Chapters 1, 2, and App A Questions

Questions may be asked in class, on quizzes, and on exams

• Questions you must be able to answer:

* 1、Explain why operating systems (OS) need to exist
* 2、Identify and describe three issues that drove the development of the earliest operating systems
* Horrendous, awful wires that needed to be plugged in;
* toggle switches were difficult
* Tedious step by step process done manually
* Significant set up time running a job
* 3、Identify and describe three solutions to problems that were occurring during the early development of OS
* Dedicated systems to shared computer systems
* The solution to the I/O problem of the CPU being left idle was overlapped I/O with magnetic tape units
* Control cards used to provide information directly to the monitor about what programs to execute next. Previously, the operator did that.
* 4、Explain how the OS manages the system CPU, including how the use of the CPU looks different between the user experience and the system management
* a computer system as consisting of hardware, software, and data. The operating system provides the means for proper use of these resources in the operation of the computer system
* the operating system is designed mostly for ease of use, with some attention paid to performance and security and none paid to resource utilization—how various hardware and software resources are shared.
* the operating system is the program most intimately involved with the hardware. In this context, we can view an operating system as a resource allocator
* 5、Explain how the OS manages computer hardware, including how it protects hardware from potential misuse
* the operating system is designed mostly for ease of use, with some attention paid to performance and security and none paid to resource utilization—how various hardware and software resources are shared.
* 6、Identify and briefly describe the four fundamental components of a computer system
* Hardware, os,application programs, a user
* 7、Identify and briefly describe three services that are provided by the OS to user applications
* Program execution: System has to be able to load program in memory, run it, & end it normally or abnormally (b/c of error).  
  \*I/O Operations: Since users can't directly control I/O devices the OS must provide a means to interact with I/O devices.  
  Error Detection: OS needs to detect & correct errors/
* 8、Explain how using interrupts helps with OS management
* **Interrupts** are signals sent to the CPU by external devices, normally I/O devices. They tell the CPU to stop its current activities and execute the appropriate part of the operating system.
* 9、Briefly explain the difference between a “dumb” terminal and a computer
* "dumb terminal" to mean a terminal without "intelligent" capabilities like cursor addressing
* A dumb terminal is simply an [output device](https://www.webopedia.com/TERM/O/output_device.html) that accepts [data](https://www.webopedia.com/TERM/D/data.html) from the [CPU](https://www.webopedia.com/TERM/C/CPU.html).
* A computer include a dumb terminal and an intelligent termianl
* 10、Briefly explain the difference between CLI, GUI, and batch operations

CLI: Command line interface. Uses text commands and a method for entering them(i.e., keyboard for typing in commands...) Faster performance because directly using commands.  
  
GUI: Graphical user interface. Most commonly used. The interface is a window system with a pointing device to direct I/O, choose from menus, and make selections and a keyboard to enter text. Good UI for users to pick up on because very visual. Can go through multiple folders and files at a time.  
  
Batch: Batch interface. Commands and directives to control the commands that are entered into files and then those files are executed. Good for direct line to files and folders.  
  
Some systems provide the user with two or three of these variations

* 11、Explain the benefits that CLI, GUI, or batch processing have over the others (e.g., CLI over GUI, GUI over batch processing, etc.)
* ew users will pick up a GUI much faster than a CLI. In a CLI, new users have some difficulty operating it because they are not familiar with the commands.With a CLI, users have all the control over file system and operating system, and the tasks become simple. For example, you can copy a file or several with one command. CLI over GUI is faster
* It generally has lower capital costs.
* It has the flexibility to produce a variety of different product variations, or different products.
* It works well when small production runs are needed, such as individual sandwich shops baking only the cookies they need.
* It is ideal for custom or seasonal orders, or trial runs of a new product.
* 12、Identify and briefly describe three system services and how they support the system
* 13、Identify and briefly describe three system calls
* \*File Management: creating a file (create()), open(), write().  
  \*Communication: translate the hostname to an identifier by which the OS can refer to the process (get\_hostid())/  
  **Protection:**get permission of setting resource such as file & disks (get\_permission()), allow user to access resource (allow user()). deny user access (deny user()).
* 14、Identify and briefly describe three ways to pass data to a system call

1. Parameters can be passed in registers.
2. When there are more parameters than registers, parameters can be stored in a block and the block address can be passed as a parameter to a register.
3. Parameters can also be pushed on or popped off the stack by the operating system

* 15、For purposes of OS design, explain the difference between “policy” and “mechanism”
* Policy determines WHAT will be done.  
  Mechanism determines HOW to do something.  
  For instance, you have a program that does web scraping, it's policy is to web scrape. And it's mechanism is how it will do it.
* 16、Explain the difference between a true layered OS and a microkernel OS structure
* This approach breaks up the operating system into different layers.
* This structures the operating system by removing all nonessential portions of the kernel and implementing them as system and user level programs
* 17、Explain the difference between a microkernel OS and a modular OS structure
* A modular operating system is built with its various functions broken up into distinct processes, each with its own interface
* 18、Explain the difference between a modular OS and a true layered OS
* 19、Explain the difference between a true layered OS structure and the way the original MS-DOS layered OS structure worked
* MS-DOS operating system is split into various layers and each of the layers have different functionalities.
* 20、Explain why an OS is thought to be a “mandatory middleman”
* Couldn't find term "mandatory middleman" in the book, but Google says:  
  On the one hand it forbids you to directly access hardware resources, you must talk to it first, on the other hand this simplifies most users lives as they would not need or want that direct access.
* 21、Explain what a virtual machine is and why it might be necessary

A virtual machine is an emulation of a computer system. Since you can run multiple VM's from a single platform that are each isolated from each other it could reduce costs for the need a physical hardware. For instance, you want to run a both linux and Windows Server, you would need two physical machines. But with VM, you would only need one machine running two virtual machines.