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| **COMP.5201 Information Technology Operations** | **Semester 2, 2017** |

**Portfolio 1**

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| **Week 01** | **Session 1 - Monday (2 hr)** | **Date - 10/07/2017** | **Present** |  |
| **Task & Activity**  Today in this session Stefan told us about the Course structure, learning outcomes and course contents along with the importance of attendance and suggest us student might fail the subject if attendance fails below 80%. He also notifies us about the resources of library and suggest us to use it to enhance our knowledge. After discussing these important facts, we move to week 01 PC intro pdf.  Here we discussed about Computers and introduce it briefly.  Computer can be defined as the digital electronic device that operates under the control of instructions stored on its own memory called program. It accepts data(input), process the data according to specified rules, produces information (output) and stores the information in the for the future use.  After this we discussed about the onion diagram showing user, Application, Operating system and Hardware comparing it with the relation of eye, brain and hand.  Image result for computer PC intro diagrams  **What is a Computer?**  Computer can be defined as the digital electronic device that operates under the control of instructions stored on its own memory called program. It accepts data(input), process the data according to specified rules, produces information (output) and stores the information in the for the future use.  Output  Processing  Input  File  Program instructions  **Data and Information**  Computer process data into information either data includes numbers, text, images, audio, and video. Data is not meaningful on its own but once data is proceeding into information (charts, graphs, statistics etc) by the computer it then acquires meaning and is useful to people.  **Categories of Computer**  Computers in present are classified into seven categories by IT industry commentators. Desktop computers are personal computers and workstations, Mobile computers and devices are Laptop, Notebook, Ultra Notebook, Tablets, Smart phones. Besides this there are Gaming Consoles, Servers, Mainframes, Super Computers and Embedded Computers. Here Embedded Computers can be defined as a computer system with a dedicated/specific function within a larger mechanical or electrical system, often with real-time computing constraints.    The best computer is our brain and the most powerful Super computer is in China which is used for nuclear projects. And New Zealand too used it for climate forecasting and results.  http://3.bp.blogspot.com/-pd_DFo6rp_E/UaB3UmPQPfI/AAAAAAAAAS8/HGjCOg0pCmk/s1600/computerhardware1.jpg  **Components/Hardware**  Components of Hardware are input devices and output devices.  Input devices allows you to enter data and instructions into a computer while output device is hardware component that conveys information to one or more people  System unit is the Case that contains the electronic components of the computer that are used to process data  Storage Devices holds data, instructions, and information for future use  Communication Devices enables a computer to send and receive data, instructions, and information to and from one or more computers or mobile devices  **Basic Personal Computers**  It is the computer which can perform all its input, Processing, output and storage activities by itself.  Two popular architectures are the PC and the Apple. The term PC refers to any personal computer based on the original IBM personal computer design.  **Basic Personal Computer System**  A system of personal computer consists of hardware and software component where hardware can be defined as the physical equipment such as the case, storage drives, keyboards, monitors, cables, speakers, and printers and software is the operating system and programs.  The operating system instructs the computer how to operate programs or applications look after the different functions of computer  **Specialised Personal Computer Systems**  It includes:  • Gaming PC  • Home Theatre Personal Computer (HTPC)  • CAD and CAM (CAx) workstation  Computer Aided Design and Manufacturing  • Audio and Video Editing workstation  • Virtualisation workstation  • Others?  However, A workstation is typically a specialised personal computer designed for technical or  scientific applications. | | | | |
| **Reflections**  It’s very precious class for me as this all stuff are very new for me and today in this lecture I learnt many things about CPU’s, personal computer processors, intel processors, buses, bridges and many more. I had just studied about the onion diagram but I get an opportunity about Hyper- V virtual box. And also know about program instructor in processing. | | | | |
| **Problems & Difficulties**  Besides knowing these things too it’s a bit difficult to understand about chipset and multicores | | | | |
| **Trouble shooting**  Moodle is open book for us so when I revise these hard topics going through it I found it easy. | | | | |

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| **Week 01** | **Session 2 - Thursday (1 hr)** | **Date – 13/07/2017** | **Present** |  |
| **Task & Activity**  Today our session starts from signals and data representation which lies in slide 12 and after that we had discussed about the digital data which is Bits and Bytes.  **Signals and Data Representation**  There are two types of signals which are analog signals and digital signals.  • Analog Signals are the wave form that vary in strength between some  minimum and some maximum. (eg. NZ phone system, AM/FM radio etc)  • Digital Signals may have two or more discrete states. Binary digital used by most computers,  have only two discrete states:  - On and Off aka  - High and Low  - True and False  - 1 and 0  **Digital Data: Bits and Bytes**  • Bits (Binary Digits):  Binary is a number system that uses two unique digits 1 and 0    • Byte: 8 Bits form a Byte. A byte represents a single character from the keyboard.  A byte is a unique sequence of eight 0’s and 1’s for representation.  • Range from all 00000000 to all 11111111  28 = 256 possible combinations of 1s and 0s  • Example bytes: 01010011 01000001  01001101 10001110  For calculation computer represent 1 as 00000001  **Bits and Bytes**  A computer circuit represents the 0 or 1 electronically by the presence or absence of an electrical charge.  Eight bits as a unit, taken together are called a byte. A byte can represent a single character (ASCII) on the computer.  Note: one or more bytes can also be used to be used in the calculations, as numbers. integers, decimal numbers, floating point numbers, and so on.  Here in bits and bytes that we look at the small graph represent keyboard input and print output. If we number 4 on your computer, read how 00110100 and when we're in the computer press E and the computer reads it as 01000101.  **Data Representation - ASCII**  • ASCII is widely used coding scheme to represent data  • Standard ASCII 7-bit code  27 = 128 possible characters  • Extended ASCII 8-bit code  28 = 256 possible characters  Unicode uses 2 bytes (16 bits) and allows for encoding more characters in various languages.  We also look at the different numbers and letters symbols and its ASCII representation.  **Input from the Keyboard**  Letter will be converted to binary form and back as follows:  The scan code for the capital letter T is sent to the system unit.  A user presses the capital letter T (shift + T keys) on the keyboard, which in turn creates a special code, called a scan code, for the capital letter T.  The system unit convert the scan code for the capital letter T to its ASCII binary code (01010100) and stores in it memory for processing.  After processing, the binary code for the capital letter T is converted to an image and displayed on the output device.  **ASCII Example**  What are the ASCII characters COMP.5201 in 8-bit binary (a byte)?  • C 01000011  • O 01001111  • M 01001101  • P 01010000  • . 00101110  • 5 00110101  • 2 00110010  • 0 00110000  • 1 00110001  **What meaning “a Byte”? (For Calculation)**  • An ASCII character is not intended to be straightforwardly utilized as a part of computations, eg. including of numbers. They are to speak to characters.  • If ASCII characters speaking to numerical esteems are to be utilized as a part of estimations they should be changed over to another organization initially to speak to a numerical sort. ie. at least one bytes are utilized to speak to number sorts like whole number, decimal, coasting point and so forth utilized as a part of computations.  **ASCII (Char) Data Type >>>** 8 bit Integer Data Type  “0” 01100000 00000000  “1” 01100001 00000001  “2” 01100010 00000010  “12” 01100001 01100100 00001100  “20” 01100010 01100000 00010100  **What meaning “a Byte”? (Other)**  Other than used to speak to a character or a number for figuring, bytes can be utilized to speak to other PC data, eg.  • IPv4 Network Address (32 bits) Thankfully there are techniques for  abbreviating these binary IP addresses.  11100000 10101000 00000001 00010011  192 168 1 19 < Decimal abbreviation  • IPv6 Network Address (128 bits)  11111110 10000000 00000000 00000000  00000000 00000000 00000000 00000000  00000000 00000000 01001101 00000111  00010110 01110101 11000010 01101110  FE80 : 0000 : 0000 : 0000 : 0000 : 4D07 : 1675 : C25E < Hexadecimal abbreviation  FE80 : : 4D07 : 1675 : C25E < Fully abbreviated  After that we talked about Computer stockpiling estimation.  **PC Storage - Measurement**  • There had been disarray about what esteems a kB, MB, GB, TB and so on really speak to.  e.g. is a GB 1,000,000,000 or 1,073,741,824 byte?  • To separate between them we have a decimal name and a double name, eg.  - Decimal: Gigabyte (GB)  - Binary : Gibibyte (GiB) – Giga double byte  **Drive capacity in Windows**  Why do hard drives show the wrong capacity in windows?  http://www.howtogeek.com/123268/windows-hard-drive-wrong-capacity/  **PC**:  **Parts OF THE SYSTEM UNIT – 1**  • Motherboards (and MB Form Factors)  • Chip Sets (eg. Northbridge and Southbridge)  • Busses  • CPU Features  Focusing on Intel CPUs normally found on desktop/note pad PCs. There are numerous  different CPUs accessible (eg. ARM – Advanced RISC Machine and others) normally found on  **PDAs and tablets**.  **What a system unit?**  • A case that contains electronic parts of the PC used to process information.  • All sizes of PCs and cell phones have a framework unit.  A PC system unit contains Drive bay(S), Power supply, Sound card, Video card, Processor and memory, and the Motherboard.  **Motherboard**  The motherboard, now and again called a framework board, mainboard or, on the other hand principle circuit board.  The Motherboard Accommodates  • CPU Socket and CPU (and Heat sink/fan Assembly)  • Memory (RAM) Slots and the Memory (RAM)  • Expansion openings (for connector cards)  • BIOS chip  • CMOS chip, RTC (clock) and battery  • The Chipset, eg. a Northbridge (perhaps) and a Southbridge  • Connectors/ports to associate with interior and outside gadgets  • Embedded wires/tracks on and in the printed circuit board that electrically interconnect the motherboard  components.  Some of these electrical pathways found in a PC are called "Buses".  **PC Motherboard Form Factors**  Form factors describes the physical layout of the different components and devices on motherboard. ATX is the most common motherboard in present which uses ATX tower and ATX power supply.  Big CPU’s are called Tower case and look at the Mini desktop case and the server had got two power supplies.  **Central Processing Unit**  • The CPU (or "Processor") is frequently alluded to as the "brain" of the PC. It controls and arranges the operation of the PC framework.  • It is the electronic hardware (a huge number of parts/transistors on a silicon chip) that conveys out the directions of a PC program. The CPU executes the program, which is a grouping of put away guidelines in memory.  • Under the course of a program (ie. software), it plays out the fundamental arithmetic, logical, control and input/output (I/O) operations indicated by the guidelines.  **LGA 1366 CPU Chip and socket:**  The Socket on the Motherboard determines the type of CPU that can be installed. It is used by the Intel core i7 and server class Xeon CPU’s.  **LGA 2011 CPU chip and socket:**  It is used by Intel Core i7-5960X (8 Core, 16 thread) CPU.  **LGA 3647 CPU Chip and Socket:**  It is used by the Intel Xeon phi \* 200. A smaller Intel CPU shows the size comparison with the Xeon’s socket.  **CPU Packages/Sockets:**  •PGA – Pin Grid Array (AMD and older Intel CPUs)  The pins are on the CPU chip rather than the socket.  •LGA – Land Grid Array (Modern Intel CPUs)  The pins are on the socket rather than the integrated circuit (ie. CPU chip). The CPU had flat contacts.  • BGA - Ball Grid Array (CPUs for compact mobile devices)  It is a type of surface-mount packaging used to permanently mount (solder) devices such as microprocessors to a circuit board. They replace the pins on a PGA array with tiny solder balls that are heated to form a permanent bond with the circuit board.  **CPU cooling – Heatsink and Fan:**  PC CPU’s generates heat at the speed of 3 GHz. With the help of CPU heatsink and Fan it protects the CPU going to Thermal overloaded and Shutting down.  Thermal Paste:  It is the paste used in between CPU and Heatsink to ensure good Thermal Conductivity and effectively allow hat transfer from the CPU to cooling system. Smooth out the paste spreader and ensure the surface is uniformly covered.  **CPU cooling – Liquid:**  Especially It is used by Gamers as their CPU is typically “overclock” and need Liquid Cooling Systems. | | | | |
| **Reflections**  It’s very precious class for me as this all stuff are very new for me and today in this lecture I learnt many things about signals and data representation, system units where we also learn about calculation and the big CPU’s are called tower case and the widely used CPU is ATX and talks about Boolean logic and arithmetic. I came to know about Cooling liquid and where it is used. | | | | |
| **Problems & Difficulties**  After knowing all these things, it’s hard to understand about the Booleans and logics. But I know many things about it after I get home and studied it on Moodle. | | | | |
| **Trouble shooting**  Practice is the better way to get out of trouble because of which there are not much difficulties parts in this session. | | | | |

