**Overview:**

Students work individually to understand and establish the specifications for a PC dedicated to a specific task or function. (The specific task or function will be assigned to the student from the list below.) The function and features of various hardware components are researched to develop a general understanding. Specific components and features are then selected based on appropriate need for the assigned task or function. The final product is a brochure that will be shared with other classmates during a tradeshow event.

**Objectives:**

* Use correct terminology to describe computer hardware, speed measurements, and size

measurements

* Describe the functions of the internal components of a computer
* Describe the functions of common computer peripheral devices
* Assess user computing needs and select appropriate hardware components for different

situations

**Getting Started:**

1. You will be required to design a “dream machine” personal computer (PC) for one of the tasks assigned to you from the list below.
2. To get started, develop a general understanding of what will be important features and what will be less important features of our dream machine. Consider the following:
   1. Operating system software
   2. Special application software
   3. Processor & motherboard speed
   4. Main memory speed and size
   5. Secondary storage speed and size
   6. Graphics and display speed and resolution
   7. External devices (e.g. keyboard, pointing devices, joysticks, etc.)
   8. Network connectivity
   9. Power and data backup
   10. Printers, scanners, and similar equipment
   11. Portability and durability
   12. Budget (cost) considerations

Specific Tasks & Functions

1. ***Game Computer***: Dedicated to playing PC games in a home environment
2. **Photo Editing & Organization**: Dedicated to editing and producing photographs and images in a home or professional environment
3. ***Business Office Computer***: Dedicated to producing documents and presentations and communicating with other people in a professional office environment
4. ***Student Home Computer***: Dedicated to completing homework, paying bills, communicating with friends and other similar tasks in a home environment
5. ***Factory Floor Computer***: Dedicated to reading documents, filling in forms, processing orders, etc. in a factory or warehouse environment.
6. ***Media Production and Streaming Computer***: Dedicated to production and distribution of video and/or music media in a semi-professional environment
7. ***Web Surfing Computer***: Dedicated to surfing the web, streaming media, and communicating through on-line services in a home environment

**Level 1: Processor & Memory**

1. Research and summarize the main features and function of a CPU processor chip. Consider the following:
   1. Physical packaging shape and size

The size of the actual CPU processor chip is 4.1 x 4.1 x 0.8 cm

* 1. Processing speed and power

The processing speed could be around 2.9 or 3 GHZ with at least 35 watts. The cores should be around 2-4 cores and have also 6 GPU cores.

For media production or streaming, the speed should be around

* 1. Memory speed and size

At least 2MB cache memory, with around 8 gigs of ram or more. The memory size should be 64 bits and should be 2400G or above.

1. Research and summarize the history of how a CPU processor chip has changed over the years. Consider the following:
   1. Typical processor speed, size, model numbers in the early 1990’s

The typical processor at 1990 was the AM386 microprocessor. The memory size of the chip was 32-bit and the processor can clock from 20Mhz-40Mhz. Furthermore, the technology of the chip was powered by CMOS.

* 1. Typical processor speed, size, model numbers in the early 2000’s

The typical processor in the early 200’s was the Pentium 4 with a decent speed of 1.3Ghz and a size of 64bit.

* 1. Typical processor speed, size, model numbers in the current time

The typical processor at this time which is considered to be very powerful could be the i7 8700k in which could be a little bit powerful for media production but could be very powerful to produce any type of media as it has 3.70 Ghz speed and 6mb cache speed.

1. Research and summarize the main features of motherboards. Consider the following:
   1. Physical packaging shape and size
   2. Speed and size

Currently, most desktops or laptops contain an ATX motherboard in which is the layout, design and size of the motherboard. However, motherboards do not form any sorts of speed due to its main function is to hold each of the ports, cables, processor and ram together. The motherboard does not form any kind of speed. However, the size can be 4.1 x 4.1 x 0.8 cm as most typical motherboards have it around this particular size.

