Homework #8

Q1 – what is the difference between buffering and spooling? Where and how they are used?

Difference between spooling and buffering is that Spooling can handle the input/output of one job along with the computation of another job at the same time while buffering handles input/output of one job along with its computation.

Spooling considers disk as a huge buffer that can store as many jobs as possible for the device till the output devices are ready to accept them; in contrast, buffering is a region of memory used to temporarily hold data while it is being moved from one place to another.

Q2 - 12.5 from book (Page 525) - How does DMA increase system concurrency? How does it complicate hardware design?

DMA controller must be integrated into the system and the system must allow the DMA controller to be a bus master.

Q3 – Compare and contrast the role of device driver vs device controller?

A device driver is OS specific and hardware-dependent program, it offers to interrupt handling, and is required for the asynchronous time-dependent hardware interface; in contrast, device controller is a circuit board that interfaces between the device and the OS.

Q4 . 12.6 from book (Page 525) - Why is it important to scale up system-bus and device speeds as CPU speed increases?

Because the communication between a fast CPU and a slow device or between a fast CPU and a device using a slow bus can be a bottleneck for the whole system.

Q 5- How busy bit and ready bit are used in polling?

The host entirely reads the busy-bit during host actions; in contrast, the ready bit is set to 1 by the host once the busy bit has been cleared. The host writes the command to the command register before changing the (command) ready-bit to 1.

Q6 – T/F – When the DMA takes control of the bus system, it communicates directly with the CPU.

FALSE: When the DMA takes control of the bus system, it **communicates directly with the memory**

Q7 – T/F – PCI bus connects high-speed high-bandwidth device to memory subsystem and CPU.

TRUE: The PCI bus connects high-speed high-bandwidth devices to the memory subsystem and the CPU.

Q8 – T/F – A process is moved to wait queue when I/O request is made with non-blocking I/O.

FALSE: **With blocking I/O a process is moved to the wait queue when an I/O request is made**, and moved back to the ready queue when the request completes, allowing other processes to run in the meantime.

Q9 – T/F – "Context switching" means that the OS causes the processor to divide its attention between a series of different user processes.

FALSE: A **context switch** is the mechanism to store and restore the state or context of a CPU in Process Control block so that a process execution can be resumed from the same point at a later time. **Time-sharing** or multitasking is a logical extension of multiprogramming. Processor's time which is shared among multiple users simultaneously is termed as time-sharing.

Q10- T/F – I/O control drivers act as an interface for communication between the CPU and input and output peripherals.

TRUE: I/O Control Drivers (Device Drivers) These components provide the technical details required to operate the hardware devices, and handles the sending and receiving of information between the CPU and any input, output, communication or secondary storage hardware devices.