Homework 12

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- (12.5) How does DMA increase system concurrency? How does it complicate hardware design?

  Solution. DMA allows CPU to execute other tasks while the DMA system is transferring the data from the I/O devices to the memory using the system memory buses. Therefore, DMA can increase the system concurrency because the CPU can execute other tasks and does not need to focus on the data transferring anymore.

  The reasons why DMA complicates the hardware design are as follows.

  – DMA controller needs to be integrated into the system so that it can send signals and receive data from I/O devices.

  – DMA controller needs to have the privilege of controlling the memory bus so that it can receive the data from I/O devices.

  – DMA needs to implement the cycle stealing technique, that is, the DMA should pause the memory bus transferring when CPU needs to access the data in memory, because DMA controller and CPU are sharing the memory bus.

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