Windows Operating System & Command-line interface

Week 8

Dr. Martin Jackson

Learning Outcomes

By the end of this lecture you will:

- Understand the Windows operating system and its function
- Be familiar with both graphic and text based system manipulation
- Be familiar with text based command line functions (Microsoft Windows)

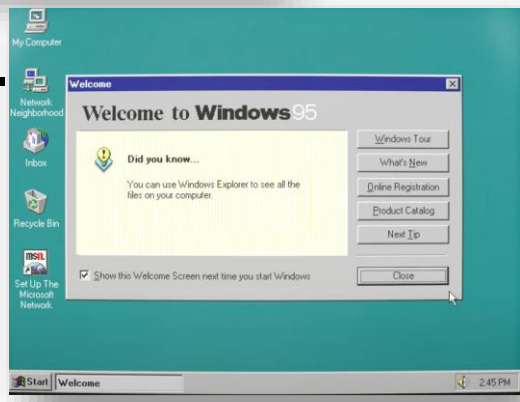
History of the Windows Operating System

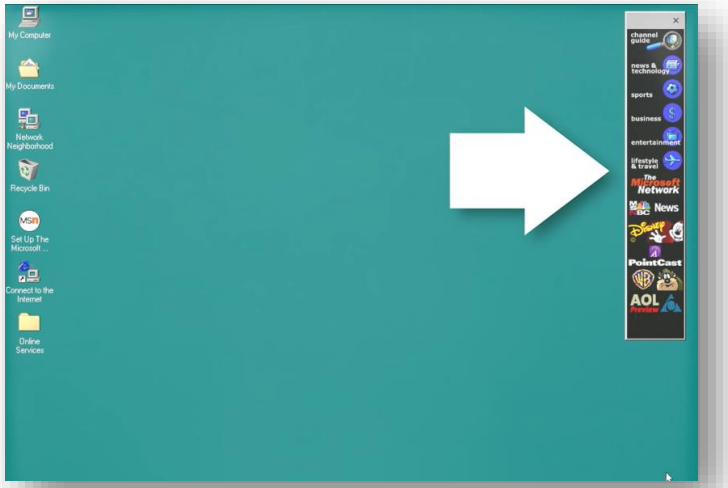
- **DOS** - is a platform-independent acronym for Disk Operating System
- **MS-DOS** – Microsoft's disk-based operating system (1981)
- All application software ran on top of the operating system, including Microsoft's Windows.

  (MS-Windows = separate application that provided a graphical user interface and tools)

Windows 95 & 98

- In 1995, Microsoft released **Windows 95** that was both an operating system and graphical interface.
- Windows 98 was a supped up version of Windows 95. but was so buggy they had to release Windows 98 2nd Edition.





2000 Rough year for Windows.

Windows 2000 - Stable than 98 but a lot of Security issues.
Windows ME - Unstable OS with a lot of system crashes


Sep 5, 2020, 05:43am EDT | 19,669 views

20 Years Ago Microsoft Released The Worst Windows Ever: Windows Me

Barry Collins Contributor
Consumer Tech
I am a consumer tech expert writing about Windows, PCs, laptops, Mac, broadband and more.

Every set back is opportunity to do better.

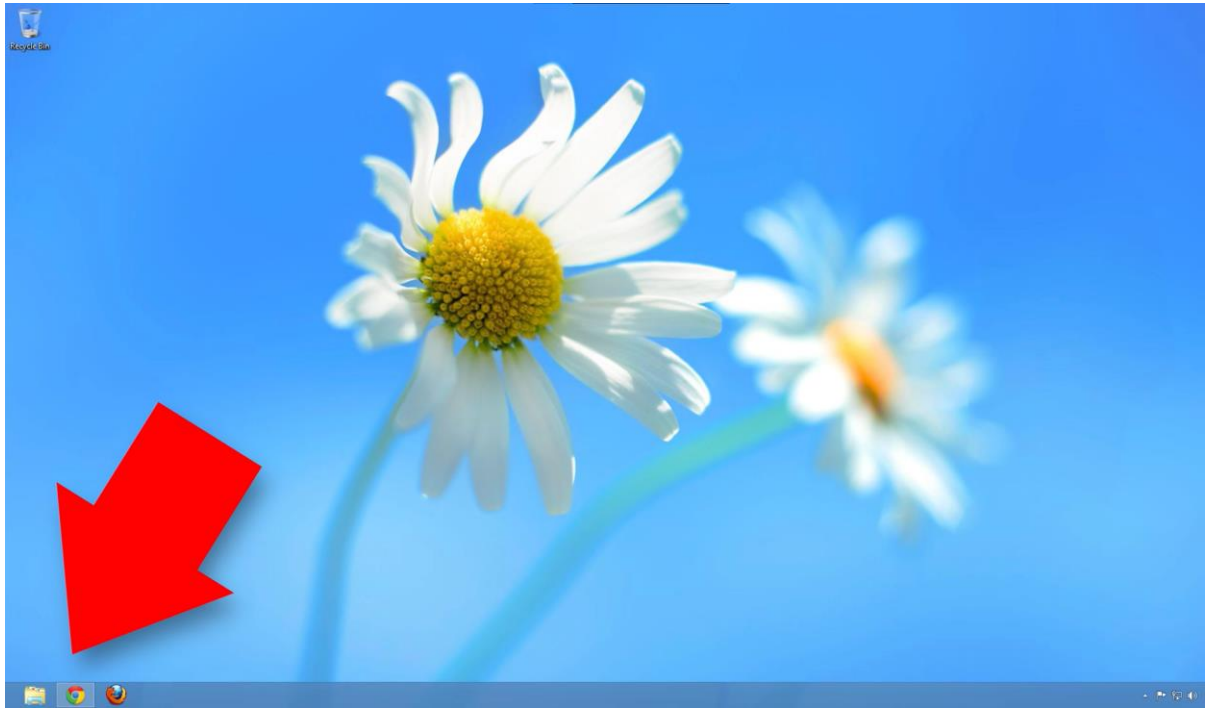
Boom!! The Legendary OS.

