SY110
Operating System Basics

Major Brian Hawkins, USMC

U.S. Naval Academy

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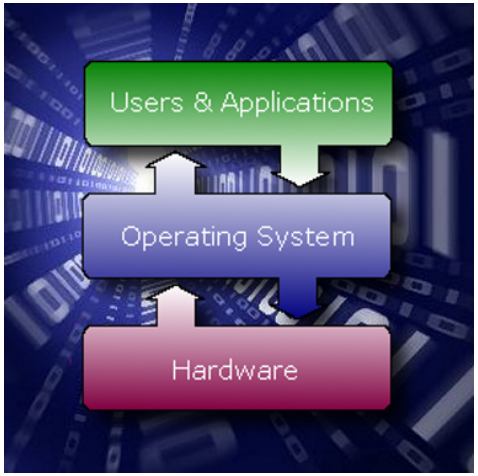
Outline

What is an Operating System?



High-level view

When we think of a computer, we can think of three major components:

- The user and the programs the user runs
- The Operating System (OS)
- The physical hardware itself

What is an Operating System?

What is an Operating System?

- Intermediary between the physical hardware of the computer, and the user & their applications
- A program (or collection of programs) that manage other programs on your computer

Example

- Double-clicking on Word icon
  - OS loads the instructions from the HDD necessary to run the program, display the Word user interface, etc
- Saving a Word document
  - Word asks the OS to create/modify the .doc file on the HDD.

Many OS Varieties

There are many, many different kinds of operating systems

- Microsoft Windows
- Unix/Linux (& the many flavors it comes in)
  - Linux is *open-source*
- Mac OSX
- iOS (iPhone/iPad/iPod)
- Android

OS Functions

What the OS does

- File operations – managing the storage-related peripherals like hard drives, flash drives, DVDs, etc.
- Network connections – manage data that is transferred over WiFi (wireless) or the computer's Ethernet (wired) port. A program that wants to send information asks the OS to do it.
- User accounts, permissions, and logins – ensures users log in properly and only have access to files/programs they were granted
- Processes – manages the programs that are running, divvies out CPU cycles

Discussion – The OS enforces security policy, but what if the OS has security flaws itself?

Accessing the OS

There are three ways that the OS can be accessed:

OS access

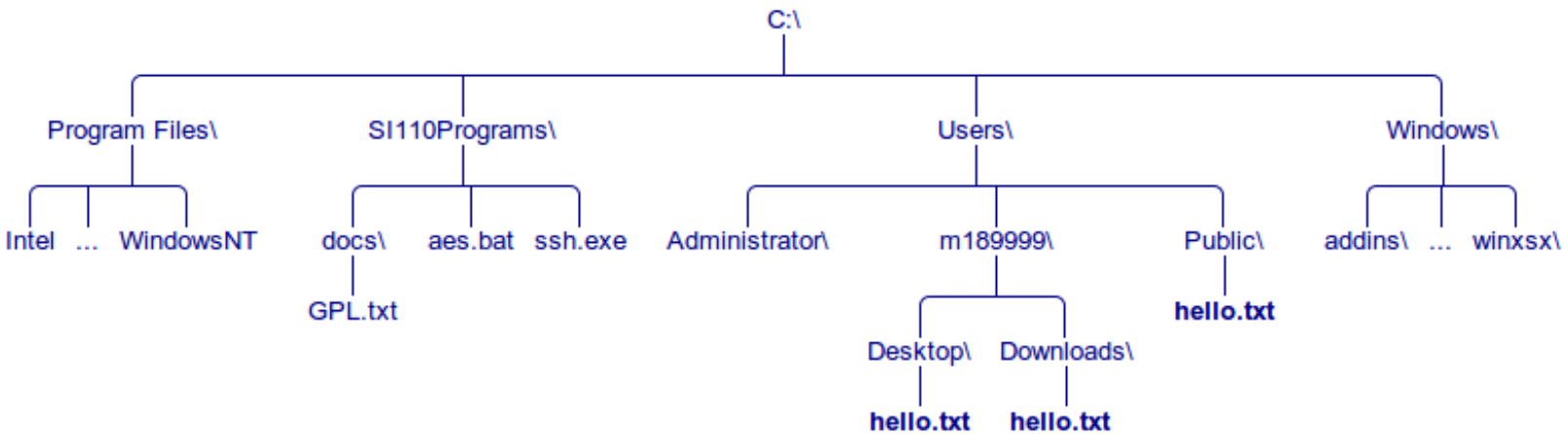
1. The GUI (Graphical User Interface) – How most people use an OS – pointing and clicking on the screen. This method is for users.
2. The Shell – An interface for commands to be entered as plaintext strings (recall ASCII) for the OS to execute. In Windows the shell is called the "Command Prompt". The shell is for both users and programs.
3. The API (Application Programming Interface) – The API is a means by which executing programs can communicate directly with the OS. The API is available only for programs.

