ECE 437
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PS-10
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1. assume average queue time is 0ms
ave_access_time = 0 + 0.1ms + 6ms + (0.5*60/7200 * 10^3)ms + (8KB / 80MB * 10^3 )ms = 10.364ms

6.7.1

a. For a printer to communicate with the CPU, an asynchronous bus would be the most appropriate bus type for it to adopt, due to the large difference between the speed of the CPU and the speed of the printers.

b. For a scanner as the I/O device for a computer, an asynchronous bus could also be the most appropriate bus type for handling the communication between CPU and scanners.

6.7.2

For both the printers and scanners as I/O with the CPU using synchronous busses, they would have similar problems due to the long synchronous bus connection timing delay. The issue of clock skew could happen easily because of using longer parallel cables. The timing delay could be significantly increased as the increase of the connection cable for the buses. Also longer cables could cause the noise due to the surroundings. Besides, synchronization issues might also appear due to the large difference between the I/O devices and the CPU.

6.7.3

For both the printers and scanners as I/O with the CPU using asynchronous busses, both of them are very timing sensitive devices, the issues could be similar with asynchronous busses. In those situation such as a larger bulk data need to be transmitted the time for asynchronous busses could be much longer than the synchronous busses. This might lead to incorrect output or input because both devices are very timing sensitive.

6.11.1

Yes, the CPU does relinquish control of memory when DMA is active. As long as the CPU initiated the data transfer the data would be transfer immediate, and the devices and memory communicates directly with no intervention from the CPU.

6.11.2

a. For a mouse as an I/O with the CPU, the mouse controller would not benefit from DMA. Because the DMA would have the advantage on large data transfer. However, the data required a mouse to transfer is not that large. Besides, a mouse is more important about timing on data transfer.

b. For an Ethernet Controller as an I/O, it could benefit from DMA by taking its advantage of large data transfer. But the real benefit also dependents on the I/O functionality and driven method. Overall, it benefits more from the DMA than a mouse controller.