Supported NTFS file system for high capacity high drive and 64 bit edition.

Windows Vista and 7

Windows Vista and Windows 7 both looked visually similar. One flopped one Succeeded. WHY?

Windows ??

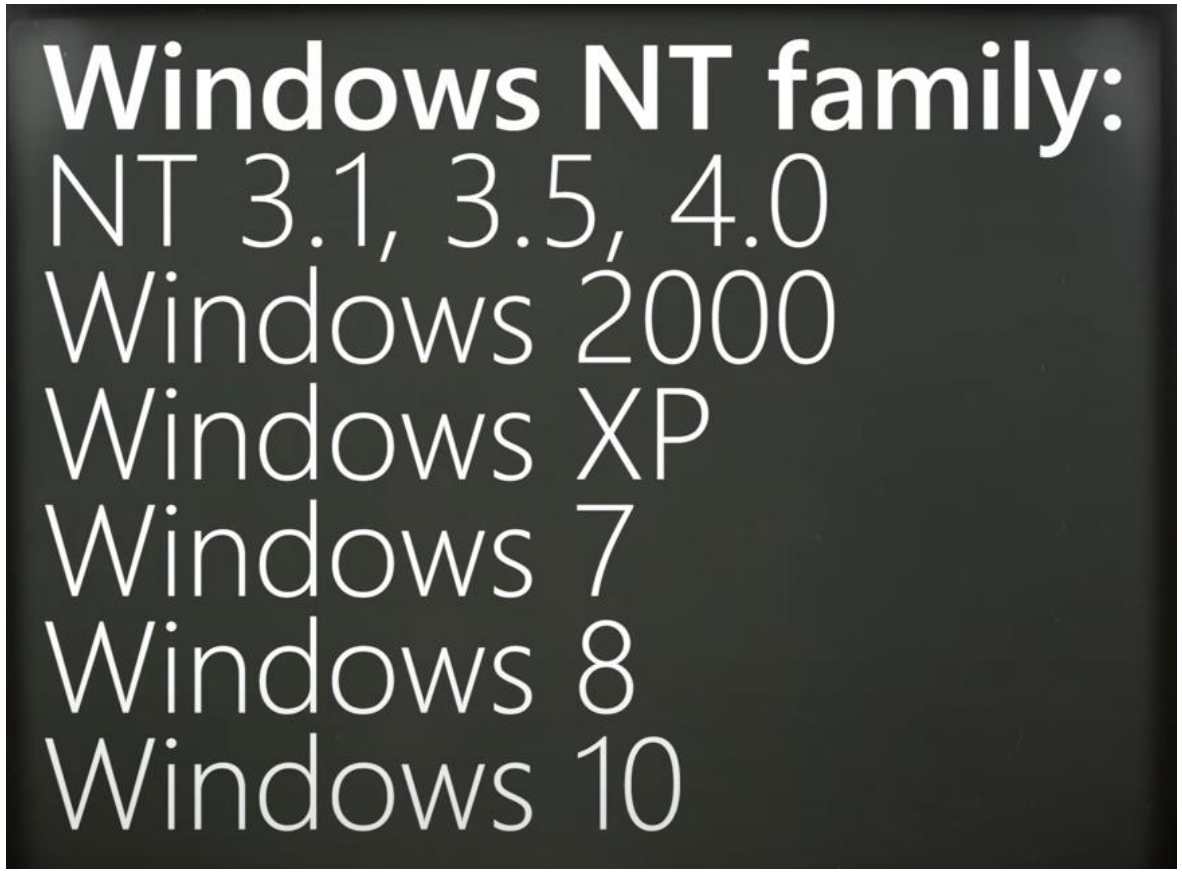


Windows 8 was one of the main reason for the success of Windows 7.
Windows 8 focused more to tablet and it had Start screen instead of Menu.