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| **Week 01** | **Session 3 - Friday (2 hr)** | **Date – 14/07/2017** | **Present** | **Absent** |
| **Task & Activity**  In this session, we had discussed about the portfolio and the marks carry by it during assignment. We had also discussed about video assemble. By looking at the small diagram representing Program – MS word – PC report doc.- Data.  In this topic, we also look at the embedded system of the computer on which we are operating. There, GHz represents how fast the computer can run and nm represents the distance between the silicon chips. The leading manufacturers of personal computer processor chips are Intel and AMD. We discussed about personal computer processors and intel processors including the definition of an embedded system. To know the system of our computer we must click on start button and then right click and then on system. We also discussed about the generation of computer. Apart from this we also talk about Moore’s law. There are two types of Buses one is Internal which is attached in CPU and on motherboard and the next one is External which is externally attached devices. We look at the diagram of “Generic” system bus and go in on North bridge and South bridge. Every computer in present have South bridge but some don’t have North bridge. Things will be complicated when some computers have two CPU’s. We learnt about intel chipset. In i7 there is no more North bridge. Modern computers have 64bit i.e. 641and O’.  Example: 1.06\*106 (FPU)  Either the CPU is 64 bits or 32-bit OS controls the function of CPU. Application designed for 32-bit don’t work in 64 bits.  We also discussed about Workshop safety care which includes what to do during Fire evacuation, electrical safety, RCD, fire alarm, switching power supply, etc. Here Stefan told us about pushing red button because of which electrical current will cut off. Because of RCD electrical current will cut off if we feel electrical shock. 240V of power will kill people. We also discussed about chipset and switching power supply. Stefan talks about carbon extinguisher. We also discussed about Electrostatic discharge protection. | | | | |
| **Reflections**  It’s very precious class for me as this all stuff are very new for me and today in this lecture I learnt many things about CPU’s, personal computer processors, intel processors, buses, bridges and many more. I also know about how to look at the system information on our computer. Now I am able to carry my task as machine Cycle which teaches us to Fetch- Decode- Execute- Practice. Last but not least, I became more safe in this college as I had learnt about the safety workshop and can apply everywhere and any time in my life in case of risk factors. | | | | |
| **Problems & Difficulties**  Besides knowing these things too it’s a bit difficult to understand about chipset and multicores | | | | |
| **Trouble shooting**  Moodle is open book for us so when I revise these hard topics going through it I found it easy. | | | | |

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| **Week02** | **Session 1 - Monday (2 hr)** | **Date –17/07/2017** | **Present** |  |
| **Task & Activity**  Today we learn about installing Adobe Acrobat and also talk about the content of week 02 and move on to practical.  At first Stefan himself work on 745A and he turndown and makes us do so. After that, we Leo and me work on 745A computer no.16.  While working on 745 we have to push at the back liver and pull off the side cover and place it somewhere safely. After that, disconnect all the cables from power supply and take off the power supply. Detach all the cables from the motherboard and pull off the heat sink and separate it from motherboard. After doing this all, pull off cooling fan cables and speaker cable from motherboard while we pull off all the cables, we should take off the RAM by pushing the side bars and have to remove thermal paste so we can separate hit sink along with fan assembly from processing chip cover and reassemble in order after Stefan shows us how to reassemble it. We always should be aware of handing Antistatic Scrap as it is a safety measure for us. | | | | |
| **Reflections**  I had some general knowledge of Hardware in past but I know many new tings in this class. Generally, I used to unplug the cables but I didn’t know about its type that is SATA/PATA/DATA. Now onwards, I can work on Thermal paste which I didn’t saw in the computer in Nepal. I became able to work on the Computers on my own and can teach other as well | | | | |
| **Problems & Difficulties**  No difficulties | | | | |
| **Trouble shooting**  No troubleshooting | | | | |

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| **Week 02** | **Session 2 - Thursday (1 hr)** | **Date – 19/07/2017** | **Present** |  |
| **Task & Activity**  Parallel preparing utilizes numerous processors at the same time to execute a solitary program or errand.  Enormously parallel preparing includes hundreds or thousands of processors (eg. Super Computers).  **Processor-Hyperthreading:**  For each physical processor center that is available, the working framework tends to two virtual or sensible centers, and offers the workload between them when conceivable.  Each physical center performs 2 assignments/threads at the same time.  We had studied about Sockets, Memory clock speed and many more.  **PERSONAL COMPUTER: COMPONENTS OF THE SYSTEM UNIT – 2**  It consists of the topics like,  • Memory vs. Storage  • ROM/BIOS/CMOS  • RAM: SRAM/DRAM  • Memory Modules  • “Universal” Memory  **Memory vs. Storage:**   * Primary Storage are just called memory which include computer memory on the Motherboard which consists of RAM and ROM where RAM stands for Random Access Memory and ROM for Read Only Memory. * Secondary storage is called Storage. It includes the Hard Drive, CD drive, USB Flash Drive which all are Non- Volatile in nature.   In Volatile memory data is lost when the power is turned off but in Non Volatile memory data will not be erased even a power is removed.  **Memory/Storage – Use:**  RAM sores DATA while computer is running.  • The working framework expected to deal with the PC framework.  • Data that will be handled, the guidelines (applications) that will procedure the information and the consequences of the information handling.  Hard Disk (stockpiling) is utilized to for all time store:  • The working framework and other framework programming.  • Applications programming and information  RAM is quick and utilized for "now processing ".  Hard Disk is "slower" and utilized for perpetual capacity.  **System Memory Hierarchy:**  • CPU Registers: -  Volatile, eg. 64 bits.  • CPU Cache - L1, 2 & 3: -  Volatile, eg. 32K, 256K, 8MB.  • Main Memory - Physical Memory on the Motherboard:  - Often just referred to as “RAM”.  - Volatile, eg. 4, 8, 16GB.  • Virtual Memory- A part of disk put aside to go about as an expansion of physical memory/RAM (eg.  windows pagefile.sys).  - Will be talked about in more detail in Operating Systems.  Note: Adapter cards (eg. video and system cards) will have an measure of memory/RAM on board for use in the operation of the connector card.  **With RAM, what is Random Access?**  • The capacity to get to anything of information from a populace of addressable components effortlessly and effectively as some other, regardless of what number of components might be in the set.  • The way toward exchanging data to or from memory in which each memory area can be gotten to specifically (otherwise known as coordinate get to) as opposed to being gotten to in a settled succession (aka sequential access).  On the off chance that your framework has 16GB of RAM (principle memory), the exact to start with memory area (data in the first address) can be gotten to (read/written) similarly as fast as the last memory area (data in the last address).  **Read Only Memory (ROM)**  ROM chips are called Hardware which are located on the motherboard and adapter cards which contains software that can be directly accessed by the CPU.ROM chips are known as Firmware which is also called software in Hardware.  There are types of ROM that can be written to:   * PROM * EPROM * EEPROM   RAM can be written millions of times but ROM can be written only the few times.  **Motherboard ROM (System BIOS):**  It contains system BIOS software called Firmware where the BIOS is Basic Input/output System. ROM can be found in a socket directly onto the Motherboard, EEPROM can be reprogrammed in situ.  **System BIOS Software:**  System BIOS software consists of four Programmes. They are as follows:   * POST (Power on Self-Test) – performs basic tests/diagnostics on the system hardware. * Setup – provides a user interface to setup the “BIOS configuration” (system configuration) stored in CMOS. * Bootstrap Loader – searches storage devices (eg. HDD, DVD, USB) for an operating system * Instructions for basic low-level support for key devices, eg. keyboard, video, HDD etc.   When the OS starts it loads previously detected or installed “Drivers” to provide full support for all devices. A device driver is software for the OS to communicate with a hardware device.  **CMOS:** Battery moved down RAM (non-volatile).  Where is the CMOS RAM chip - some place on the MB.   * Holds the framework (or BIOS) design data, eg. date/time, boot arrange, FSB recurrence, CPU clock proportion and so forth. * The BIOS Setup program enables a client to change the settings in CMOS.   **UEFI: Unified Extensible Firmware Interface:**   * UEFI is a later EFI that characterizes a product interface between a working framework and stage firmware. * UEFI is intended to supplant the inheritance Basic Input/output Framework (BIOS) firmware interface. * The first/early EFI was created by Intel. * UEFI will be talked about again later in Operating Frameworks. | | | | |
| **Reflections**  From this session I learnt many things that are new for me including chips and many more but I had been able to synchronize time clock operation in system and understand the parts of reading as usual. | | | | |
| **Problems & Difficulties**  There aren’t much difficulties in this session as it is a theory class and I went home and revise once about the BIOS, RTC then became able on that topics. | | | | |
| **Trouble shooting**  Not at all | | | | |

