Computer Science – Lecture 4
Introduction to Spreadsheets

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Objectives of the Lecture

- To investigate the history of spreadsheets
- To understand the different ways that people use spreadsheets
- To understand how spreadsheets work
- To use spreadsheets ourselves

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

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

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

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

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
  - (We will NOT be covering these)

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
  - (We won't be covering these either!)

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

This Week's Practical – Excel Basics

- Entering data in cells
- Editing existing data
- Selecting cells
- Formatting cells
- Adding cell contents
- Other arithmetic operations
- Inserting, deleting and moving cells