Marathon Exercises/Extravaganza Tutorial [Part 2]

Chapter 8: Input and output

Review Question: Text Book pg 231

1. What is Internal Reference Alphabet?
2. What is the major function of an I/O?
3. List and briefly define three techniques for performing I/O?
4. What is the difference between memory-mapped I/O and isolated I/O?
5. When a device interrupt occurs, how does the processor determined which device issued the interrupt?
6. When a DMA module takes control of a bus, and while it retains control of the bus, what does the processor do?

Problems: Text Book pg 231

1. In virtually all systems that include DMA modules, DMA access to main memory is given higher priority than CPU access to main memory. Why?
2. A DMA module is transferring characters to memory using stealing, from a device transmitting at 9600 bps. The processor is fetching instructions at the rate of 1 million instruction per second ( 1 MIPS). By how much will the processor be slowed down due to the DMA activity?
3. A 32 bit computer has two selector channels and one multiplexor channel. Each selector channel supports two magnetic disk and two magnetic tape units. The multiplexor channel has two line printers, two card readers, and 10 DVT terminals connected to it. Assume the following transfer rates:

Disk drive 800 Kbytes/s

Magnetic tape drive 200Kbytes/s

Line printer 6.6 Kbytes/s

Card reader 1.2 Kbytes/s

VDT 1Kbytes/s

Estimate the maximum aggregate I/O transfer rate in this system

Chapter 9: Operating system

Review Question: Text Book pg 272

1. What is an operating system?
2. List and briefly define the key services provided by an operating system
3. List and briefly define the major types of OS scheduling.
4. What is difference between a process and a program?
5. What is a purpose of swapping?
6. What is the purpose of a translation lookaside buffer?

Problems: Text Book pg 272

1. Give reasons that the page size in a virtual memory system should be neither very small nor very large.
2. In the VAX computer, user page table are located at the virtual addresses in the system space. What is the advantage of having user page tables in virtual rather than main memory? What is the disadvantage?
3. Consider a computer system with both segmentation and paging. When a segment is in memory, some words are wasted on the last page. In addition, for a segment size s and a page size, there are s/p page table entries. The smaller the page size, the less waste in the last page of the segment, but the larger the page table. What page size minimizes the total overhead?
4. Assume a task is divided into four equal sized segments and that the system builds an eight entry page descriptor table for each segment. Thus, the system has a combination of segmentation and paging. Assume also that the page size is 2Kbytes.

* What is the maximum size of each segment?
* What is the maximum logical address space for the task?
* Assume that an element in physical location 00021ABC is accessed by this task. What us the format of the logical address that the task generates for it? What is the maximum physical address space for the system?