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| **Week 02** | **Session 3 - Friday (2 hr)** | **Date – 21/07/2017** | **Present** |  |
| **Task & Activity**  **RAM– Random Access Memory:**   * DRAM - Dynamic RAM:   It stores bits ( 0,1) in memory cells which stores a charge on a capacitor and a transistor.   * Capacitors lose their charge timely so need to be refreshed 2ms approximately or the memory cell loses its contents.   **SRAM - Static RAM:**  Stores bits ( 0,1 ) in memory cells consisting various transistors.It is a Volatile memoy and don’t need to be refreshed it timely and is used for cache i.e CPU cache.    **MRAM - Magneto-Resistive RAM**   * Stores information utilizing attractive charges instead of electrical signals (does not should be revived). * Retains its substance after power is expelled (non-unpredictable). * MRAM conceivably has more prominent stockpiling limit than DRAM. * Fast and expends less power. * MRAM is more up to date innovation not yet found on PC frameworks   Summary: SRAM VS DRAM  1. SRAM is static while DRAM is dynamic (requires invigorating).  2. SRAM is faster compared to DRAM.  3. SRAM devours less power than DRAM.  4. SRAM utilizes more transistors per bit of memory contrasted with DRAM. Thusly DRAM can store more bits per  unit range (higher thickness) contrasted with SRAM.  5. SRAM is more costly than DRAM.  6. Less expensive DRAM is utilized as a part of fundamental memory while SRAM is usually utilized as a part of  store memory.  **DRAM Types:**  Image result for types of DRAM with Comments  **SDRAM, DDR1, DDR2, DDR3 and DDR4:**  Image result for SDRAM, DDR1, DDR2, DDR3 and DDR4  SDRAM, DDR1, DDR2, DDR3 and DDR4 Designation & Transfer Speeds:  Look at the various transfer rate of these particular RAMs and the maximum transfer rate of each RAM is as follows:  DDR 333 have 2.6 GB/s, DDR3 1866 have 14.9 G MB/s, DDR2 800 have 6.4 GB/s and DDR4 3200 have 25.6 GB/s.  **SDRAM: Type (Designation) & Industry Name**:  Here, we look at the common memory types and characteristics along with their memory type including Industry name and peak transfer rate. The memory type called PC 100 SDRAM have transfer rate of 800 MB/s which is the minimum transfer rate and the DDR3-2133 which have peak transfer rate of 17066 MB/s.  **Speed Measurement – MBps & Mbps:**  • RAM Peak Transfer Rate – MBps  Mega (millions) BYTES per second  eg. 17066 MBps for a DDR3 RAM module.  • SATA HDD - Gbps  Giga (billions) BITS per second eg. SATA 1/2/3 interfaces are1.5/3/6 Gbps respectively.  • RAM: 17066 MBps = 136528 Mbps = 136 Gbps  this is 136 / 6 = 22 times faster than the SATA 3  HDD  This shows that sequential access to HDD is potentially reasonably fast (only 22 times slower than  RAM) however for random access, HDD is 100 to 200 thousand times slower than RAM!!  **Speed Measurement – Access Time**  • Another approach to portray memory speed is Access Time  - the measure of time it takes to get to the information.  • RAM get to time is measured in nanoseconds (billionth's of a sec).  • HDD get to time is measured in milliseconds (thousand's of a sec).  RAM is much more faster than HDD for random access  **Memory Modules**  • DIP: Dual Inline Package (obsolete)  • SIMM: Single Inline Memory Module (obsolete)  • DIMM: Dual Inline Memory Module (current)\*  • SODIMM: Small Outline DIMM (current)\* Is a smaller, more condensed version of DIMM for use  mainly in notebooks where conserving space is desirable.  \*Package for SDRAM, DDR, DDR2, DDR3 & DDR4 SDRAM chips.  • RIMM: RAM Bus Inline Memory Module is a circuit board that holds RDRAM chips (not typically  found on PCs)  **DIMM/SODIMM Memory Modules**  DIMM Modules for SDRAM:  • 168 pin - for SDRAM  • 184 pin - for DDR  • 240 pin - for DDR2 & DDR3  • 280 pin - for DDR4  **SODIMM Modules for SDRAM:**  • 140 pin - for SDRAM  • 200 pin - for DDR  • 204 pin - for DDR2 & DDR3  • 260 pin – for DDR4  **Multi channel:**  • Dual Channel CPUs are substantially quicker than RAM – RAM get to is an average bottleneck in the framework.  For DDR, DDR2 and DDR3 frameworks, double channel mitigates bottlenecks by having one channel controller handle the perusing and composing while the other channel controller gets ready the following access. (Possibly pairs RAM data transfer capacity). Populate the DIMM spaces in indistinguishable sets (read the MB manual).  • Triple/Quad Channel Possibly triples/quadruples the memory data transmission. Ought to be introduced in an arrangement of three or four relying upon the engineering of the motherboard.  **Memory Errors**  • Hard Errors:  Caused by physical components, for example, unnecessary temperature variety, voltage push, or physical anxiety brought upon the memory bits.  • Soft Errors:  Happen when information is composed or perused uniquely in contrast to initially proposed, for example, varieties in voltage on the motherboard, to grandiose beams or radioactive rot that can make bits in the memory flip.  "Typical" desktop/portable PC memory can't recognize or rectify mistakes. Present day memory is tranquil solid so for normal PC these mistakes are not as basic. On the off chance that a blunder happens, the framework may crash/stop or you will get the world renowned "BSoD" (Blue Screen of Death). Utilize "Memtest" or a comparable utility to analyze the memory issue and supplant the broken RAM modules.  In mission basic circumstances (eg. servers), what should be possible about the blunders? Utilize extraordinary ECC RAM.  **Memory Errors – Detection/Correction**  • "Parity" Memory (Legacy):  − In the past when memory was less dependable, parity memory was accessible which permitted one piece mistake discovery yet not redress.  • Error Correcting Code (ECC) Memory:  − ECC memory keeps up a memory framework insusceptible to single-piece blunders, ie. distinguishes and remedies single-piece blunders. It forestalls information debasement, and anticipate framework accidents and disappointments.  − Used where information defilement can't go on without serious consequences. It is more costly so is utilized for the most part on servers and not found on ordinary PCs. Should be upheld by the BIOS, CPU, Chipset and MB.  **Memory Errors – Detection/Correction:**   1. Checking if EEC is working - A memory test injects ECC errors that are hopefully detected. 2. ECC RAM Module - extra bits are stored with each byte & extra memory chips may appear on the RAM module. 3. Parity RAM Module - An extra bit is stored with each byte & an extra memory chip may appear on the RAM module.   **What RAM to get?**  New RAM might be required:   * When there is a fault (the framework or an application bolts up or the PC shows visit blunder messages eg. "BSoD"). Perform a "memtest" to analyze the issue. * To enhance framework execution by including more memory. * When choosing new RAM, check the similarity with the current motherboard – DDR/DIMM sort. Refer to the MB specs. * The speed of the new RAM ought to be the same or quicker than the existing RAM.   Use the CPU-Z utility to get RAM specs without taking the cover off the PC.  “**Universal” Memory:**  A hypothetical memory combining the cost benefits of DRAM, the speed of SRAM, the non-volatility of flash memory, and infinite durability.  Potential candidates under research:  1. Magnetoresistive random-access memory (MRAM)  2. Bubble memory  3. Racetrack memory  4. Ferroelectric random-access memory (FRAM)  5. Phase-change memory (PCM)  6. Programmable metallization cell (PMC)  7. Resistive random-access memory (RRAM) For various reasons, none have yet achieved all the goals.  **DDR Technology advancement/ DDR RAM module:**  **Image result for DDR Technology advancement/ DDR RAM module:**  **PERSONAL COMPUTER: COMPONENTS OF THE SYSTEM UNIT - 3**  • Case and Power Supply  • Serial vs. Parallel Data Transfer  • Adapter Cards and Expansion Slots  • Plug and Play (PnP)  • Identifying Adapter/Expansion Cards  **Case and Power Supply Unit (PSU)**  **PC Case:**  • Provides security and support for interior segments.  • Should be durable, simple to benefit, and have enough space for extension.  • The size and format of a case is known as a frame factor.  Power Supply Unit (PSU):  • Converts 240 AC control from the divider attachment into DC.  • Must give enough power (Watts) for the introduced parts (regularly 25% more) and future increases.  NOTE: Select a case that matches the physical measurements (shape factor) of the power supply and motherboard, eg. ATX MB in an ATX case with an ATX PSU  **PC Cases:**   * Desktop case * Tower cases * Micro Tower Case * Mid Case and Mini * Full Tower Case * Shuttle   **PC PSU**  Image result for PC PSU  • The PC's PSU is a high proficiency "exchanging" control supply. Exchanging innovation includes creating high  voltages (1000's Volts) – considerably more than 240V mains.  • Never take the cover off!  **PSU: 240V AC to DC Power:**  The original ATX power supply has gone through many revisions, (eg. ATX12V, ATX12V 1.x and ATX12V 2.x) as motherboards have evolved  **CPU Voltage Regulator Module (VRM)**  Present day desktop processors (eg. i7- 7920HQ) have low working voltages to lessen control utilization, eg. Vcore of  0.55 V to 1.52 V.  The PSU gives voltages of 3.3V to 12V for use by the CPU – isn't this too high?  A voltage controller module (VRM), in some cases called processor control module (PPM), changes over the provided voltage to a much lower voltage required by the CPU center. This permits processors with various voltage necessities to be mounted on the same motherboard.  The VRM parts are normally near the CPU itself and has a 12V 4 stick control connector adjacent.  The displays indicated demonstrate more seasoned MBs and VRMs  **CPU Voltage Regulator Module (VRM) :**  High spec or high-performance motherboards will have VRMs with cooling features, eg heatsinks, heat transfer pipes.  **PSU ratings:**  PSU power (Watts) ratings are usually between 250W to 1000W.  Modern power supply have 1200W of Total Power.  **Parallel versus Serial Data Transfer**  • Parallel  - Send a byte or numerous bytes on a transport at any one time.  - Each piece in the byte/s is individually way.  • Serial  - Send one piece at any given moment on a solitary way (a "wire").  - Each piece in the byte/s go on a similar way in a steady progression.  Usually, 8 bits = 1 byte  Parallel versus Serial Data Transfer  • Parallel   * Prone to impedance (eg. crosstalk) and Skew Affect (timing issues   - bits not touching base in sync).   * Short separations as it were. * CPU to Memory, the more seasoned PATA (Parallel ATA or EIDE) HDD interface furthermore, the PCI interior transport for connector cards.   • Serial   * Not as inclined to impedance or timing issues as parallel. * Longer separations. * SATA (Serial ATA) HDD interface, the PCIe interior transport for connector cards.   PCIe x1, x2, x4, x8, x16, x32 – the "x" demonstrating the quantity of serial paths on the Bus slot.  **Adapter Cards:**  An adapter card (or expansion card) enhances functions of a component of the system unit and/or provides connections to peripherals. eg. a NIC Network Interface Card  **Plug and Play (PnP):**  With Plug and Play (PnP), the PC framework consequently design connector cards and different peripherals when you introduce them.  Every single present day framework are PnP. This requires all the accompanying to be PnP perfect:  • Adapter Card  • Motherboard, eg. System BIOS (Firmware)  • Operating System  System resources that are auto configured:  • DMA Channels  • I/O Address  • IRQ  **Before Plug and Play:**  Before attachment and play, the ISA\* transport connector cards (see underneath) had "jumpers" and "plunge switches" that were utilized to design framework assets, for example,  • DMA Channels (Direct Memory Access Channels)  • I/O Address (Input/Output Address of the device)  IRQ (Interrupt Request line) \*ISA (Industry Standard Architecture) 16 bit internal bus predated the  PCI bus.  **Expansion Slots**    • An expansion slot is a socket on the motherboard that can hold an adapter card.  • PCI – Peripheral Component Interconnect (earlier/old).  • PCIe – PCI Express (later/current): PCIe x1, x2, x4, x8, x16 & x32.  **Adapter Slots: PCI and PCIe**  The PCIe x16 slot is usually populated by a graphics/video card.  • x16 (16 serial lanes) for high bandwidth/speed devices.  • x1 & x2 (1 & 2 serial lanes) for low bandwidth devices.  • x4 & x8 (4 & 8 serial lanes) for mid range bandwidth devices.  **PCIe Generations/Versions ( 1, 2 & 3)**  Serial data transfer (bandwidth) is typically measured in bits per second (bps, b/s) however the table to the left show bandwidth in Bytes per second (Bps, B/s).  The PCIe bus is a serial bus made up of separate lanes.  The PCIe generation 4 (x16 - 64GB/s) due for release in 2017.  Generation 5 (x16 - 128GB/s) due in 2019.  **PCIe Lanes**  The PCIe comes in x1, x2, x4, x8, x16 and x 32 serial lanes.  The PCIe x32 is extremely rare (especially for desktop computers) and typically found only on servers. The PCIe x2 and x8 slots and adapter cards are available but not common.  **Adaptor Slots: MSI P67 Motherboard**  You can put a PCIe x1, x2, x4 or x8 card in a PCIe x16 slots. It will just utilize the required number of the accessible 16 paths. Thus you can put a PCIe x1 card in a PCIe x4 and so on. Motherboard with eight PCIe x16 spaces!  Not every one of them are prone to be completely supporting 16 paths - read the specs or information could be imprinted on the board.  For this situation four are x16 and four are x8.  PCI (Peripheral Component Interconnect):  An interior parallel bus initially 32bits and after that 64bits of every 3.3V and 5V inductions. PCI spaces are generally accessible on motherboards to help more seasoned connector cards or cards that don't require the transfer speed/speed of PCIe.  32 bit:  133 MB/s at 33 MHz  266 MB/s at 66 MHz  64-bit: 266 MB/s at 33 MHz  533 MB/s at 66 MHz  Most of the motherboards with PCI slots tend to have the common 32bit 5V slot version.  **Various Adapter Cards:**  Various Adapter Cards are SCSI HDD Controller, TV Tuner, Modem Card, Wireless NIC, Video/Graphics  **Identifying Adapter/Expansion Cards**  • Sometimes there might be data on the card giving some sign with reference to what the card is – regularly there is not.  • Sometimes the assignment on the "fundamental" chip on the card can be a piece of information – find it on the web. In some cases the chips are secured with heatsinks and fans.  The most ideal approach to discover what kind of connector card it is, is to take a gander at the PORTS! Occasionally the ports are related to symbols or content yet regularly they are most certainly not. Know how to distinguish the ports.  The accompanying displays are however little specimen of the tremendous cluster of various extension cards that you may run over. We will focus fundamentally on PCIe x1, x4 and x16.  **Sound Cards:**  Here, We also look at the Creative Sound Blaster with 5.1 channels, 3.5mm analog jacks and PCIe \* 1 Slot, PCI Interface with Gaming port and also look at the PCIe \* 1 interface. Not only this, We also look at the RCA plugs.  **Internal Dialup Analog Modem:**  We look at the dialup modem with RJ 11 port having 6 contacts and larger RJ 45 with 8 Contacts. Also look at the Dialup Modem with RJ 11 jack and with PCI interface where one jack is connected to the telephone cable and another to connect to the telephone.  **Network Interface Card:**  Here in this slide too we look at different Network interface card with different slots in it including both PCIe \* 1 interface and PCI interface. Along with this we discussed and had a look at Legacy Network Interface Card with different connector like Terminator, “T” connector and BNC connector  **Wireless NICs:**  We move on slide 31 and 32 where we look at the different types of slots and its design with one antenna and many antennas.  Video Card Slots: AGP vs. PCIe:  We look at the AGP slots and PCIe slots where AGP called Accelerated Graphics Port was a predecessor Video/graphics bus slot to the PCIe. | | | | |
| **Reflections**  It is a amazing lecture that I got a chance to learn about Pinball machine, Core memory, Magnetic memory like transistor inside glass. Not only this I had no knowledge about CPU-Z in past and came to know that it is used to recognize the features of computer.These stuff are mind-blowing and enhance my knowledge on very new topics. | | | | |
| **Problems & Difficulties**  There was problem recognizing the types of RAM but after I learnt myself and preparing for the test I know those stuffs. | | | | |
| **Trouble shooting**  Moodle clear my doubts. | | | | |

