

Student name: Jay Kalyanbhai Savani

HOMEWORK 1

The purpose of this assignment is a basic overview of the textbook's materials, so you will understand the context of the entire course from the start date.

Please use the APA style. Please review the following link:

<https://owl.english.purdue.edu/owl/resource/747/13/>

	Answer:	Work Cited
1. Why the Von Neumann model is essential in understanding computers ? (Chapter 1)	It is important because it is used to store data and programs in the same memory. This approach is also referred to as the stored program notion, and many modern computers are built using this model. It is necessary because it has three components: the control processing unit, the main processing unit, and the input/output devices.	The Architecture of Computer Hardware, System Software and networking: An Information technology Approach. 5 th edition
2. Numbers: Please write TWO examples representing the numerical data in any possible base, including binary, hexadecimal and octal, as well as floating point number notations	Numerical data: 1). 130(base 10) Binary : 10000010 Hexadecimal: 82 Octal: 202 2). 200(base 10) Binary: 11001000 Hexadecimal: C8 Octal: 310 Floating point numbers 1). 50.5 (base 10) Binary: 110010.1 Hexadecimal: 32.8 Octal:62.4 2). 20.5(base 10) Binary: 10100.1 Hexadecimal: 14.8 Octal: 24.4	
3. Data - Please describe any TWO examples representing different formats of data used for still images (bitmap versus object images), video, audio and alphanumerical data. (Ch 4 p. 100-135)	Still images(bitmap): PNGand JPEG Still images(object): Postscript and SVG Video: MPEG-4 and WebM Audio: MP3 and WMA	The Architecture of Computer Hardware, System Software and networking: An Information technology Approach. 5 th edition.

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4. LMC - Explain the inner workings of the Little Man Computer and its relation with real life computers, including the basics of assembly instructions. (A three-four sentences answer will suffice) Ch 6—p.178-193	The Little Man Computer's internal workings are based on three-digit instructions; the first number denotes the operation, while the other two are used for various things and point to addresses. It can perform common calculations like addition and subtraction, move data between the calculator and input-output devices, and assist the small man computer in stopping the process. The operation to move the data from mail slots to the calculator is done by instructions. Although this computer is capable of performing all fundamental operations, modern advanced computers are more complex and can carry out more difficult operations.	www.vivaxsolutions.com/web/lmc.aspx
5. CPU-memory – Explain how the CPU and memory communicate. Concept of a register (including MAR/MDR). (A three-four sentences answer will suffice) Ch 7 p. 201	Memory address register is MAR. One of the control units (CU) of the CPU that holds the input and output data is this one. MDR is short for memory data register. The address is also stored by a control unit (CU) of the CPU. Together, these two registers assist the CPU in reading data from memory and serve as an interface for input and output, enabling the CPU to run many programs simultaneously.	The Architecture of Computer Hardware, System Software and networking: An Information technology Approach. 5 th edition.
6. Fetch-execute – What is the fetch-execution ? (Ch 7.4 p. 207)	Also known as the instruction cycle, the fetch-execute cycle is the basic operation cycle of a computer It's the process in which a computer receives information (data) and determines what to do with said data This cycle is run continuously by the central	www.thecomputingteacher.com/csc/index.php/sa-d/hardware/fetch-execute-cycle

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	processing unit (CPU) The process follows four phases: fetch, decode, execute and store	
7. Stack - How the stack is permanently used through any subroutine call to better write code? (Ch 7.13 p. 221)	The stack is used to store data along with its address. It works in LIFO fromate(Last In First Out). The most recent data is entered after the previous, therefore the stack will be in the reverse order from which the routine has entered and by this we can check that is has returned from the last known as subrutine to the last one entered. It also prevent the code from bugs and to go in an infinite loop.	https://users.ece.cmu.edu/~koopman/stack_computers/sec1_4.html
8. I/O – Please list different types of Input/Output: Programmed I/O vs Interrupts and explain how they each work, as well as their advantages and disadvantages. (Ch 9.3)	<p>I/O that is programmed consists solely of data being sent from the CPU to external devices. CPU drivers are the ones who start this transfer.</p> <p>Advantages: It makes it simple for users to interface with computers using input-output devices. less hardware is used.</p> <p>Disadvantages: Because I/O devices occupy the CPU for a prolonged period of time, whether performing productive work or not, overall performance suffers.</p> <p>Interrupts: It causes a message from a different I/O controller to be sent. This interrupt line is employed to pause and switch between one prioritized program and another.</p> <p>Advantages: The system as a whole gets fatter as the CPU performs better and waiting times are reduced.</p> <p>Disadvantages: Writing code in low level language can make it more</p>	http://inputoutput5822.weebly.com/programmed-io.html

