

# Software



## ICD 20



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# Software Layers



- Software can generally be divided into several layers for organizational purposes
  - Layer 1 – BIOS (Basic Input Output System)
  - Layer 2a – Operating System Kernel
  - Layer 2b – Operating System User Interface
  - Layer 3 - Applications

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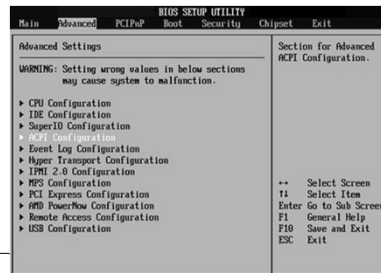
## What is the BIOS?



### Basic Input Output System

Including:

- Firmware (resides permanently on motherboard)
- Utilized during startup and initialization to test available hardware

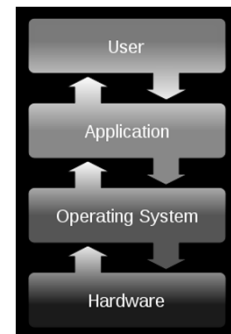


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## What is an operating system?



- Often called an O/S or OS
- 3 Main Functions
  - Manage files and resources (CPU, memory etc.)
  - Provide a user interface
  - Provide a platform for application software
- Consists of 2 parts
  - **Kernel** – Nucleus of software that communicates with hardware
  - **User Interface** – Software that is designed for user interaction



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## Managing Files



- Differences between operating systems?
  - Allowed characters, length of names, case sensitivity
  - File security
- Many different file & disk formats
  - FAT32, NTFS, HFS, EXT

<https://www.youtube.com/watch?v=KN8YgJnShPM>

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## User Interface



- Brings structure to the interaction between a user and the computer
- A program or set of programs that sits as a layer above the operating system itself.
- Two types
  - Graphical User Interface (GUI)
  - Text Based User Interface (Shell/Command Line)

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# GUI



## • Graphical User Interface

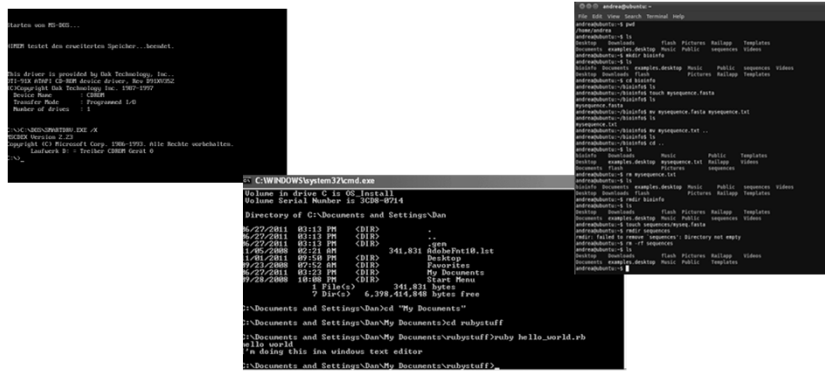


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# Shell/Command Line



## • Text Based User Interface



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## Types of Operating Systems



- **Real-Time Operating System (RTOS)**
  - For control machinery, scientific / industrial equipment
  - Little (if any) user interface
  - Good at doing something specific
  
- **Multi-Task Operating System**
  - The type most people have today
  - Designed for one person to do a variety of tasks, possibly at the same time
  - Ex: Windows, Mac OS, Linux