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| **Week 03** | **Session 1 - Monday (2 hr)** | **Date – 24/07/2017** | **Present** |  |
| **Task & Activity**  On that session, we did practical class and we plug out all the cables from power supply and cd drive. Then, we move forward and remove all the graphics card, DVD drive, floppy drive, hard drive, CMOS battery and other removable tools. We must be careful while removing the cables because blue cable is for hard drive and orange one for DVD drive. There also included twisted cable which we had plug into floppy and the another one to the motherboard.  In the same process, we also must plug out all the cables coming from Speakers and Fans put it safe somewhere. The blue cable we discussed before some lines perpendicular jack goes to hard drive and parallel one to the motherboard.  While we are tearing the CPU off the CPU there we saw a Slim Blue Chip in motherboard, if we take off that chip for a while the password we set can be removed. Password might also be removed if we remove CMOS battery for a while as well.  After doing so, we fix the components sequentially as we had done during tearing down the computer. | | | | |
| **Reflection**  Practical class itself is very energetic class as it set every task not in copies and laptops but in our mind that’s why when Stefan first show off about the process then I get everything including the knowledge power supply jacks on which I got confused lot of time in past but this session is of real worth. | | | | |
| **Problems & Difficulties**  There aren’t any difficulties as Stefan told us early to raise question in case of any difficulties. | | | | |
| **Trouble shooting**  Not at all | | | | |

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| **Week 03** | **Session 2 - Thursday (1 hr)** | **Date –27/07/2017** | **Present** |  |
| **Task & Activity**  Today we start our class talking about the Slack channel of 5201-17B.  **Video Card:**  In this session, we look at the Video cards with different slots structure including PCIe \* 1, PCIe \* 16 and they are with different input and output ports. some includes HDMI, DVI and some include Display port.  **Legacy AGP Video Cards:**  AGP video cards were before the appearance of Display port and HDMI port on Video card and consists of S- Video port, DVI port and VGA port.  **SATA HDD Adapter Cards:**  We had a look at the different SATA ports including both PCI interface and PCIe \* 1 interface.PCI interface HDD card consists 4 SATA ports while PCIe \* 1 consists 8 SATA ports.  **SATA, eSATA HDD Adapter Cards:**  Here we have a compact view of cards with PCIe \* 4 Interface with 2 \* eSATA and PCIe \* 8 interface with 4 \* eSATA.    **USB Adapter Cards:**  USB adapter cards are the cards which contains USB ports in it and have almost all kind of interface in it.  **“Multi Function” Adapter Cards:**  It consists SATA port, eSATA , USB 3 port with PCIe of different numbers.  **Specialty Card: TV/Games/Video Capture:**  It have HDMI port and consist 75 ohm Antenna input (Coaxial Cable) with PCIe \* 1 interface.  **Personal Computer System Unit – 4**  **Ports And Connectors:**  Ports: Are a piece of a dynamic gadget where fringe gadgets, for example, console, mouse, USB gadgets, arrange links and so forth associate. Association with the ports empowers fringe gadgets to impart to the System Unit, ie. the motherboard.  Connectors: Are on a link end that connect to a port. - Male and Female Connectors  Jacks, eg. containers where you connect the a link to the divider.  We had a overview of Typical PC ports and have a look on all the computer ports and also have a look at the picture shopwing three types of ports representing their types.  **USB:**  USB stands for Universal Serial Bus ( 127 Devices)   * USB 1.1  - 12 Mb/s in full-speed mode (5 metres) - 1.5 Mb/s in low-speed mode (3 metres) * USB 2.0 (4-5 metres) - 480 Mb/s * USB 3.0(3 metres - depending on cable type) - 5 Gbps (4.8Gbps) - is backward-compatible with previous versions of USB   **USB 3.1:**   * 10Gbps and backward compatible with earlier USB. * USB 3.1 ports can exist with the original, larger shape Type A connector (called USB 3.1 Type-A) or the newer and compact Type C connector (called USB 3.1 Type-C).   **USB-Type C (USB-C) Connector:**   * USB Type C is the emerging industry-standard connector for transmitting both data and power. * USB 3.1 Type-C **Gen 1**: 5Gbps, 3 metres and can provide 100W of power. * USB 3.1 Type-C **Gen 2**: 10Gbps, 1 metre and can provide 100W of power. * The default protocol with the new USB-C connector is now USB 3.1   **IEEE1394a Standard (Firewire 400):**   * Known by the brand Firewire (Apple) & i.Link (Sony) * Support up to 63 devices * Firewire 400 (IEEE 1394a) - 1995 - 400 Mb/s, 4.5m copper   **IEEE1394b Standard (Firewire 800):**  Firewire 800 (IEEE 1394b) - 2002   * 800 Mb/s, 4.5m copper * The standard supports 3200Mbps & up to 100m optical connections.   **IEEE1394c Standard & Beyond:**   * Firewire S800T (IEEE 1394c) - 2006  A new port specification that provides 800 Mbit/s over Ethernet connectors with Category 5e UTP cable. * FireWire S1600 and S3200 – 2008 1600 Mbit/s and 3200 Mbit/s using the same 9-conductor connectors as the existing FireWire 800.   USB is favoured more rather than using Firewire.  **Video ports:**  It includes VGA, DVI, Display port, HDMI and Thunderbolt  **VGA:**   * It refers to Video Graphics Array which was introduced by IBM PSII computers in 1987.It is mostly use by Analog Computer and have 15-pin D-subminiature VGA connector or the 640x480 resolution itself. * Later it supports higher resolution analog standards - IBM's Extended Graphics Array (XGA), Super VGA etc.   **DVI:**   * It was developed by Digital Display Working Group (DDWG) * It is used to control display devices * Developed with the intention of creating an industry standard for the transfer of digital video content. * Designed to transmit uncompressed digital video.   It usually supports analog conectors.  DVI can be configured to support multiple modes such as:   * DVI-D (digital only) * DVI-A (analog only)   DVI-I (digital and analog)  **Display port:**   * It was developed by Video Electronics Standards Association (VESA). * Used to carry USB, and other forms of data and can connect display device * Designed to replace VGA and DVI   **HDMI:**   * It is used for transferring uncompressed video data and compressed or uncompressed digital audio data. * It connects a HDMI-compliant source device, such as a display controller to a compatible computer monitor * It itself is a digital replacement for analog video standards   **Video Ports on Graphics Cards:**  Here we look at the Graphics card with various VGA, DVI, Display port and HDMI port combinations.  **Thunderbolt (an Apple/Intel Development):**   * An I/O technology that supports high-resolution displays and high-performance data devices through a single, compact port. * One simple port and a cable that carries both DisplayPort and PCI Express data. * It provides for PCI Express speed outside the box and hot-plug your external devices like RAID arrays and video capture solutions. * Thunderbolt with symbol of itself Combines PCI Express (PCIe) and DisplayPort (DP) into one serial signal alongside a DC connection for electric power, transmitted over one cable while Thunderbolt with symbol of screen can support upto six peripherals may be supported by one connector through various topologies.   **Network/LAN (IEEE 802.3 - Ethernet):**  Fast Ethernet (IEEE 802.3 100Base-T) - old - 100Mbps over “Category 5” copper twisted pair cable (100m) – RJ45  Gigabit Ethernet (IEEE802.3 1000Base-T) - current - 1000Mbps over” Category 5e & 6” copper twisted pair (100m) – RJ45  10 Gigabit is common on servers. 40 &100 Gigabit are being developed and available.  These are the Optical fibre version of LAN Standards. | | | | |
| **Reflections**  We are IT students so this session is very important as we leart about VGA ports slots,DVI ports and many other as well. I didn’t know much about thunderbolt and I came to know about that from this class. | | | | |
| **Problems & Difficulties**  There is little difficulties in understanding the features of firewire, USB, USB 3.0 and some other as well | | | | |
| **Trouble shooting**  I opened Moodle and go through it and do oral reading which makes me feel understandable. | | | | |