Here we are

- Windows 10 and 11
  - Windows 10 released in 2015
  - Windows 11 released in 2021

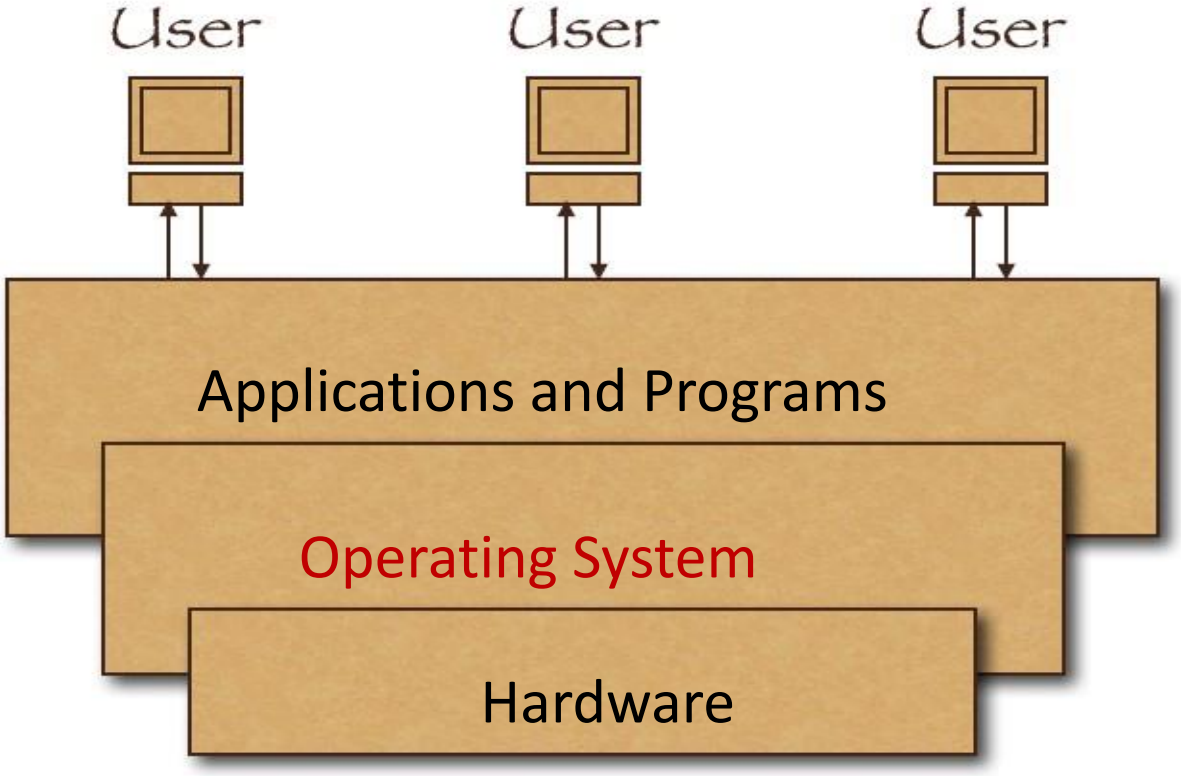
New Technology Family



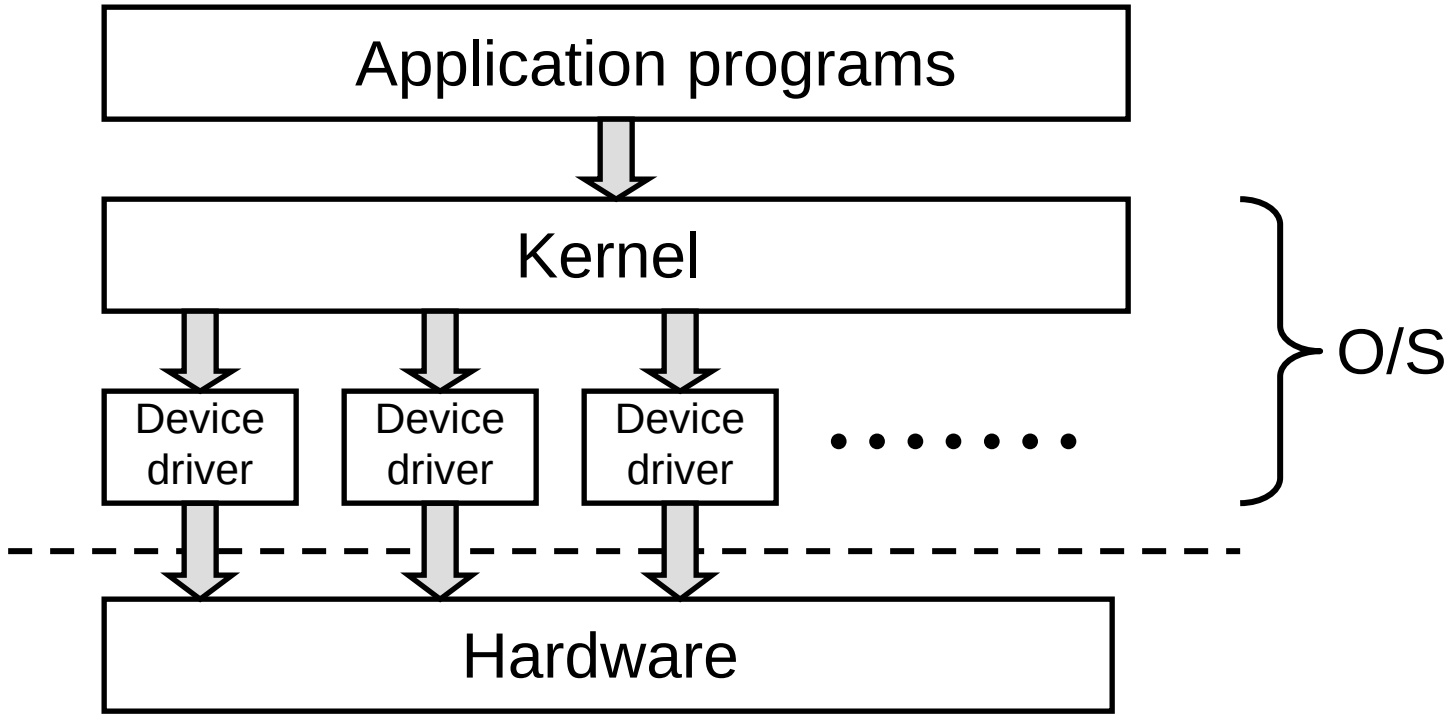
What does an Operating System do?

