Lecture 8 – Spreadsheets: Uses and Pitfalls

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Objectives

- **To investigate the history of spreadsheets**

- **To understand the different ways that people use spreadsheets**

- **To understand how spreadsheets work**

- **Today's practical**
  - **Further Powerpoint and Presentation Preparation**

History of the Spreadsheet

- **Spreadsheets are important in the history of the personal computer**

- **"Visicalc" program**
  - **Written by Dan Bricklin**
  - **Released in 1979 for the Apple][computer for $100**
  - **Based on paper sheets used for financial modelling**
  - **Eventually become Lotus 1-2-3**
  - **Very successful product**

- **Important because people bought Apple computers just to run Visicalc**

Financial Modelling

- **Visicalc was based on large sheets of paper, printed with grids**
  - Used by financial companies to look at the effect of different prices, sales etc.
  - Completed by hand
  - Recalculated if anything changed

- **Still a major use of spreadsheets**
  - Financial planning
  - Business plans
  - Cost / benefit analysis

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Financial Modelling Alternatives

- **Not many!**

- **Some accounting packages provide modelling**

- **Part of some Enterprise Resource Planning (ERP) packages**

- **Many add-ins for Excel (from Microsoft and others)**

Spreadsheets for Form Filling

- **Probably the most common use – Expenses Claims**
  - **Automatic calculation of totals**
  - **Separation of VAT**
  - **Checking claim limits**
  - **Adjusting mileage claims**
  - **Formatting and printing for signature**

- **Other similar uses**
  - **Overtime claims**
  - **Simple invoices**

Form Filling Alternatives

- **Specialist tools for particular purposes**
  - **E.g. Oracle based time recording system**

- **Form filling software**
  - **Adobe Acrobat**
  - **Digital signatures**

- **Workflow Systems**
  - **(IBM) Lotus Notes**

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Spreadsheets for Presentations

- **Spreadsheet for basic data entry**
- **Graphing tools to create charts**
- **Often embedded in other documents**
  - **Presentations**
  - **Word processing documents**

- **Can also be useful for organising data in a tabular form**
  - **E.g. Table of the Elements**
  - **But Word Tables are probably better for this**

Presentation Alternatives

- **Not many for chart creation**
  - **Other than special purpose mathematical tools**
    - **Mathematic**
    - **MATLAB**

- **For tabular information**
  - **Use a Word Processor**
  - **Use (X)HTML Tables**

- **Remember, large tables and complex charts do <u>NOT</u> present well**

Spreadsheets as Databases

- **Good for "simple" data**
  - I.e. data is all of the same "type"
  - Can be entered into a single sheet
  - Like one table of a database
- **Can sort and filter data**
- **Can use data entry screen**

- **Can be used for more complex data**
  - Other types of data in other sheets
  - Cross referenced / index links to other data

- **Access or other true database package better**

Database Alternatives

- **Databases!**
  - Oracle

- **Simple flat file database packages also available**

- **Database tools included in Integrated Development Packages**
  - E.g. Visual Basic
  - Delphi

Spreadsheets for "Data Mining"

- **A large amount of data is loaded onto multiple sheets**
  - Usually from a large Oracle or Access database
  - For example sales data by product, region and time

- **Spreadsheet tools used to find "patterns" or "features"**
  - Regions with high sales, times with low sales, etc.
  - Tools include charts & graphs
  - Outlining tools
  - Pivot tables and charts
  - Sometimes collectively known as OLAP
    - On-Line Analytical Processing

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"Data Mining" Alternatives

- **Add-ons to database systems**

- **"AI" packages to find patterns**
  - **Using heuristics, statistical and other techniques**

Spreadsheets for doing sums!

- **Used like a calculator**
- **Allows us to try out different values**
- **Like financial modelling but much simpler**
- **Can solve some mathematical problems**

- **There are some tools for this**
  - **Goal seeking**
  - **Scenarios**

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Alternatives for doing sums

- **A calculator!**

- **Mathematical packages**

- **General programming languages**
  - **Especially interpreted (scripting) languages**

How Do Spreadsheets Work?

- **A spreadsheet is a (sparse) grid of cells**
  - **Empty cells do not occupy any memory space**

- **Cells contain formulas**
  - **Can be simple numbers**
  - **Can contain calls to functions { like `log()` }**
  - **Can contain references to the contents of other cells**

- **Internally, the spreadsheet maintains a list of "dependencies"**
  - **Which cells refer to this cell**
  - **If this cell changes, recalculate the dependent cells**

- **The spreadsheet checks for circular dependencies**

Spreadsheet Pitfalls

- ## The "Spurious Credibility" Problem
  - Any spreadsheet or chart is only as good as the underlying data
    - Much data is incomplete, estimated or just plain wrong

- ## The Precision Vs Accuracy Problem
  - 14 digits after the decimal point make your answer precise, NOT accurate
  - A "rough guess" can be more accurate (& useful)

- ## The "Prototype" Problem
  - Useful and exciting prototypes can be developed very quickly using a spreadsheet
  - Scaling that prototype so that it can obtain accurate data every day / week / month is much harder

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Today's Practical

- **Advanced Microsoft Powerpoint**
- **There is a lot of material to cover – you may NOT be familiar with all of it**

- **Time to work on your presentations for next week**

- **<u>REMEMBER TO SIGN OFF ON THE REGISTRATION SHEET!</u>**

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