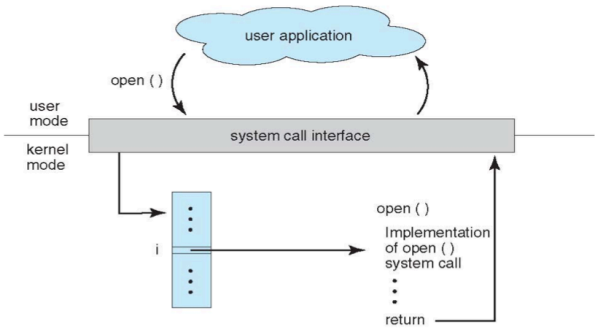
Ch.2 – OS Structures

- User Interface (UI) – Can be Command-Line (CLI) or Graphics User Interface (GUI) or Batch
  - These allow for the user to interact with the system services via system calls (typically written in C/C++)
- Other system services that a helpful to the user include: program execution, I/O operations, file-system manipulation, communications, and error detection
- Services that exist to ensure efficient OS operation are: resource allocation, accounting, protection and security
- Most system calls are accessed by Application Program Interface (API) such as Win32, POSIX, Java
- Usually there is a number associated with each system call
  - System call interface maintains a table indexed according to these numbers
- Parameters may need to be passed to the OS during a system call, may be done by:
  - Passing in registers, address of parameter stored in a block, pushed onto the stack by the program and popped off by the OS
  - Block and stack methods do not limit the number or length of parameters being passed
- Process control system calls include: end, abort, load, execute, create/terminate process, wait, allocate/free memory
- File management system calls include: create/delete file, open/close file, read, write, get/set attributes
- Device management system calls: request/release device, read, write, logically attach/detach devices
- Information maintenance system calls: get/set time, get/set system data, get/set process/file/device attributes
- Communications system calls: create/delete communication connection, send/receive, transfer status information



- OS Layered approach:
  - The operating system is divided into a number of layers (levels), each built on top of lower layers. The bottom layer (layer 0), is the hardware; the highest (layer N) is the user interface
  - With modularity, layers are selected such that each uses functions (operations) and services of only lower-level layers
- Virtual machine: uses layered approach, treats hardware and the OS kernel as though they were all hardware.
  - Host creates the illusion that a process has its own processor and own virtual memory
  - Each guest provided with a 'virtual' copy of the underlying computer
- Application failures can generate core dump file capturing memory of the process
- Operating system failure can generate crash dump file containing kernel memory