- It acts as a Resource Manager
- It Provides services for the applications installed (executable software)
- Its key goals are:
  - **Efficiency**
  - **Usability**

Where Does the Operating System Fit?



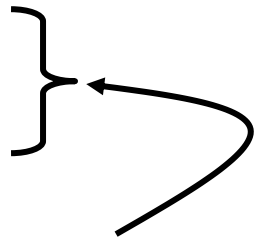
The Kernel



- Kernel - "The software that contains the core components of the operating system."

Talking to the Operating System

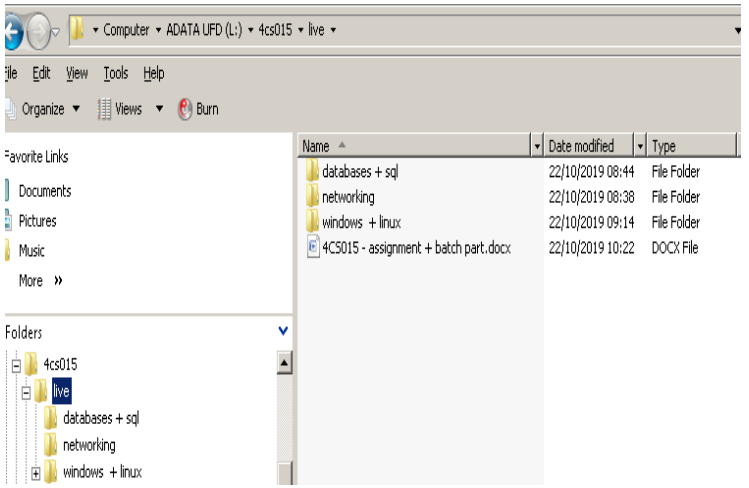
- Program wants to:
  - Read data from disc
  - Display data on screen



- O/S can do these things
- The program communicates with O/S using a System-call
  - a **system call** is how a program requests a service from an operating system's kernel

File System

- All software applications require the use of a file system for operation
- The file system contains names and locations
- This will include a directory structure, made up of –
  - Directories (sub-directories)
  - Files (of different types e.g.)
    - .EXE (executable)[windows]
    - .DOCX (word)[windows]