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| **Week 03** | **Session 3 - Friday (2 hr)** | **Date – 28/07/2017** | **Present** |  |
| **Task & Activity**  Good Friday starts with Personal Computer : STORAGE – 1.  **Primary vs. Secondary Storage:**   * **Primary Storage:** (or just called “Memory”) - Computer Memory (typically on the motherboard)   + - RAM – Random Access Memory (Volatile)     - ROM – Read Only Memory (Non-volatile) * **Secondary Storage:** (or just called “Storage”) Typically external of the motherboard, eg. - Hard Disk Drive (magnetic) or SSD - CD/DVD (optical) - USB Flash Drive (flash memory) (All are non-volatile)   Volatile memory are those memory on which data are lost when the power is removed and Non Volatile are those where the data can be placed even the power is removed from it.  **“Secondary” Storage – Medium:** It is the physical component of Computer which Stores Data , instructions and information. Reading and writing methods are typically magnetic, optic and electronic.  **Secondary Storage:**  It stores data for future use eg. OS, Word Documents, etc.   * A “DOS” (Disk Operating System – eg. Windows) is loaded from the hard disk drive into memory/RAM during the system boot (start-up) process. * The application (eg. MS Word) is loaded into memory/RAM when you select the application from the Start menu or open the application from an icon on the desktop etc. * The information/data is loaded into memory/RAM when you use the application to open/retrieve a data file from storage. It is copied from memory/RAM to storage when you save the data/file.   **Storage Capacity – Measurement:**  Had a through view on Storage term, Approximate no. of Bytes and Exact no. of Bytes.  **Computer Storage – Measurement:**   * There had been confusion about what value a kB, MB, GB, TB etc. actually represent. eg. is a GB 1,000,000,000 or 1,073,741,824? * To differentiate between then we have a decimal name and a binary, eg. Gigabyte (GB) and Gibibyte (GiB)   **Storage: Two Main Processes:**  Reading- It is the process of transferring items from a storage medium to memory  Writing- It is the process of transferring items from memory to a storage medium  Secondary storage is Slower than that if RAM.  **Hard Disk:**  Sometimes it is called HDD and sometimes it is called Fixed disk  It contains one or more hard circular patterns which are typically made from ceramic metal. The platters are coated on both sides with magnetic particles i.e. Ferric Oxide or similar  **Hard Disk: 1’s & 0’s:**  The North/South orientation of magnetic particles is used to store binary data (1s and 0s), for example:  “**N-S**” may be a “**1**” and “**S-N**” may be a “0”.  Hard disks can store data using:   * Longitudinal recording is old method * Perpendicular recording is the currently used type   **Characteristics of a HDD:**   * Platters * Read/Write Heads * Tracks * Cylinders * Sectors (a physical/hardware concept)   **HDD: Zone Recording:**  At past no. of sectors per tracks are same and there is inefficient use of medium.The Curface of harddisk is divided into parts. As distance from the centre increases, the number of sectors in each “angle”/segment increases, eg. from one (red) to two (green) to four (grey).  Zone recording Improve the storage efficiency of Storage Devices.  **How a HDD Works:**  Image result for how HDD works  **Hard Disk – Reading/Writing 1’s & 0’s:**  Without getting into the detailed Physics, there is a strong relationship between electrical current and magnetism.  **Writing to Disk:**   * A +ve current in the read/write heads will induce a magnetic field that causes magnetic particles to align in a N-S direction for example, to write a “1” to disk. * A –ve current (flow in the opposite direction) in the read/write heads will induce a magnetic field that causes magnetic particles to align in a S-N direction for example, to write a “0” to disk.   **Reading from Disk:**   * A magnetic particle (N-S for instance) moving under the read/write heads will induce a +ve current in the read/write head. This could be interpreted as a “1”. * A magnetic particle (S-N for instance) moving under the read/write heads will induce a -ve current in the read/write head. This could be interpreted as a “0”.   **HDD: Head Clearance**:  Disk read/write heads are the small parts of a [disk drive](https://en.wikipedia.org/wiki/Disk_drive) that move above the disk platter and transform the platter's magnetic field into electrical current (read the disk) or, vice versa, transform electrical current into magnetic field (write the disk). The heads have gone through many changes over the years.  **Access Time:**  All in all, get to time is the aggregate time it takes the PC to process an information ask for from the processor and after that recover the required information from capacity.  Smash - measured in nano seconds  HDD - measured in milli seconds.  The plate drive's normal get to time is the interim between the time a demand for information is made by the framework and the time the information is accessible from the drive.  As the HDD is a mechanical gadget, setting off to a specific area to peruse a division of information requires time for the heads to move to the required track and after that more opportunity for the required segment on the turning platter to show up under the heads.  **HDD access time includes:**  Seek Time - the amount of time it takes a hard drive’s read/write head to find the physical location of a piece of data on the disk.  Rotational Latency - the average time for the sector being accessed to rotate into position under a head, after a completed seek.  These are average times since it depends on how far away the head is from the desired data.  Other than the seek time and rotational latency, access time includes other overheads, eg. command processing time.  **HDD: Disk Spin Speed (RPM):**   * Disk Spin Speed in revolutions per minute (RPM) is an important factor in disk performance.   Given two identically designed hard drives with the same areal densities, a 7200 RPM drive will deliver  data about 33% faster than the 5400 RPM drive.   * Consumer hard disk drives operate at 5,400 RPM to 10,000 RPM, with most desktop HDDs spinning at the standard 7,200 RPM. Enterprise-level drives may be up to 15,000 RPM.   **HDD: Data Transfer Rates:**  The data transfer rate, or DTR, is the speed (MBps) at which the computer can transfer data from the HDD across the PATA, SATA or SCSI interface to the CPU.  This can be the source of some confusion. Some vendors list “internal” transfer rates as:  The rate at which the disk moves data from the head to its internal buffers.  Others cite the burst data transfer rate, the maximum transfer rate the disk can attain under ideal circumstances and for a short duration.  More important for the real world is the “external” data transfer rate, or how fast the hard disk actually transfers data to a PC’s main memory.  **Hard Disk Cache:**  Hard disk enhance their get to time by utilizing disk store. Disk cache, occasionally called a buffer, comprises of memory chips on a hard plate that stores often got to things. Store memory is normally 8 to 64 MB.  **HDD characteristics:** Although a HDD may be advertised as having 4 platters (8 heads) – this is what the HDD logically reports to the system BIOS.  Physically the disk may have a different platter/head configuration.  **HDD: Advanced Format:**   * Traditionally (magnetic) hard disks had a physical sector size of 512 bytes. * With the storage industry moving to higher areal density of magnetic storage and HDDs with capacities of > 10 TB, the error correction mechanisms were becoming space inefficient, ie. an increased amount of overhead is required to ensure the media is usable. * A solution for improving this error correction mechanism was to introduce a different physical media format that includes a larger physical sector size.  This new physical media format is called Advanced Format– sectors are 4096 (4K) bytes.   **HDD Sector Comparison: 512 vs. 4096 (4K):**  The storage efficiency of the Advanced Format Drive compared to the traditional 512 byte drive – 88.7% vs. 97.3%  There are overheads for storing a sector, ie. additional space needed to support the actual data stored and ensure the media is usable.   1. This 15 bytes of overheads includes an “inter-sector” gap which allows time for the disk controller to synchronise and get ready to read the sector; a sector header that stores the sector’s address. 2. The Error-Correcting Code (ECC) is additional bytes stored with the data to help detect/correct errors (overheads of 50 bytes and 100bytes respectively).   **Typical Desktop HDD Specs:**  Seagate range of HDDs for Desktop computers - 1TB to 4TB and the rotation speed is 7200 RPM.  **Large Capacity HDD:**  HGST (Western Digital) Ultrastar He12  Enterprise Hard Drive:   * Release Apr 2017 * 3.5-inch * Helium filled * 12TB 3.5” Helium filled * 6Gb/s SATA and 12Gb/s SAS interfaces * Price not available yet but a similar Seagate 10TB drive released in 2016 was US$550   **HDD: Controller/Interface:**  A HDD will have a HDD Controller/Interface associated with it to control the transfer of data from the disk to and from the system.   * PATA: Parallel ATA (HDD/Optical Drive interface) - It is the old one. Previously known as IDE and EIDE (Enhanced Integrated Drive Electronics). * SATA: Serial ATA (HDD/Optical Drive interface) –typically used at modern periods. (A SATA RAID adapter supports RAID arrays).   eSATA: external Serial ATA (HDD/Optical Drive interface).  ATA are usually called Advanced Technology Attachment.  Present day drive interfaces, eg. SATA3 which "hypothetically" has a 6Gbps exchange rate (real is more like 4.8Gbps or 600MBps), are not a constraining component for HDDs – the interface can without much of a stretch adapt to the information rate from the run of the solid-state drive.  This may not keep on being the situation for the quicker present day Solid State Drives (SSDs) that are consistently being discharged.  **HDD: PATA/EIDE (Legacy) – Parallel ATA:**  This uses Parallel signals of (16 bits) to transfer data.  40 pin cables (80 conductors) up to about 0.5m.  Typically, 2 PATA motherboard sockets (Primary & Sec). Each socket can have a ribbon cable that supports two drives (Master/Slave).  Jumpers on HDD to select Master/Slave.  Data transfer rates from 33 to 133 MBps.  RPM – 5400 & 7200 typical  **HDD: SATA – Serial ATA:**   * Serial signals to transfer data * 7 pin data cable * Typically, 4 SATA ports on MB (one drive per port). * Data transfer rates: 150-200 MBps (typical) * RPM – 5400 to 10,000 with 7200 being typical for desktop computers. * SATA interface standards: * SATA1 - 1.5 Gbps, SATA2 - 3.0 Gbps, SATA3 - 6.0 Gbps   **HDD: eSATA – external SATA:**   * Traditional HDD have several ports i.e. eSATA, FW400, FW800 and USB. In some laptops which combine ports eg. eSATA + USB was common.   **HDD: Other Controllers/Interfaces:**  SCSI was an 8 bit and 16 bit parallel data interface but it is also used as SAS -Serial Attached SCSI for use in modern systems.  SCSI are not found in desktop computers but are common in Servers and RAID arrays.  **Features of SCSI are:**   * It transmits data in parallel form i.e. 8 bit “narrow” SCSI or 16 bit “wide” SCSI. * Long distances, eg. up to 6m compared to PATA’s 0.5m * Typically the controller of SCSI provide an adapter card card with 7-15 peripheral devices per controller. * RPM – 7200, 10000 and 15000 * They are High performing drivers - typically used in Servers in a RAID configuration.   **Flash Memory Storage:**   * They are type of So;id State Components containing no mechanical parts * Non Volatile memory and can be erased electronically and re written.   Uses of Flash Memory:   * + Solid State Drives (Notebooks and Desktops – fixed in the device)   + USB Flash Drives (Ubiquitous portable storage)   + Memory Cards (Portable, mostly for hand-held devices)   **SSD vs. HDD:**  Advantages of Solid State Drives over Hard Disks:   * Faster access time and faster access rate * It takes less power, generate less heat without any noise. * Smaller & Lighter in Weight. * Less Prone to Shock and Vibration. * Potentially more Durable and Longer Life Span - no moving parts.   **SSDs – Use NAND Flash Memory:**  There are distinctive real sorts of NAND:  SLC - Single Level Cell  Is the most costly, however has quicker compose speeds, bring down power utilization, and higher Program/Erase (P/E) cycles. SLC is regularly utilized for big business review arrangements.  MLC - Multi-Level Cell Has a lower cost because of higher information thickness, however experiences bring down compose speeds, bring down P/E cycles, and higher power utilization than SLC. MLC is the customer review standard.  TLC - Triple Level Cell  Is denser than MLC, intensifying both the professionals and the cons. Meaning, it is the most minimal costing per GB with bring down compose rates and P/E cycles with the advantage of higher stockpiling thickness. TLC is additionally shopper review, yet not as generally found as MLC.  **SSD “Issues” – “Latency” Writing New Data:**  With SSDs, new information must be composed on totally new or eradicated cells of the drive.  Since the space must be cleared preceding a compose, if enough free space is not effectively accessible at the time a document is being composed, it must be eradicated first. This can adversely influence execution.  **TRIM:** To defeat this issue, present day working frameworks take into consideration a capacity called "TRIM". On the off chance that the working framework were to eradicate unused space before composing new information, when the gadget is not at the same time attempting to compose, record sparing execution could be moved forward. TRIM is regularly killed of course, it must be empowered.  HDDs can straightforwardly compose new information (a bit) to a capacity cell with no exceptional planning. Attractive introduction of a cell is changed specifically – there is no compelling reason to initialize or "clear" it before composing the new information.  **SSD “Issues” – SSD Longevity:**  SSDs have no moving mechanical parts yet they do "destroy" after some time. That is, every cell in a flash memory bank can be composed to and erased a limited number of times (ie. number of cycles). Erasable optical media, for example, CD-RW and DVD-RW are evaluated up to 1000 cycles however flash memory used as a part of SSDs has a substantially higher cycle rating.  Wear Leveling is a strategy for drawing out the administration life of SSDs and other flash memory media.  Wear leveling endeavors to work around these restrictions by organizing information with the goal that eradications and re-composes are dispersed equitably over the medium. Along these lines, no single erase block prematurely fails because of a high convergence of compose cycles.  **SSDs – Types (Form Factors):**   * 2.5” SSD Like a HDD in that it uses the usual SATA interface and associated power/data connectors. * mSATA or mini-SATA It is a bear circuit board smaller than a 2.5” SSD. It’s small form factor makes it a compact choice for ultra-notebooks and other small form factor PCs that require a small footprint   **SSDs – Types (Form Factors):**  M.2 SSDs Like mSATA drives in that they additionally come in as an uncovered circuit board. The name alludes to the shape factor and connector and there are both SATA and PCI-E variations. The M.2 frame factor has a wide range of width and length combinations, considering greater flexibility in its usage .  PCI-Express SSDs Uses the PCI-e slots for their interface. Relatively more costly (cost per GB) however offers high performance.  **Typical Desktop SDD Specs:**  SAMSUNG V-NAND SSD 850 PRO  – 512 GB Model (Size range 128Gb – 2TB)   * Interface: SATA3 6Gb/s * Form factor: 2.5 inch * Cache memory: Low Power DDR2 SDRAM (up to 1GB) * Sequential Read: Max. 550 MB/s * Sequential Write: Max. 520 MB/s * TRIM support: Yes (Requires OS support) * Endurance -Terabytes Written: 300 TBW (lookup “TBW”)   The larger capacity drives have the larger amount of cache.  **Large Capacity SSD:**  Dec 2016:   * Seagate 60TB * 3.5” form factor, SAS interface * Pricing not available yet * Aimed at data centres   March 2016:   * Samsung 16TB * 2.5” form factor, SAS interface * ~ $10,000 US * Enterprise   **Large Capacity USB Flash Drive:**  Jan 2017   * Kingston DataTraveler Ultimate GT 2TB USB 3 US$5000 * Kingston DataTraveler HyperX Predator  1TB USB 3 240MB/s Read, 160MB/s Write US$2700   **SD Memory Cards:**  There are three types of Memory cards. They are as follows:   1. Standard 2. Mini 3. Micro   **SD: Card Capacity:**  The three main categories of SD card capacity are:   * Secure Digital Standard Capacity (SDSC)   2 to 4 GB   * Secure Digital High Capacity (SDHC)   Up to 32 GB   * Secure Digital extended Capacity (SDXC)   32 GB to 2 TB    **Partitioning Storage:**   * Partitioning a storage device is the process of dividing the available storage capacity into smaller sections. * Disk partitioning is separating one physical disk “drive” into multiple independent “volumes”.   It is performed using an operating system utility.  Partitioning will be discussed further in the operating systems section of the course.  Also look at the You tube videos. | | | | |
| **Reflections**  I got an oppurtunity to learn about the ports and slots in this session and now I can easily determined the pots and slots on the motherboard and and use any sorts of interface cards on my own. | | | | |
| **Problems & Difficulties**  There are some hard stuffs as well as we have to remember features of each type of memory card and HDD. | | | | |
| **Trouble shooting**  No rouble shooting,after reading the slides orally at home. | | | | |

