The 1st Killer App. VisiCalc

- The idea for the electronic spreadsheet came to me while I was a student at the Harvard Business School, working on my MBA degree, in the spring of 1978. Sitting in Aldrich Hall, room 108, I would daydream. "Imagine if my calculator had a ball in its back, like a mouse..." (I had seen a mouse previously, I think in a demonstration at a conference by Doug Engelbart, and maybe the Alto).

- And "...imagine if I had a heads-up display, like in a fighter plane, where I could see the virtual image hanging in the air in front of me. I could just move my mouse/keyboard calculator around, punch in a few numbers, circle them to get a sum, do some calculations, and answer '10% will be fine!'" (10% was always the answer in those days when we couldn't do very complicated calculations...)

- Source: www.bricklin.com/history/intro.htm

Development

- Background
  - Dan Bricklin and Bob Frankston

Design

- Visible Calculator
  - Organize calculations as we would on paper - in columns and rows.
  - Supports automatic updating of calculations.
  - Copy formulas so we may apply these to large amounts of data.
Microsoft Excel - Overview

- Used to represent a table of data
  - Rows (labelled with numbers)
  - Columns (labelled with letters)
  - Cells

Changing appearance of cells

- Alter Size
  - Click on cell separator and drag

- Add Borders
  - Format Cell

- Add Shading
  - Format Cell

- Font
  - Style
  - Size
  - Alignment

- Numbers
  - Decimal points

Entering Data

- Cells contain
  - Text
  - Numbers
  - Formulae (start with ‘=’)

- Entry box
  - Type data in entry box
  - Hit Enter key to accept value
  - All formulae are recalculated
  - Results shown in each cell

Formulae

- Entering formulae
  - Always begin with an equals sign
  - Calculation typed into entry box
  - Result displayed in the cell
### Using Cell References

- **Cell Reference**
  - Formulae refer to other cells
  - Specify cell location using Row and Column IDs

### Filling Down and Filling Right

- **Save time**
  - Fill many cells with same contents
  - Select a group of cells
  - Fill Right
  - Fill Down

### Filling Cells with Formulae

- **Use Fill Down/ Fill Right on formulae**
  - Saves us entering new formula for each row

### Relative References

- **Cell reference in formula**
  - Use same formula, different cell references
  - Cell reference is relative to position of formula
  - Spreadsheets adjust formula automatically during fill operation
Cell references that don’t change

- **Absolute references**
  - Sometimes the cell reference should not change
  - Eg. for constants
  - Use a dollar sign $ before the row or column

![Formula stays the same](image)

Relative and Absolute references

- Sometimes formulae require a mixture of references that change and references which are fixed

![Formula](image)

Exercises

**Exercise 1:** Is the reference to cell D6 in the formula =D$6*2 a relative or an absolute reference?
- An absolute reference

*Imagine that you are keeping track of the sales for tickets at the Olympic games. A number of different sports are located in different venues. Each venue has a number of seats available. Your spreadsheet will keep track of the number of tickets available and the number actually sold.*

**Exercise 2:** Given the following spreadsheet, what formula would you use in cell D6 to calculate the number of tickets remaining?

![Spreadsheet](image)

**Exercise 3:** What formula would you use in cell E8 to calculate the money made from ticket sales?

![Spreadsheet](image)

**Exercise 4:** What formula would you use in cell B11 to calculate the total number of tickets available?

![Spreadsheet](image)
Using built-in functions

- Insert a Function
  - Many categories
  - Help is useful

Functions

- Many functions exist
  - Allow us to make more complicated formulae
  - Examples
    - SUM
    - MAX
    - MIN
    - AVERAGE

- Specifying a range of cells
  - Top Left cell
  - Bottom Right cell
  - B6:C10

Functions

- Format of Excel functions:
  =nameOfFunction(comma separated list of parameters)

- Examples:
  =SUM(5, 6, 7)
  =AVERAGE(A2:D2)

Boolean Logic

- Boolean value
  - True or False
  - 2-valued logic

- Compare two different values
  - =
  - >
  - <
  - >=
  - <=

- Example. Are the following true or false?
  - =3 < 4
  - =4 < 6
  - =MAX(5, 6) = 5
  - =SUM(1,2,3) = 6
IF functions

- **Makes a decision**
  - Different values used in the cell depending on the logical test

- **IF( logical_test, value_if_true, value_if_false )**
  - Must be either true or false
    - value
    - condition (test)
    - boolean function
  - This value appears in the cell if the boolean is true
  - This value appears in the cell if the boolean is false

Boolean Functions

- **AND( a, b )**
  - True only when a and b are both true

- **OR( a, b )**
  - True if either a is true or b is true

- **NOT( a )**
  - True only when a is false

- **Are the following formulae TRUE or FALSE?**
  - =AND( 3 = 4, 2 = 2 )
  - =OR( 7 < 5, 3 > 3 )
  - =NOT( 3 = 2 )
  - =OR( AND( 2 = 3, 4 > 3 ), NOT( 2 = 3 ) )