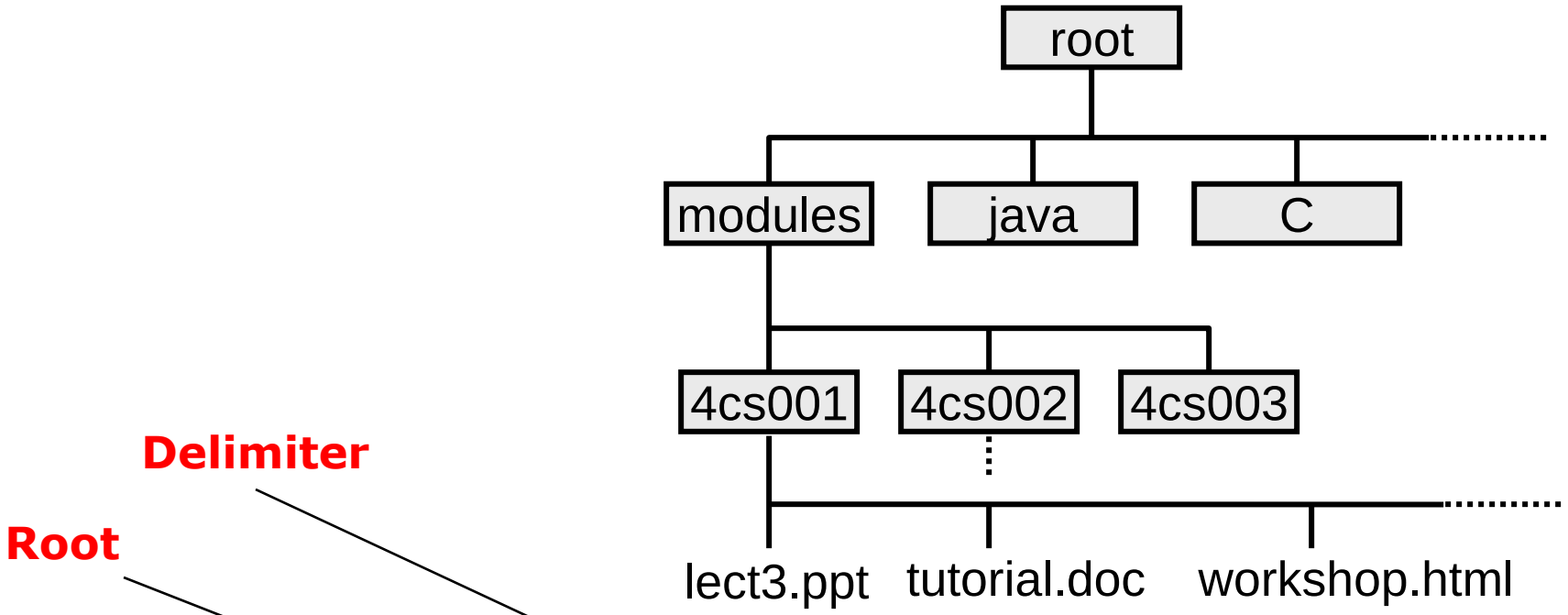
Why are there many File Systems

- Different file systems have different ways of organizing their data.
- Some file systems operate faster than others
- Some have additional security features
- Some are geared towards large storage capacity
- Some file systems are more resistant to file corruption

File System development

- There is usually a trade-off between many of these features:
  - **Robustness ←→ Speed**
  - **Cost (*always a major factor*)**
- There's **no-one** best file system for all uses
- The overall goal for system developers is:
  - **Speed (*faster*)**
  - **More stable (*blue screen of death*)**
  - **Scalable (*increase size and type of device*)**
  - **New functionality and features (*usability*)**

File System: Example



Windows - c:\modules\4cs015\lect3.ppt

Linux - /modules/4cs015/lect3.ppt

File System

- Think of it as a filing cabinet.

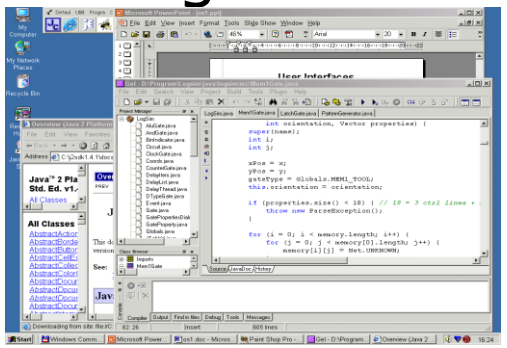
Each drawer is the equivalent to a **DRIVE (eg. C: E:)**

Each **DRIVE** contains folder(s) (**DIRECTORIES**) which contain individuals **FILE(S)**

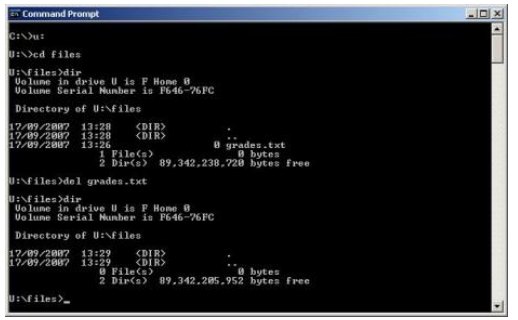
A file

Using the OS (Windows)

- The user tells the O/S what to through the **User Interface** -
  - Graphical
  - (**windows** + mouse)



  - Text based
  - (**command line** + type)
  - [cmd]



- If using the command-line option a shell command(1 line) or script(multiple lines) is used
- This script is interpreted (by the command line interpreter) and then actioned by the operating system.

Text Based User Interfaces

- Using the Command Line Interpreter (CLI)
  - Uses keyboard and screen/window for all interaction
  - Runs (executes) as a program and waits for user to type in commands (if required)
  - Some functions are very powerful and extremely useful *(can be dangerous / powerful – if used incorrectly – delete or format drives)*

Command Line Interface Features

- User commands
  - Manipulate file system - copy, delete, rename files and directories, etc.
  - Run programs, etc.
- Input/output redirection
  - Input to program can be redirected from keyboard to file
  - Output from program can be redirected to a file instead of display

    e.g. **`dir > filelist`**

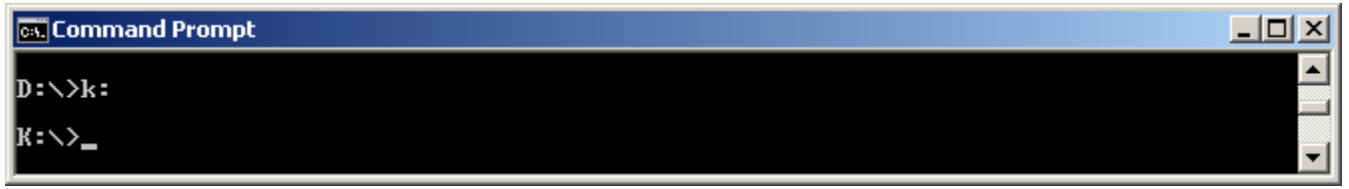
How to use Windows OS CMD

- Starting CMD -
  - Click: start
  - Type: cmd
  - You will be presented with the command-line interface (the wordage content will differ)