1. Research and summarize the history of how motherboards have changed over the years. Consider the following:
   1. Typical speed, size, model numbers in the early 1990’s
   2. Typical speed, size, model numbers in the early 2000’s
   3. Typical speed, size, model numbers in the current time

The motherboard which was firstly known as the Planar Breadboard was brought into the technology world at 1981 by IBM. The Planar had chips which was only used to connect the CPU and RAM of the computer together. They were connected by cassette tapes and supplier parts. The Planar motherboard was also called the “IBM compatible” standard like many other modern-day motherboards. Present day motherboards are significantly different from the IBM motherboard due to the immense features of the newer motherboards like adding integrated circuit packaging in 1990 and including peripherals like the mouse and keyboard. Furthermore, including the mouse and keyboard with the motherboard gave both devices lower power consumption so it would not consume the power of the desktop. Most monitors now come in various sizes and perform many different functions/features. Higher grade motherboards can now help boost performance in any sorts of tasks. In the early 2000, the ETX motherboard was also created in which it was significant to becoming an absolute improvement compared to the old ones.

1. Research and summarize the main features and function of RAM memory. Consider the following:
   1. Physical packaging shape and size
   2. Speed and size
2. Research and summarize the history of how RAM memory has changed over the years. Consider the following:
   1. Typical speed, size, model numbers in the early 1990’s
   2. Typical speed, size, model numbers in the early 2000’s
   3. Typical speed, size, model numbers in the current time
3. Research and summarize the main features and function of Hard Disk Drives (HDD). Consider the following:
   1. Physical packaging shape and size
   2. Speed and size

Hard Disk Drives range from 5400 rpm to 7200 rpm. These drives can also expand from 500GB to 6 TB.

1. Research and summarize the history of how Hard Disk Drives (HDD) have changed over the years. Consider the following:
   1. Typical speed, size, model numbers in the early 1990’s
   2. Typical speed, size, model numbers in the early 2000’s
   3. Typical speed, size, model numbers in the current time

Since the 1980’s many components have been changed by having expandable storage. At the start of the 1980’s a common hard disk drive will be around 10 MB with very slow speeds which is unnoticeable with today’s technology. Later on in the 1990’s, hard drives have varying sizes which each computer can then put into the hard drive slots. During 2000’s, hard disk drives introduced

1. Explain and justify the processor and memory requirements for your ‘dream machine’ task. Discuss the following:
   1. Minimum and “would be nice” requirements for the CPU chip

The minimum requirement could be the Ryzen 5 2400G Processor with Radeon RX Vega 11 Graphics. This could be a budget processor as its around $150. A “would be nice” requirement for a CPU chip could be an INTEL Core i9-9900K Processor which is a very powerful processor in which it contains 16mb smart cache with 8 cores and has a processor base frequency of 3.60Ghz. It has 16 threads which can make processes go easily through each of the 8 cores.

* 1. Minimum and “would be nice” requirements for the Motherboard

A minimum Motherboard which could be beneficial for media production can possibly be the ASUS Sabertooth Z77 which can be a good budget motherboard for media production as it has 4 memory slots with HDMI input/output ports. The motherboard also includes the memory type DDR3 SDRAM with a ATX form factor. The motherboard also uses Gigabit Ethernet for faster connection and has a sound cloud to provide better quality sounds. This motherboard would be significant for media production as it can help process faster and record easier. A “would be nice” motherboard could possibly be Z390 Aorus Pro Wifi. This motherboard has a LGA-1151 type socket and has up to 65 GB DIMM socket memory.

* 1. Minimum and “would be nice” requirements for the RAM memory

Minimum requirements for RAM memory should be 6 GB as most computers contain around 6 gigs of ram and will not cost so much. “Would be nice” RAM could be 16 GB and up. Higher RAM would lead to the computer to be able to work with more information in which can boost speed for media production and can make work twice as more easy.

* 1. Minimum and “would be nice” requirements for the HDD

Minimum requirements for the HDD of the computer could possibly be 1TB of Western Digital blue hard drive. This will be a minimum requirement as you will need a decent amount of space to record a large portion of videos, audio or any types of media. A would be nice requirement will be the 4TB of Western digital blue hard drive. This “would be nice” requirement will make the individual record a very large amount of media without having to risk filling the actual hard drive up.

