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**CS 330 Computer Organization/Assembly Language**

**Homework Assignment 2**

**2/2/18**

**Exercise 2:**

Consider these review questions from chapter 3:

* 3.1: What general categories of functions are specified by computer instructions?
* “The categories are processor-memory, processor-I/O, data processing, and control” ("Chapter 3: A Top-Level View of Computer Function and Interconnection.").
* 3.2: List and briefly define the possible states that define an instruction execution.
* Instruction address calculation: Determines the address of the next instruction to be executed.
* Instruction fetch: Read instructions from the appropriate memory location into the processor.
* Instruction operation decoding: Analyzes instructions to determine the type of operation to be performed and operands to be used.
* Operand address calculation: If the operation involves reference to an operand in memory or available via I/O, then determines the address of the operand.
* Operand fetch: Fetches the operand from memory or read it in from I/O.
* Data operation: Performs the operation indicated in the instruction.
* Operand store: Writes the result into memory or out to I/O.

("Chapter 3: A Top-Level View of Computer Function and Interconnection.")

* 3.3: List and briefly define two approaches to dealing with multiple interrupts.
* Disabling interrupts: The processor has the ability to and will ignore specific interrupts. Those interrupts remain pending and will be checked after the processor has enabled interrupts.
* Interrupt service routine (ISR): priorities assigned to the different types of interrupts. ISRs with higher priorities can interrupt ones with lower priority, in which case the ISR with the lower priority is put on the stack until that ISR is completed.

("Chapter 3: A Top-Level View of Computer Function and Interconnection.")

Consider these review questions from chapter 4:

* 4.1: What are the differences among sequential access, direct access, and random access?
* Sequential access: Memory is organized into units of data, called records. Access must be made in a specific linear sequence. Cannot be accessed outside of this linear sequence.
* Direct access: Individual blocks or records have a unique address based on physical location. Access is accomplished by direct access to reach a general vicinity plus sequential searching, counting, or waiting to reach the final location.
* Random access: Each addressable location in memory has a unique, physically wired-in addressing mechanism. The time to access a given location is independent of the sequence of prior accesses and is constant due to this.

(Herrera, 2005)

* 4.2: What is the general relationship among access time, memory cost, and capacity?
* Faster access time, greater cost per bit; greater capacity, smaller cost per bit; greater capacity, slower access time.

(Herrera, 2005)

* 4.3: How does the principle of locality relate to the use of multiple memory levels?
* It is possible to organize data across a memory hierarchy such that the percentage of accesses to each successively lower level is substantially less than that of the level above. Because memory references tend to cluster, the data in the higher-level memory need not change very often to satisfy memory access requests.

(Herrera, 2005)

Works Cited

“Chapter 3: A Top-Level View of Computer Function and Interconnection.” *Quizlet*, 2014, quizlet.com/28195640/chapter-3-a-top-level-view-of-computer-function-and-interconnection-flash-cards/.

Herrera, Victor Manuel Murray. *Homework # 2 Solutions* (n.d.): n. page. *Introduction to Computer Architecture and Organization*. 30 Aug. 2005. Web.