



Summary of Material to Know from Chapter 1

You are expected to know each of the topics below and to be able to expand on each.

1. What is an **Operating System** and what does it do?
 - Be able to identify what components are and what are not a part of the operating system, or describe what is not consistent about this.
 - Describe functionally what an operating system does - as a resource allocator and control program, and as a provider of a user interface and API
2. Computer system structure:
 - The components of a computer system: hardware, operating system, applications, users
 - A layered view of these components and what interacts with what
3. Organization of computer system - components and how they interconnect
4. What happens on system startup: describe the steps
5. Computer system operation - I/O devices, CPU, and memory and how they inter-operate
6. Common functions of interrupts, and use of traps and exceptions
7. Interrupts and interrupt handling
 - How source of interrupts is determined
 - How they are serviced
8. I/O structure:
 - How I/O happens in a system with interrupts
9. Storage structure and the storage hierarchy as seen via
 - Speed
 - Cost
 - Volatility
 - Capacity (including definitions of measurements of capacity)
10. Caching:
 - How it works at various levels of the hierarchy
11. **Direct Memory Access** and how it works
12. Computer system architectures - what are each of these:
 - single CPU
 - multiple CPUs - cores versus separate off-chip processors
 - asymmetric versus symmetric multiprocessors
 - multi-computers versus multiprocessors
 - clusters



13. Operating system operations:

- Multiprogramming
- Timesharing
- Swapping
- CPU Scheduling
- Virtual memory
- Exceptions and traps
- Dual mode operation: kernel mode and user mode
- System calls
- Process timers and time-outs

14. Process management and representation

- Definition of a process
- Resources needed
- Process termination
- Single-threaded processes
- Multi-threaded process has one program counter per thread
- Concurrency

15. Process Management Activities - what the various process management tasks are, such as

- memory management
- file system management
- process management
- mass storage management
- I/O management
- protection and security

16. Free and open source operating systems - define and give examples