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	difficult.	
9. DMA - How Direct Memory Access works and when it is useful to use it? (Ch 9 p 268)	<p>Direct Memory Access, also known as DMA, enables the computer system to transmit data between memory devices and I/O devices more quickly or easily. It works better when sending MP4 or video data to the video I/O system.</p> <p>Operation of DMA:</p> <p>Using programmed I/O, a CPU program starts a data transfer. As soon as the Transfer is complete, the I/O module will send the CPU an acknowledgment. The data is now in memory and can be used by the program to run after this is finished.</p>	<p>https://www.embedded.com/introduction-to-direct-memory-access/</p>
10. Buses – Please list the advantages and limitations of different types of buses (serial vs parallel with many examples). Ch 7.5 page 210	<p>Serial mode offers the advantage of fewer traces on the pc board, and fewer pins on the devices. Parallel offers the advantage of transferring 8 data bits per I/O clock cycle, but at the disadvantage of many more pins required on the devices.</p> <p>On some of the DDS devices (AD9852/54/58) the parallel port offers the advantage of addressing single bytes in the device register set, whereas the serial port requires all of the bytes of a multibyte register to be loaded at one time.</p> <p>Overall, the parallel mode offers the advantage of faster loading of the registers, but with the disadvantage of requiring more interconnect traces. The serial mode offers simplicity, but with less speed.</p> <p>In some cases, an application may require a data update rate which can be achieved while using the parallel mode, but which could not be</p>	<p>https://www.analog.com/en/education/education-library/faqs/faq_what_are_the_advantages_and_disadvantages_of.html</p>

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<p>11. Peripherals - How computer peripherals work, including magnetic disk drives (floppy disks, hard drives), optical disk drives (CD-R, CD-RW, DVDROM, DVD+R, DVD-R, DVD+RW, DVD-RW), displays (CRT and LCD monitors) and laser printers and realize why it is important to limit the number of disk-read phases when writing programs. (Ch 10 p. 297)</p>	<p>accomplished while using the serial mode due to its slower update rate.</p> <p>Magnetic Disk Drives One or more flat, plastic or metal disks coated in magnetic material make up a magnetic disk. With the use of an electromagnet, the particles within that small region of magnetic material can be polarized in one of two orientations, and this device can recognize the direction of polarization that was recorded. To distinguish between 1s and 0s, employ this magnetic polarization. The drive motor rotates the disk at a constant speed around its elliptical axis. The surface of the disk allows the arm to allow the head to move in and out. And the entire arm position is controlled by the head motor.</p> <p>Disk optical drives Data is stored on the disk in the form of blocks by CD-ROM. It is spiraled from the inside and outside of the disk and put linearly in the track. It is organized into files and strung on a single track. DVD disks are the same size and format as the above-mentioned disks. For the tight packing in this instance, a shorter wavelength infrared light is utilized. On the same side, two layers of data can be stacked one on top of the other. This will enable the use of the disk's two sides. Also using this technology are DVD+R, DVD-R, and CD-R. Advanced rewriteable disks include DVD+RW, DVD-RAM, and CD-RW.</p>	<p>https://ecampus.matc.edu/mihalj/scitech/unit7/hardware/hardware.htm</p>
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	Displays This system converts the pixels from RGB to display them on the screen by reading values from a table that represent the screen color that a certain pixel value corresponds to.	