Although most users are familiar with the GUI, we will using the shell often in this course (on both Windows and Unix OSes).

What is a file system?

A file system is a hierarchical organization of files and folders within your computer that allows for storage and retrieval of files. Different OSes have different file system structures.

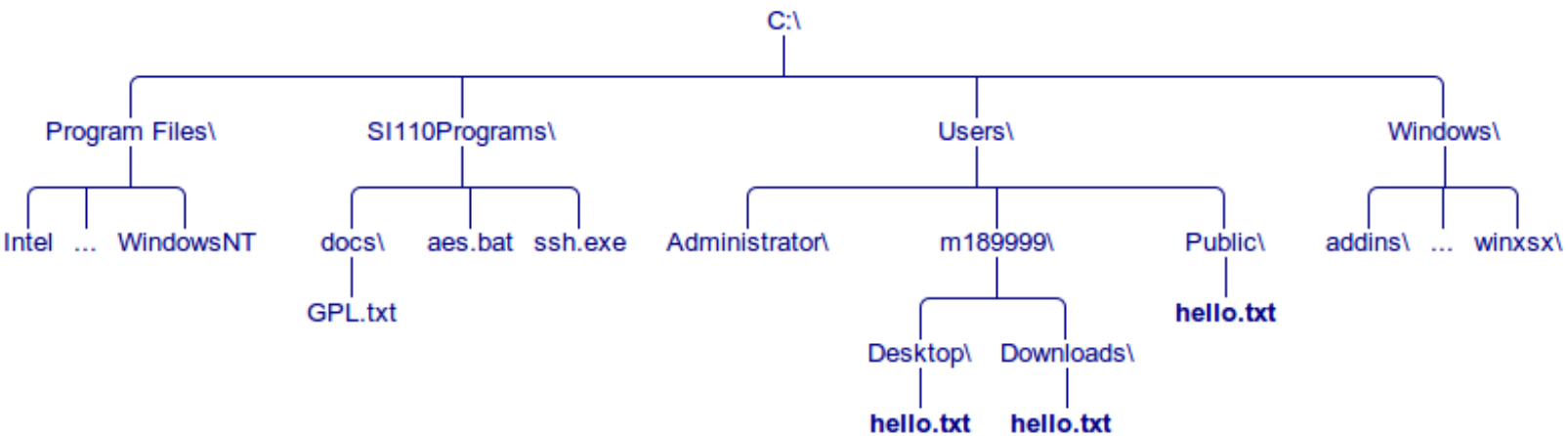
In Windows, the **root** folder/directory is a drive letter (usually "C:\"). Files and folders are hierarchically organized; every file is uniquely named by its **path**.



File Systems

For example, we have three files in this file system that are called "hello.txt". Their *paths*, however, are unique. The first two are:

- `C:\Users\m199999\Desktop\hello.txt`
- `C:\Users\m199999\Downloads\hello.txt`



File Systems

In Windows, there is a separate hierarchy for each drive letter, which correspond to different devices – `C:\` usually indicates the computer's hard drive, `E:\` may be your DVD drive, and `F:\` may be assigned to a camera or other USB device you plug in. Regardless, the hierarchical nature of each drive letter/file system remains the same.

Important locations

There are a few import locations on your computer to remember:

- Your "home" directory
  - `C:\Users\m199999`
- Your desktop
  - `C:\Users\m199999\Desktop`
- Your documents
  - `C:\Users\m199999\Documents`

Key Points

Make sure you understand the following points about file systems:

1. Files and folders are arranged hierarchically
2. Every file and folder on your computer has a place in the hierarchy
3. Every file and folder is uniquely named by its path
4. In a file viewer window in the GUI, you see the contents of one folder – the *currently working directory*, and the address bar describes the path to that directory

Questions

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