

Operating System Design - Homework 1

Dr. Fakhr Ahmad

By Sasan Vahidinia 9732499

1. In DMA, hardware writes and read addresses without involving CPU. While, in Memory - Mapped I/O, hardware needs CPU to read and write.
2. User mode: with user mode, we protect the operating system and the tables like process control blocks from the user program.
Kernel mode: with kernel mode, we control the instructions, registers and also memory. So, multiple processes can't occur at the same time.
3. code, data and files.
4. Hardware interrupts like pressing the keyboard or when an I/O operation is completed, a software interrupt occurs.

Software interrupts like requesting operating services (to read or write media) or exceptions like divide-by-zero exception
5. One user can access other users' private data (privacy issue) and also can change his/her data (integrity issue).
I think if we can manage to do something so that the computer doesn't share the data between the users, it would be fine.
6. process number, process state and program counter.
process state which checks what is the state obviously, program counter which indicates the address of the next instruction, CPU registers which also save the state (for example when an interrupt occurs), scheduling information which has the priority and ..., accounting information which has the number stuff like CPU usage and ..., and I/O status information which includes the list of I/O devices
7. A. It's a hierarchy which separates computer storage based on response time given and that is necessary for the CPU to be able to manipulate data.
B. cost, capacity, and access time.

- 8.** They are threads which are NOT implemented in the OS but in the application. We can find it in Solaris systems and early versions of Java. We can implement green threads with python via some libraries but, because python does not support multi-threading, it is not recommended to use.
- 9.** On systems with multiple command interpreters to choose from, the interpreters are known as shells.
Command interpreter is an interface which allows users to enter commands directly.
Exit, cd, echo and end
- 10.** System initialization, execution of a process creation system call by a running process, a user request to create a new process and initiation of a batch job
Orphan process is a process when parent process does not invoke wait() and terminates, so the child processes are now called orphans.