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| **Week 04** | **Session 1 - Monday (2 hr)** | **Date – 31/07/2017** | **Present** |  |
| **Task & Activity**  Today in this session, Stefan discussed about the reflection once again and talks about the Portfolio assessment. After that we start our regular class from Storage 2.  **PC:**  **Optical Storage:**  **Discs vs. Disks:**   * Discs (Optical)   + A disc refers to optical media, such as an Audio CD, CD-ROM, DVD-ROM, DVD-RAM, or DVD-Video disc etc.   + Some discs are read-only (ROM), others allow you to burn content (write files) to the disc once (such as a CD-R or DVD-R, unless you do a multisession burn).   + Some can be erased and rewritten over many times (such as CD-RW, DVD-RW, and DVD-RAM discs).   + You cannot partition an optical disc into smaller volumes. * Disks (Magnetic/Flash)   + A disk refers to media, such as a floppy disk, your computer's HDD or SSD drive, an external hard drive.   + Disks are always rewritable unless intentionally locked or write-protected.   + You can partition a hard disk into several smaller volumes.   **Optical Discs:**   * Read Only Memory (ROM):   Data is “pressed” on the disc at manufacture and is read using a laser, eg. CD-ROM/DVD-ROM).   * Recordable (R): (“WORM” – Write Once Read Many)   Data is written to and read using a laser, eg CD-R/DVD-R.  Also known as “WORM” – Write Once Read Many.   * Re-Writeable (RW):   Data is written to and read using a laser, eg CD-RW/DVD-RW.  **Optical Discs:**  An optical plate is a level, round bit of plastic material (eg. polycarbonate).  120mm in measurement and around 1.2mm thick.  A few gadgets (games consoles or versatile gadgets) may utilize smaller than normal optical minimized plates that are 80mm width.  Portable Media:  Cd: Compact Disk  DVD: Digital Video (Versatile) Disk  HD-DVD: High Definition DVD  **BD: Blu-Ray Disk**  **Reading Data from CD-ROM:**  CD ROM disks include a thin layer of intelligent material on which are pressed microscopic "pits" (spaces) and "lands" (pads) to speak to double 0 and 1. (Data and Audio CD-ROMs).  **CD-ROM: “Track” and Sectors:**  Optical disk stores data in a single track that spirals from the center of the disc to the edge.The track is divided to even sectors.  One sector of an optical disc typically holds 2352 bytes (this may include overheads).  **CD-ROM – Transfer Rates (“1x”):**  CD- ROM are rated to speed factor relative to music/audio CD’s.  In the event that a CD-ROM is perused at an indistinguishable rotational speed from a sound CD, the information exchange rate is 150 KiB/s, generally called "1×". (1x is 150KiB/s)  At this information rate, the track moves along under the laser spot at around 1.2 m/s - a moderately consistent straight speed.  To keep up this straight speed as the optical make a beeline for various positions, the rakish speed (RPM) is changed from 500 RPM at the inward edge to 200 RPM at the external edge. (You may hear the change in rotational speed).  **CD-ROM – Transfer Rates (> “1x”):**  By expanding the speed at which the disc is spun, information can be exchanged at more noteworthy rates.  A CD-ROM drive that can read at 8× speed turns the disc at 1600 to 4000 rpm, giving a direct speed of 9.6 m/s and an exchange rate of 1200 KiB/s.  Over 12× speed most drives read at Constant Angular Velocity (CAV, ie. steady RPM) with the goal that the engine is not rolled out to improvement starting with one speed then onto the next as the head looks for from place to put on the disc.  In CAV mode the "×" number signifies the exchange rate at the external edge of the disc, where it is a most extreme  **CD-ROM - Data Transfer Rates:**  We had a look at the different transfer rates of CD’s as well along with its capacities.  **Recordable/Re-writable Optical Disc:**  Compact disc R: Recordable (R) disc media has a color material (phase transition crystals) in the circle substrate that can be rolled out to improvement to shapeless states from the warmth produced when laser light is centered around these gems. Two unique powers of laser light (which make two distinct levels of warmth/temperatures) deliver two reflectivity modes. This procedure is alluded to as "burning".  The two reflectivity modes can be gotten by the perusing laser and meant 1 and 0. (Like CD-ROM).  Compact disc RW: Re-Writeable (RW) are like recordable however information must be cleared first (organized) by a laser before being re-composed. A laser at a particular (lower) force will produce adequate warmth to cause the color stage change material to come back to a writeable state.  **Re-writable Optical Disc:**  Cd RW disc, similar to all optical stockpiling media utilizing stage change innovation, has a breaking point to the quantity of times the recording layer in a can be dependably exchanged between its crystalline and shapeless states.  At present, CD-RW disc can "as far as anyone knows" be changed around 1000 times (as indicated by a few sources).  The problem with Optical media us that they have always limited life expectancy.  **CD: Compact Disc (120mm):**   * Media Capacity: 650MB to 900MB * Read Transfer Speed: 1x (150 KiBps) to 56x (8400 KiBps)  - 72x (10800 KiBps) using multibeam (not common)   CD-ROM (Read Only)  CD-R (Recordable, WORM)  CD-RW (Re-writeable)  Specification Example:  A 12×/10×/32× CD drive can   * write to CD-R discs at 12× speed * write to CD-RW discs at 10× speed * read from CDs at 32× speed   CD’s are single sided.  DVD: Digital Video (Versatile) Disc:  DVD-ROM (Read Only)  DVD-R/DVD+R (Recordable Formats)  DVD-RW/DVD+RW/DVD-RAM (Re-writeable Formats)  **BD: Blu-ray Disc:**  Blu-beam Disk (BD) was intended to supersede the DVD arrange.  Fit for putting away hours of video in superior quality (720p and 1080p) and ultra top quality determination (2160p).  Is a medium for video material, for example, include movies and physical circulation of computer games for the PlayStation 3, PlayStation 4, and Xbox.  The name "Blu-Rayalludes to the blue laser (particularly, a blue laser) used to peruse the plate, which enables data to be put away at a more prominent thickness than is conceivable with the more extended wavelength red laser utilized for DVDs.  BD-ROM (Read Only)  BD-R (Recordable) for PC data  BD-RW (Re-writeable) for PC data  BD-RE (Recordable Erasible) for HDTV recording  Also we had look at the picture comparing the optical storage media.  **Care of Optical Media:**  Optical disc as exceptionally powerless to harm, eg.  The surface can be effectively scratched.  They can without much of a stretch be distorted because of warmth (inside an auto out in the sun).  Discover more on the "Do's" and "Do Not's" identified with the care of optical media.  Then we talked about the future of Optical Storage and move on the Cloud storage and Google Drive. Microsoft One Drive is previously called Sky Drive.  **Cloud Storage Providers:**  On this part, we take a example of Google Drive.  **Cloud Storage: Advantages**:  Cloud storage is an Internet Service that gives offsite capacity to PC clients.  **A few Advantages of Using Cloud Storage:**  Compact get to anyplace (from any figuring gadget where you have Internet availability).  Store extensive video and illustrations documents that can take up your hard plate space. (May set aside opportunity to transfer?)  Enable access to your documents to others - share photographs, sound, and video, Offsite reinforcement.  Constrained capacity for nothing, pay choices for more storage  **Magnetic Tape Storage:**  It is Magnetic created ribbon used to store a large amount of data. It writes and reads data on a tape in sequential way.  Economic data retention (0.5 - 3 NZ cents per gigabyte) - used as a backup medium for servers - archiving in the Cloud.  **LTO-7: Linear Tape Open 7 Standard:**   * 6TB of native storage, 15TB on a compressed cartridge * NZ$170 per cartridge (approx. 1 - 3 NZ cents per GB) * Up to 300 MB/sec native transfer rate, up to 750 MB/sec compressed.   **Smart Cards:**  Normally the Size of smart Card(replacing attractive stripe cards).  Normally utilized for money related exchanges, ID and other information  An attractive stripe card contains an attractive stripe that stores data.  A Smart card stores information on a thin microprocessor chip inserted in the card. (Exist as contact or contactless Smart cards).  It doesn’t require physical contact, reader reads it and requires an antenna to communicate. It doesn’t have internal power source but depends on the radio- frequency.  Had a view of Media Life Expectancy (LE). | | | | |
| **Reflections**  This is an wonderful lecture that I get a chance to read about new stuffs like CD ROM, Blue Ray Disc and many more and I learn many things about Cloud storage and can work under the learnt topics effectively and efficiently. | | | | |
| **Problems & Difficulties**  No problems at all | | | | |
| **Trouble shooting**  Not at all | | | | |

