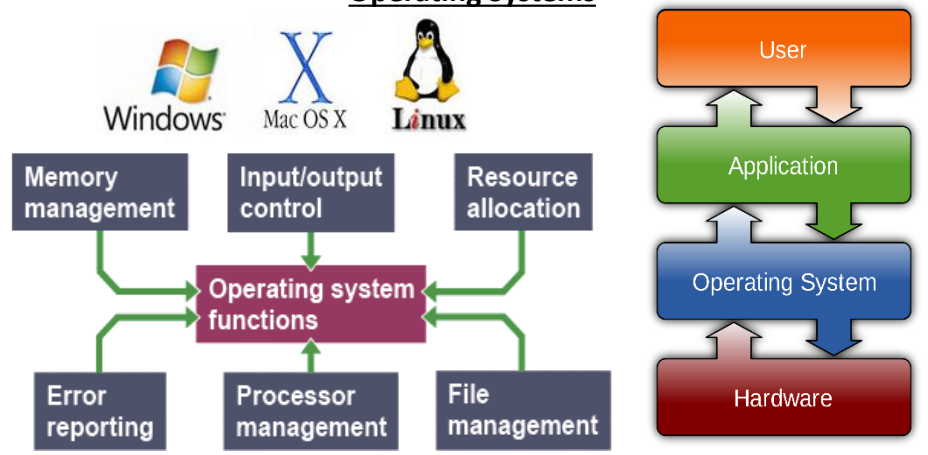
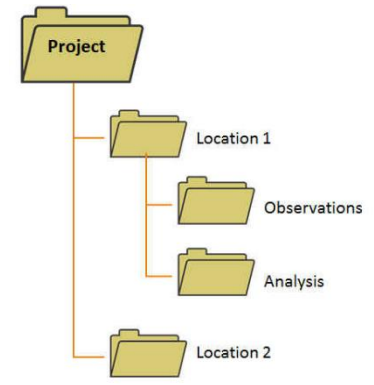
# Operating Systems

| KEY VOCABULARY | |
|---|---|
| Operating systems (OS) | Collections of programs that tell the computer hardware what to do. |
| User interface | The means of communication between the user and the computer. These are typically either *command line* or *GUI.* |
| Command Line | The most simple form of user interface where users type commands into a prompt |
| Graphic User Interface (GUI) | Most modern computers have a GUI, which uses icons to represent the programs and files. The user runs the programs through a touch-screen or mouse-controlled pointer |
| Voice Command | Increasingly users are able to speak commands to devices such as Google Home and Amazon's Alexa |
| Memory management | The OS controls available memory, moving programs to and from secondary storage to RAM |
| Multitasking | Often users have more than 1 program running at once. In reality, each CPU core can only carryout 1 task at a time, but the OS alternates between the programs to make it appear that multiple tasks are running simultaneously |
| Peripheral management | Computers must communicate with a range of external devices such as printers, monitors and scanners (peripherals). The OS uses *drivers* to correctly pass data to the device and ensure correct function. |
| Drivers | A driver is a piece of software which provides communication between the CPU and a peripherals device |
| User management | Multiple users can have accounts on the same computer, each with their own files, settings and applications, protected with passwords. The OS will ensure that only users who are granted permissions can use files or programs belonging to other users. |
| File management | Computers store files and data in hierarchical folder systems. This is efficient and allows for quick navigation |

## Operating Systems

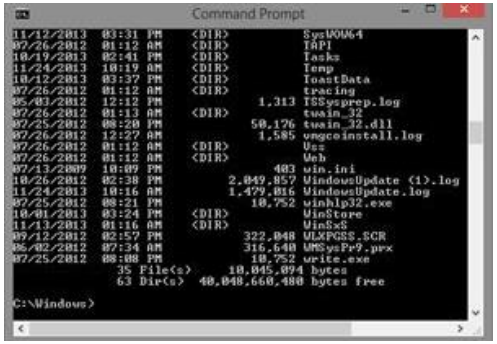



## File Management




## User Interface

Windows Command Prompt



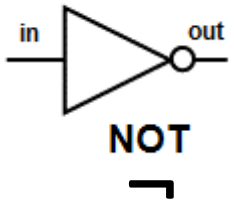

Apple Graphical Interface

# Computer Logic

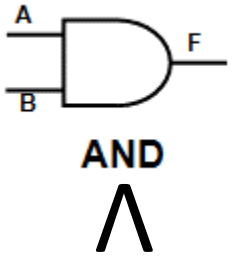
| KEY VOCABULARY | |
|---|---|
| Logic | A system designed to perform a specific task according to strict principles. |
| Logic Gates | The physical switches inside an electronic device which are able to perform the calculations a computer needs to carry out on electronic signals |
| Truth Table | A tabular representation of the possible inputs and outputs from a given logic gate, or collection of gates |
| Boolean | Mathematical *TRUE or FALSE* |
| Operator | A mathematical symbol in computing |
| + | Addition [ 1+2=3 ] |
| - | Subtraction [ 2-1=1 ] |
| / | Division [ 5 / 2=2.5 ] |
| * | Multiplication [ 2 * 2 = 4 ] |
| ^ | Exponentiation, raising a number to the power of… [ 3^3 = 3 * 3 * 3 = 27 ] |
| MOD | Modulus division. To divide a number by another, but only return the *remainder* [ 10 MOD 3 = 1 ] |
| DIV | Integer Division. To divide a number by another, but only return the *number of full sets.* [ 10 DIV 3 = 3 ] |

LOGIC GATES

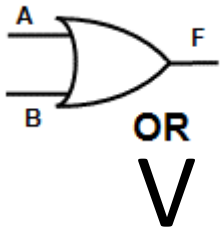
These gates take inputs (usually labelled A, B, C etc, and provide a single output. In this case labelled F, but could be another letter. Each gate is shown with its TRUTH TABLE




| Input | Output |
|---|---|
| I | F |
| 0 | 1 |
| 1 | 0 |



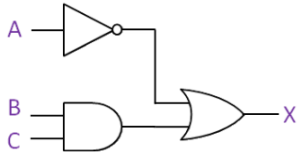

| Inputs | | Output |
|---|---|---|
| A | B | F |
| 0 | 0 | 0 |
| 1 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 1 | 1 |




| Inputs | | Output |
|---|---|---|
| A | B | F |
| 0 | 0 | 0 |
| 1 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 1 | 1 |

COMBINED GATES – Logic gates can be combined in any order to provide a range of computational possibilities. Inside a CPU, the physical switches are logic gates, and but combining them in different sequences, computers can undertake incredibly complex mathematics with these very simple tools.

( NOT A ) OR ( B AND C )




| A | B | C | NOT A | B AND C | X = (NOT A) OR (B AND C) |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 1 | 0 | 1 |
| 0 | 1 | 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 0 | 1 | 1 |