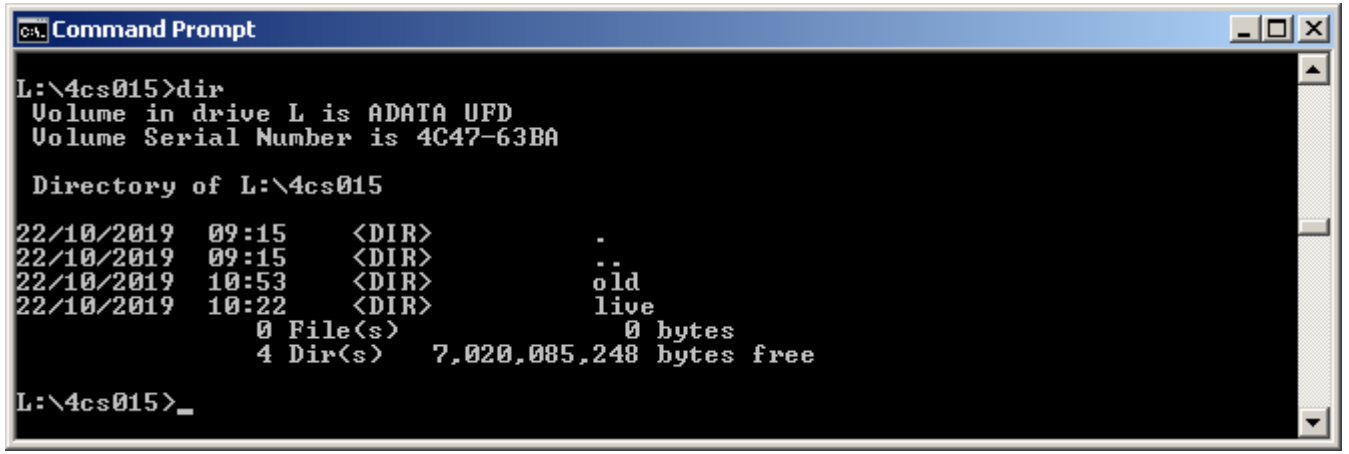
- Remember –
  - Command lines are ***not*** case sensitive
  - When a file or directory is deleted it is ***not*** moved into the Recycle Bin.
  - If you need help type - **help**
  - If you wish to close the cmd-line window **- exit**

Features: Directory information (1)

- Changing drive (from d to k) = k:



- Listing directory contents = dir

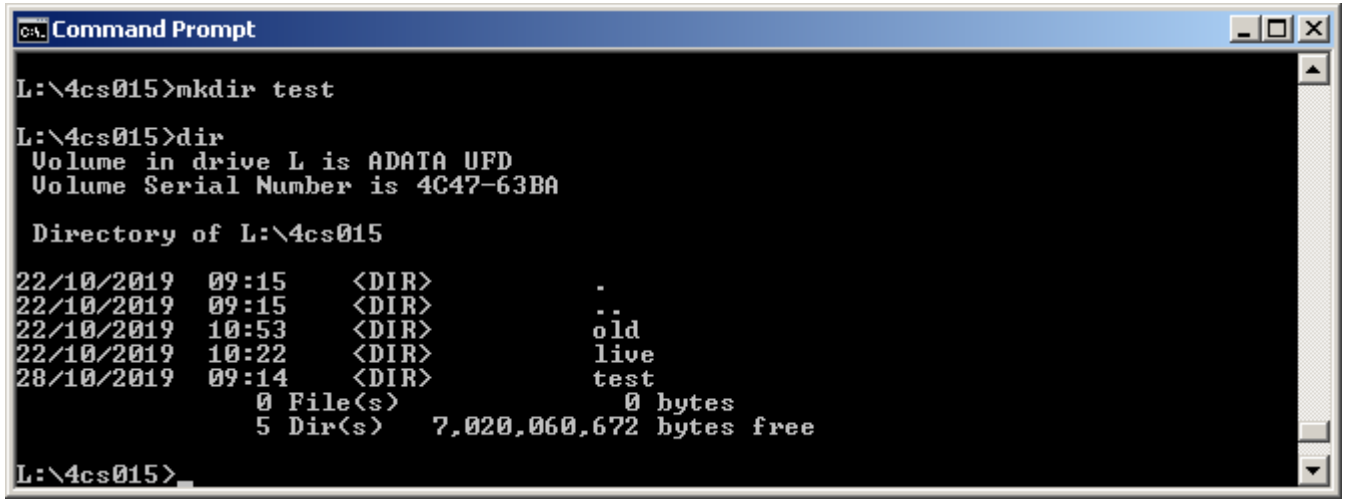


- The . & .. are current and parent information respectively
- For help type (many switches available) = dir /?
- To changing into a directory = cd old

Features: Directory information (2)