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| **Week 04** | **Session 2 - Thursday (1 hr)** | **Date – 03/08/2017** | **Present** |  |
| **Task & Activity**  **Personal Computer: OUTPUT DEVICES – 1: Display Devices**:  **What is Output?**  It is a information that can be proceed into a useful form.  The form of output varies – it depends on the hardware and software used and the user’s requirements.  **Types of Output (“Multimedia”):**   * Text: hardcopy printouts, text on websites, text on mobile phones, etc. * Graphics: logos, charts, drawings, clip arts, photos, animated graphics, etc. * Animation: computer generated imagery, simulations of complex things, etc. * Audio: audio music, listening to live news on the web, sports, VoIP (Voice over IP) etc. * Video: video clips, video tutorials, watching live news and sports, VoIP (Video over IP) etc.   **What is an Output Device?**  It is the device that can distribute information to many people and can express one or more elements of Multimedia – text, graphics, animation, audio, video etc.  **Online Color Chart:** The three individual RGB primary display colours can be specified using:   * Decimal (0 – 255)  eg. 255 100 50   or   * Hexadecimal (00 – FF) eg. FF 64 32. * H – Hue (or tint, ie. the actual colour) * S – Saturation (amount of grey in the colour) * V – Value (luminosity or brightness, ie. the amount of white in the colour )   **Pixels & Sub Pixels:**  A monitor has many rows of picture elements (millions of pixels). Each picture element (pixel) is made up of three sub pixels (primary colours R, G & B). By independently varying intensities of each of the three sub-pixels (RGB) all colours can be created.  **LCD : Controlling the Light Intensity:** A white backdrop illumination (unpolarised) lights up the whole back of the LCD board. The white light experiences a polariser and after that through every LCD component (sub-pixel).  LCD can get all the colors by controlling intensity of lights passing through each of the three RGB sub-pixel LCD elements.   * LCD Displays: Backlighting: Cold Cathode Fluorescent Lamp (CCFL) * With CCFL, fluorescent tubes powered by an inverter generates white light. The inverter is used to convert direct current (DC) to alternating current (AC). * The florescent backlight is located behind the LCD screen while the inverter, is behind the screen panel. * To replace the backlight, you must completely disassemble the display. Mercury is a key ingredient in fluorescent backlights. * LED Backlights * Uses LED technology to create the white backlight. * Consumes less power and runs cooler. More reliable & lasts longer. * Produce images with greater dynamic contrast. * Makes for slimmer and lighter panels. * Safer for the environment when disposed - LEDs do not contain mercury. * Longer life span than CCFL.   **LCD Monitor: Specifications:**  **Resolution:**  Pixels evenly and vertically, eg. 1920x1280.  **Response Time:**  The time in milliseconds (ms) that it takes to kill a pixel on or.  **Brightness:**  Measured in "nits" and the higher the nits, the brighter the picture. Nits is a measure of luminance - light produced per unit territory. One nit is proportionate to one candela for each square meter. (1 nit = 1 cd/m2).  Pixel Pitch: The separation in millimeters between pixels.  Contrast Ratio: Difference in light between the brightest white and dark black.  **LCD: Pixels & Native Resolution:**  A pixel ("picture component") is the essential unit of controllable (or programmable) shading on a PC show or in a PC picture.  On a LCD Monitor it is three LCD components (R, G and B).  The local determination is the quantity of pixels on a level plane and vertically  Ideal show quality can be achieved just when the flag input determination coordinates the local determination.  In the event that the info determination does not coordinate the local determination a LCD screen needs to depend on insertion (scaling of the picture), which causes lost picture quality. A LCD needs proportional up a littler picture to fit into the range of the local determination.  **LCD: Optimal Quality/Resolution:**  Ideal show quality can be achieved just when the flag input determination coordinates the local determination.  A few resolutions could function admirably, in the event that they are correct products of littler picture sizes. For instance, a local determination 1600×1200 LCD (4:3 viewpoint proportion) could show a 800×600 (4:3) picture well, as each of the pixels in the picture could be spoken to by a piece of four on the bigger display. A local determination 1920x1080 (16:9 angle proportion) could show 800x600 (4:3) through insertion/scaling.  Here as well we had discussed about resolution comparing with pixels.  **Resolution:**   * Native resolution is 1920 x 1080 (aspect ratio -16:9) * Possible resolution 800 x 600 (aspect ratio 4:3) would be achieved by interpolation/scaling.   **Monitor Modes:**  The available “Modes” are a combination of:   * Resolution * Colour   + Number of bits for each pixel to store the colour information.   + True Colour (32 bit) requires 32 bits (4 bytes) of video RAM per pixel.   + High Colour (16 bit) requires 16 bits (2 bytes) of video RAM per pixel. * Refresh Rate   + The number of times the screen is redrawn per second - measured in Hertz (Hz), eg. 60Hz.   **Monitors: Refresh Rate:**  **CRT Monitors (Legacy):** Low invigorate rates would give detectable "glinting" of the picture as it is being redrawn and would be challenging for the eyes.  **LCD Monitors** Refresh rate: or the "fleeting determination/fikering" of a LCD is the quantity of times each second in which the show draws the information it is being given. Since initiated LCD pixels don't streak on/off between outlines, LCD screens display no revive instigated glimmer, regardless of how low the invigorate rate.  **Video/Graphics Adapter Card:**   * GPU (Graphics Processing Unit) is a chip on the graphics card that controls the manipulation and display of graphics on a display device. * LCD monitors use a digital signal and should plug into a DVI port, and HDMI port, or a Display Port. * Some graphics cards and LCD monitors may also support the standard analog “VGA” port.   We also talk about its components i.e. GPU”A” and Memory/RAM(“B”).Along with this we had discussed about Video BIOS and RAMDAC. Similarly, we look at the picture showing Video adapter expansion card slots.  **GPU-Z:**  GPU-Z is a useful utility to discover the specifications and features of your video/graphics adapter.  **Display Resolution Standards:** We had a look at the table which shows the display standards from CGA to HDTV and also had a look at Display Resolution Standards.  **Display (Monitor & TV) Resolutions:** **Current High Definition (HD):**   * HD Ready 1280 x 720 ie. ≈ 1 MPixels * Full HD 1920 x **1080** ie. ≈ 2 MPixels * Quad HD 2560 x 1440 ie. ≈ 3.6 MPixels   Emerging Ultra High Definition (UHD):   * 4K 3840 x 2160 (3840 ≈ 4K, ie. 4000)  ie. ≈ 8MPixels * 8K 7680 x 4320 (7680 ≈ 8K, ie. 8000)  ie. ≈ 32MPixels   **Professional 4K LCD Monitor:** Samsung U32D970Q   * 31.5 inches (32”) * 3840 x 2160 * Pixel Pitch: 0.18 mm * 16:9 * LED Backlight * 90 – 110 Watt * Brightness: 350 cd/m2 * Contrast ratio: 1000:1 * Refresh Rate: 60Hz * Viewing Angles: 178⁰ H, 178⁰ V * Weight: 13.7 kg * 8 ms response (“grey-to-grey”) (maybe a bit high for gamers looking for 1 to 2ms) | | | | |
| **Reflections**  I came to know about the actual definition of Output devices and know about the color mixing in LCDs and their resolution. | | | | |
| **Problems & Difficulties**  No problem . | | | | |
| **Trouble shooting**  There aren’t hard stuffs to understand. | | | | |

