, =, >=, <=, Wildcards and string matching. Ensure examples used contain multiple search criteria. These searches must include numeric cells, text, date and time. Students should be able to extract the specified data only.</p>	<p>Provide sample spreadsheet models that can be used for the extraction of subsets of data.</p>
14e	Sort the data using one criterion or two criteria	<p>Practise sorting the data into ascending or descending order on alphanumeric data, numeric data, date and time.</p>	<p>Provide sample spreadsheet models that can be used for sorting using different data types.</p>

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14f(i)	Use the display features of the package to produce an electronic or printed report with selected data only	Use many of the features above to produce electronic or printed reports showing values/formulae, displaying data in full with no truncation or wrapping (unless specified). Practise using headers and footers, and utilise extracts to produce other formats of output, like label production. Use features like fitting to page, fitting to n pages wide and m pages high. Display only selected extracts of the data, display validation rules used, use screen shots, show and hide row and columns or just their headings.	Exercise developed to include many other features from section 14 as reinforcement and to use different display features.
14f(ii)	Export the data into a format that can be used in a different package	Export the data into a common text format (like .csv .txt or .rtf). Export data into a graph/charting package to be used for the production of graphs or charts. A resource can be developed using a search engine to find 'spreadsheet data entry exercise'. The material can then be adapted to suit the specific topic being taught.	