Operating System Services

- Operating System provides an environment for development and execution of programs and system services
- Operating System services that are helpful to the user, including
  - User interface
  - Program execution
  - I/O operations, which includes I/O devices
  - File-system manipulation
  - Communication, interprocess and over the network
  - Error detection in CPU, memory hardware, I/O devices, user programs

User OS Interface

- Graphical interface is common on workstations and mobile devices
- Command-line Interpreter (CLI) is one form of user interface
- Commands are sometimes built into Kernel and sometimes by system programs
- Provides support for scripting

System Calls

- Programming interface (API) to the services provided by the OS
- Typically written in high-level languages such as C or C++
- Three most common APIs are
  - Win32 API for Windows
  - POSIX-based systems, including virtually all Unix, Linux-based system and MacOS
  - Java API for Java Virtual Machine
Arguments for System Call

- Arguments to system calls can be passed using:
  - CPU Registers: many not have enough available registers
  - Stored in a memory block and the address of the block is passed to the system call
  - Pushed into the run-time stack by the user and popped by the OS
  - The last two methods are more flexible as they do not limit the size and the number of the arguments