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| **Week 04** | **Session 3 - Friday (2 hr)** | **Date – 04/08/2017** | **Present** |  |
| **Task & Activity**  In this session, we had discussed about Video Adapter Support 4k Displays and its functioning.   1. GPU:  Nvidia GTX 1080 FE, 1607 MHz 2. Video RAM:  8GB GDDR5 256 bit interface 3. Power: 180W  (more than typical Intel i7 CPUs) 4. Max. Resolution: 7680 x 4320 5. 4K Gaming Adapter <<< advertised as 6. Multi Monitor Support: 4 7. 2017 - NZ$1200   After that we discussed about Touch screens giving examples of electrostatic touch screens, Plasma TV monitors use gas Plasma technology. When voltage is applied in it the gas ionizes.  **CRT Monitors:**  It have vacuum inside and not in use these days as it is heavy to carry and can be used keeping it in desk.  **Projectors:**  Digital projectors are the widely use dprojector these days which gives the crisp images.  **Interactive White boards:**  An interactive whiteboard is a touch-sensitive device, resembling a dry-erase board, that displays the image on a connected computer screen.  **Personal computer Output 2** includes Printers, audio Output and Other Output Devices.  **Output devices – Printers:**  A printer is an output device that produces text and graphics on a physical medium such as paper. Printed information is known as a hard copy (versus soft copy eg. a PDF/Word document).  We look at the Dot Matrix Printer, Non impact printers and inject printers along with their working function.  Laser Printer:  They are based on electrostatic process .  Charging  Exposing  **Enterprise Colour Laser Printer:**  HP Laserjet Enterprise 500 M551dn   * 32 pages per min * 1200 x 1200 dpi * Up to A4 * CMYK Cartridges * Colour Toner 6000 pages est. * BW Toner 5500 pages est. * Memory 1024 MB * Various media (“paper”)  types supported * Ethernet and USB * Auto Duplex * 2017 - NZ$1400 * Toner cartridges (CMYK) NZ$340 each   **Thermal Printer (Direct):**  Warm printing (or direct warm printing) is a computerized printing process which delivers a printed picture by specifically warming covered thermochromic paper ("warm paper") when the paper disregards the warm print head. (Regularly utilized for EFTPOS receipts).  The covering hands dark over the zones where it is warmed, creating a picture.  Two-shading direct warm printers can print both dark and an extra shading (frequently red) by applying heat at two distinct temperatures.  **Dye-Sublimation Printer:** he picture is imprinted on uncommon warmth exchange paper utilizing sublimation "ink" (ie. color suspended in a fluid/gel).  Works like an inkjet printer however utilizes extraordinary sublimation "ink" and paper.  The printed picture on the paper is set face down onto the surface/object\* that will get the picture.  Utilizing a warmth press, the warmth makes the color on the paper be changed over from a strong to a vaporous state empowering them to infiltrate the surface with the goal that a perpetual, full shading picture is framed.  **Plotters:**  Instead of transferring toner or squirting ink, plotters use a pen, pencil, marker, or another written work device to draw different, persistent lines onto paper (and different materials) as opposed to a progression of dabs like an ordinary printer.  Plotters can consequently change their pens thus can deliver shading yield.  Plotters are utilized to deliver a printed copy of schematics or drawings/charts, for example, outlines, maps and electrical circuit graphs and so forth.  They can "print" on a wide assortment of level materials including plywood, aluminum, sheet steel, cardboard, and plastic.  Despite the fact that once generally utilized for PC supported plan, the customary utilization of these gadgets for huge size yield has been supplanted by different printers, eg. by wide-organize printers.  **What Printer?**  When choosing a printer for typical business/personal, each technology will have its specific strengths and uses. General selection criteria would include:   * Black print or colour print. * Resolution (dpi). * Speed (ppm - pages per minute). * What size/range of print media is supported. * How many pages can be printed before replacing toner/ink cartridges. * Software & drivers for your operating system. * Cost of the printer. * Cost of consumables – paper, toner/ink cartridges etc. * Warranty.   We also look at You Tube and know how 3D printer works.  **Audio Output:**  Audio output devices produces generally sound and music, speech. Computers user too attach speaker for high quality sound.  Nowadays, we use sound output to send voice messages and many other purpose.  For output we use Headphones, surrounding Speakers and other devices as well.  To play a video games we use Joystick as well which is also a output device. | | | | |
| **Reflections**  Here in this session I got an opportunity to learn about the Monitors, types of Printers and other output devices. These stuffs are not all new that’s why it’s pretty easy to understand almost everything. | | | | |
| **Problems And Difficulties:**  No problems | | | | |
| **Trouble shooting**  Everything is Awesome. | | | | |

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| **Week 05** | **Session 1 - Monday (2 hr)** | **Date – 07/08/2017** | **Present** |  |
| **Task & Activity**  Here, we talked about Mobile Devices.  Most common Mobile devices are   * Laptops (and include Notebooks/Ultra Notebooks) * Tablets * Phablets * Smart Phones * Other (Location/GPS, etc)     **Laptops:**  Most common laptops are McBook, Windows and Linux. They are light in weight and typically of 11” to 18 “. It is introduced in order to replace Desktop computers.  Its motherboard and every space inside it is compact but contains all the components used by PC’s.  We look at the components of laptops its RAM module ,How it’s CPU works and so on.  **Laptop vs. Desktop: CPU:**   * Intel Core i7 Mobile   i7-7920HQ (7th Generation)  - 3.1 GHz (base freq)  - **TDP 45 Watt**  - Socket BGA1440   * Intel Core i7 Desktop   i7-7700K (7th Generation)  - 4.2 GHz (base freq)  - **TDP 91 Watt**  - Socket LGA1151  We discussed about laptops storage, optical drivers, Batteries, etc.  Microsoft Surface Pro:  Had a overlook at it’s Motherboard, processor, battery and internal overview.  **Laptop/Mobile Devices: Displays:** There are three main types of laptop/mobile displays:   * **Liquid-Crystal Display (LCD)** LCDs pixel elements do not generate their own light, they require a “backlight” (CCFL or LED) to shine through the screen and illuminate the display. Currently the most common and cheapest of these displays. * **Light-Emitting Diode (LED)** LED pixel elements generate their own light. LED displays use less power and typically have a longer lifespan than LCD displays.   **Organic Light-Emitting Diode (OLED)** Commonly used for mobile devices and digital cameras, but can also be found in some laptops. (Thinner and lighter displays).  **LCD Display Technologies: TN vs. IPS:**  **Twisted Nematic (TN)**The most normal and the most seasoned. High shine, utilizes less power and is generally reasonable to make.  **In-Plane Switching (IPS)** Better shading propagation and better survey points, yet have low differentiation and moderate reaction time.  Makers are currently delivering Super-IPS (S-IPS) boards, at sensible costs, that have enhanced reaction times and difference.  **LCD Displays: Backlighting:**  Cold Cathode Fluorescent Lamp (CCFL)  With CCFL, fluorescent tubes controlled by an inverter produces white light. The inverter is utilized to change over direct present (DC) to rotating current (AC).  The rich backdrop illumination is situated behind the LCD screen while the inverter, is behind the screen board.  To supplant the backdrop illumination, you should totally dismantle the show. Mercury is a key fixing in fluorescent backdrop illuminations.   * LED Backlights   Utilizations LED innovation to make the white backdrop illumination.  Devours less power and runs cooler. More solid and keeps going longer.  Deliver pictures with more noteworthy dynamic complexity.  Makes for slimmer and lighter boards.  More secure for the earth when arranged - LEDs don't contain mercury.  **Laptop: I/O Ports:**  /O Ports and devices typically found on modern laptops:   * Keyboard and Touchpad * Audio out, Microphone in * Webcam * SD Card Slots * HDMI, DisplayPort for attaching another monitor * USB 2, 3 (& newer 3.1 - 10 Gbps) * USB-C, emerging standard for charging and data. It is a small 24 pin fully reversible “one port to connect them all” port. * Apple laptops may have Thunderbolt  - v1 10Gbps, v2 20 Gbps, v3 is 40 Gbps   **Smart Phones:**  Telephone/Voice, content (SMS) and information interchanges.  Interactive media creation and utilization. Photograph, video and voice recording/playing. Listen to music.  GPS (Global Positioning System) route.  An accelerometer (pivot based movement sensor) gages the gadget's introduction. There are numerous different sensors additionally, eg. iris scanner, unique mark, gyro, vicinity, compass, indicator, heart rate, SpO2.  Network by means of Wi-Fi, cell (3G/4G), Bluetooth and  NFC (Near Field Communication), USB, USB-C  Web get to opens up a bunch of versatile applications.  **Smart Phone Hardware:**  Samsung Galaxy S8 Smart Phone – 5.8” & 6.2”   * Processor: (ARM - Advanced Risk Machine) - Octa-core 64 bit (Exynos or Qualcomm) 2.3/2.35 GHz) * Memory: 4GB RAM - LPDDR4 (LP – Low Power) 64GB internal solid state storage (for OS, apps, data) * Expandable Memory: MicroSD up to 256GB * SIM: Nano SIM (single and dual SIM models) for 4G mobile network * Network and Connectivity: Wi-Fi 802.11a/b/g/n/ac (2.4/5GHz), Bluetooth v 5.0 2Mbps, NFC Location (GPS, Galileo, Glonass, BeiDou Satellite Systems) USB-C (ie. USB Type-C)   Other Mobile Devices are Smart cameras, electronic reader,etc.  **Input Devices:**   * Input devices allows use to connect and interact with computer. Keyboard to enter a product code when a bar code reader is faster and more accurate. Disk drives, NIC are the examples of some input devices.   **Key Board:**  It is the common input device .Pressed information by user are provided as instruction to the computer. Most keyboard have 101 and 105 keys. There exists function keys, windows keys, numeric keyboard, special keys, application keys and so on.  **Mouse:** It is a pointing device widely used in desktop computers.  **Touchscreens:**  It is a sensitive display device. In present days, Interactive Touch tables are introduced and was created for commercial purpose.  **Digital Camera:**  Factors that affect the quality of digital camera photos:   * Resolution – H & V pixels or total pixels, eg. 8 MP (mega pixels). * No. bits to represent a pixel.   **Voice Input:**  Voice input is the way toward entering contribution by talking into a mouthpiece.  Voice acknowledgment is the PC's capacity of recognizing talked words.  Voice Recognition Software can be utilized on PCs to talk charges to the PC to execute. The PC will acknowledge your talked words as contribution of summons/guidelines and utilize your voice to enter content (ie. Correspondence.  **Video Input:** It is the process of capturing full motion image on camera and storing them into computer.  **Optical Scanners:**  A device that can "read" content or representations imprinted on paper and make an interpretation of the data into a shape the PC can utilize.  Works by digitizing a picture - isolating it into a lattice of "boxes" and speaking to each case with either a zero or a one (a bit), contingent upon whether the container is "non-white". | | | | |
| **Reflections**  This was an amazing lecture that it provides a full knowledge on 3D scanners and other latest inventions in this present world. I came to know about how computer and input devices take us to ths digital world. | | | | |
| **Problems & Difficulties**  All stuffs are not new that’s why there aren’t problems. | | | | |
| **Trouble shooting**  Moodle helps me in studying about some unknown devices which are new for me. | | | | |

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| **Week 05** | **Session 2 - Thursday (1 hr)** | **Date – 10/08/2017** | **Present** |  |
| **Task & Activity**  Exam time | | | | |
| **Reflections** | | | | |
| **Problems & Difficulties** | | | | |
| **Trouble shooting** | | | | |

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| **Week 05** | **Session 3 - Friday (2 hr)** | **Date – 11/08/2017** | **Present** |  |
| **Task & Activity**  Exam time | | | | |
| **Reflections**  Did practical | | | | |
| **Problems & Difficulties** | | | | |
| **Trouble shooting** | | | | |