- Wildcards = dir o*

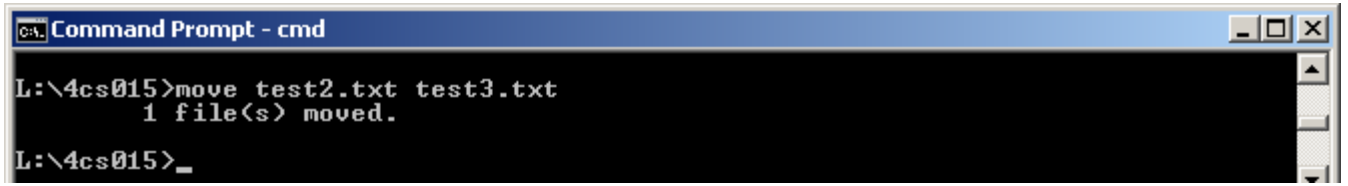
- Make a directory = mkdir test



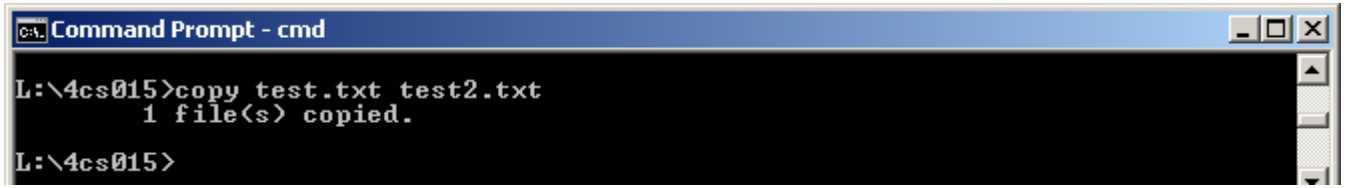
- Remove a directory = rmdir test (or :) rd test

File Manipulation (1)

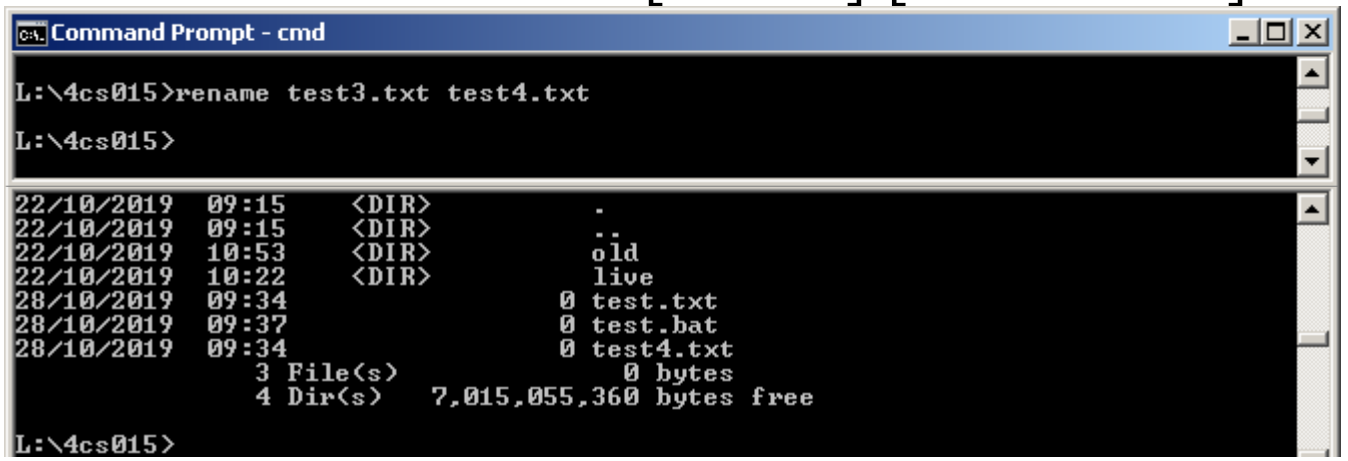
- Move file = **move** [source] [destination]



- Copy file = **copy** [source] [destination]



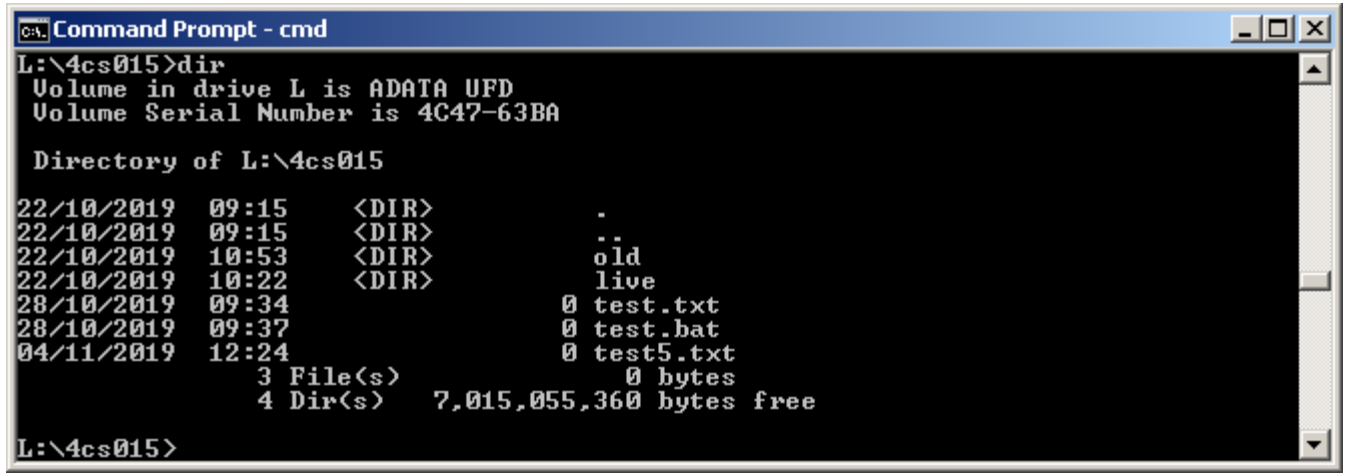
- Rename file = **rename** [source] [destination]



File Manipulation (2)

- Delete file = del [filename]

- Create a file = software-package [filename]



System Interrogation and change

- Time [set new time]
- Date [set new date]
- Tree [show directory structure from current location]
- Tasklist [show all running processes and applications
- Taskkill [kill a process or application]
- Diskcopy [copy a drive to another] [diskcopy c: a:]
- Format [format a drive – killing all contents]
- Shutdown [close down the computer]
- Very powerful commands that can be used from the **command-line** or called upon from within **software**
  - Run application [e.g. C:\notepad.exe]
  - VB.NET, c#, etc
  - or Batchfile (e.g. C:\MyBatchFile.bat)
  - Examples coming up…….

Executing Applications

- Run a program = application-name
- e.g. notepad.exe
  - With or without [.exe]
  - With or without filename [with starts application only]

Software package used

Name of file to be created with **extension**

Understanding File Extensions

- The graphical interface provides an icon that helps the user identify the type of file (associated with the software used to open a particular file) -

File name, extension, date, type, & size

- Test.txt = text file (notepad)
- Test.docx = microsoft word file (word)
- Test.mp3 = sound file (anyplayer)
- Test.mp4 = video file (anyplayer)
- Test.jpg = picture file (Irfanview)
- Test.exe (.com or .bat) = system executable file

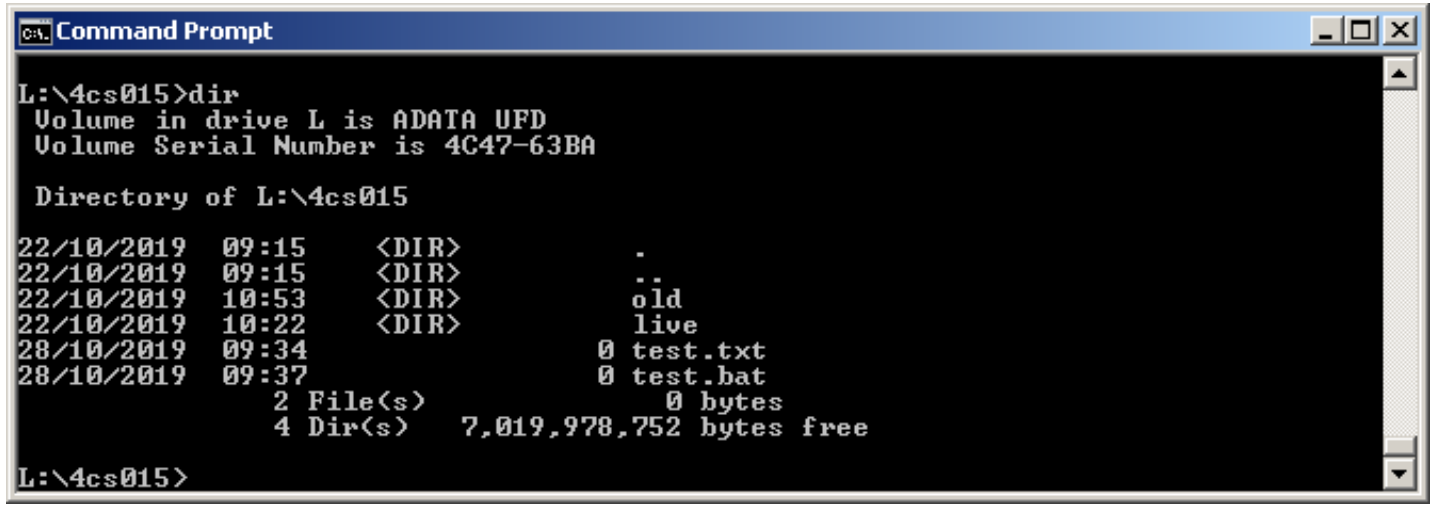
Executing cmd-lines from software

- **VB6**
  - Shell "cmd **dir**", vbNormalFocus
    [where dir = command-line function]
- **C**
  - #include <stdio.h>
  - int main() {
    - system("**dir**");
    - return 0;
    - }
- **Batchfile** *(see next slide for details)*
  - @ECHO OFF :: This batch file shows directory information
  - ECHO Please wait...
  - **Dir**
  - PAUSE

- **Any client-side executable software**

Batch Files (intro…..)

- A **batch file** is a script file in that can be run under Microsoft Windows.
- It consists of a series of commands executed by the command-line interpreter
- It is stored in a plain text file with a **.bat** extension
  - Creating a batch file = c:\notepad test.bat (executable)



Coming up…..

- **More on batch files in 2 weeks time……**
- **Next week**
  - **The Linux operating system……**
  - **Command line control……**

Summary

- Operating Systems (Windows)
  - Resource and service manager for the hardware
  - Graphical User Interface
  - Command Line interface
- The features of a file system
  - Directory structures
  - Files and files extensions
- How to use the command-line interface in the Windows OS
  - dir, rmdir, mkdir, etc.
- How to execute command-line functions from within other programs

Workshop

- Finish previous workshop material
- Start new material on command line control (graded)
  - Windows command line – 25%
  - Linux command line – 25%
  - Windows batch file control – 50%
- Portfolio – Submission date is week 12

How to use Windows CMD – Links

- https://www.computerhope.com/issues/chusedos.htm