**Level 2: Display & Peripherals**

1. Research and summarize the main features and function of Computer Display Monitor. Consider the following:
   1. Physical construction (CRT, LCD, etc)
   2. Display Standards (CGA, VGA, SVGA, XGA, etc.)
   3. Resolution & Colour depth

There are many kinds of Monitor Technology. Monitor Technology has HDMI ports to help give a display for the monitor. Monitor Technology also includes a display port to display the image. Monitors have a variety of resolutions on pixel and pixel quality. The best being 4K (3840 x 2160) to display better pixel inch to bring much crisp and sharper looks. The more dots per inch there is, the higher the image quality will be. Commonly, most monitors contain a native type of resolution namely 1920x1080p and 2560x1440p. Monitors also has different kinds of panels like the flat and curved. Finally, monitors can be classified either as LED or LCD. LED’s being more better for having better power consumption and energy efficiency while LCD is just a basic technology which is used in television.

1. Research and summarize the main features and function of a Computer Graphics Card. Consider the following:
   1. Physical packaging (e.g. On the motherboard, expansion card, etc.)
   2. Speed and frame rate (2D vs 3D)
   3. Resolution, colour depth, and memory size
2. Research and summarize the history of how Computer Display Technology has changed over the years. Consider the following:
   1. Display standards and capabilities in the late 1980’s
   2. Display standards and capabilities in the late 1990’s
   3. Display standards and capabilities in the 2000’s

Monitors have significantly changed from the 1980’s. Back then, monitors had very low resolution which provides low quality images which can only display black and white or black and green colors. These monitors back then were a CRT type (Cathode Ray Tube). Later on around 2003 and 2004, LED monitors were introduced to provide much higher quality images and higher resolutions to bring a livelier experience to the viewer.

1. Research and summarize the main features and function of External Storage and Backup. Consider the following:
2. Removable media (e.g. floppy disks, CD/DVD-RW, CompactFlash, etc.)
3. USB media (e.g. Memory Stick, External HDD, etc.)
4. Cloud based storage

Floppy disks are made of a thin and flexible magnetic storage materiel. Floppy disks are used to store various types of data in the object. Floppy disks were used in the 1970s, as they were used to start up the computer. However, floppy disks are no longer needed due to the advancements in computer technology. Before RAM was invented, floppy disks were the only or main way to store data. DVD is used for data storage and as a platform for multimedia. DVD was used to play recorded multimedia such as movies, games and videos. It was also used as a place to store data from a computer and can also be used to transfer data. Blu-ray has become more popular than DVD as it has a higher quality and sound which makes it more appealing for any individual to buy. USB are also used to store data in and out of the computer. USBs offer a lot of storage space some time up to 100Gb. USBs are still used today and is most the most common way to store and transfer storage or data. These are used as a place to store data outside the computer. These are small but they can have a lot of storage space. Cloud storage means that data is stored over the internet in a cloud and it could be accessed by any device added to the cloud. The Cloud is one of the most common uses to store data easily as individuals could access the same data from different devices. This makes the internet more accessible as it’s the easiest to transfer data around without the use of a object. However, this method isn’t always the safest way to store data as data breaches and hacking cases could happen which can lead to a compromise in your data.

1. Research and summarize the history of how External Storage and Backup has changed over the years. Consider the following:
2. Typical speed, size, model numbers in the early 1990’s
3. Typical speed, size, model numbers in the early 2000’s
4. Typical speed, size, model numbers in the current time

External storage in the 1990s was in the form of floppy disks, flash drives, zip drives, DVD and cd. These forms were not too big in terms of storage, but the size in terms of dimensions was big. For floppy disks, the bigger the disk, the more data it can store. During the 2000s, the use of SD card and blue ray disks became popular due to its immense amount of storage capacity and size. The use of floppy disks started to decrease due to its big size and a less storage capacity. In today’s day, data is mainly stored on a cloud. Cloud storage has a lot of capacity despite it being on the internet. Around todays time, nobody uses floppy disks as they are not needed.

1. Research and summarize the main features and function of Network Connectivity. Consider the following:
2. Connection technology (e.g. Dial-Up, Ethernet, WiFi, BlueTooth, Fibre, etc.)
3. Upload and download speed
4. Security

Connection technology like Dial up is a form of internet access that is uses a telephone to create a connection to the internet service provider (ISP). Internet is a wired connection in which it connects directly from the router to your PC using a wire in which it gives the individual a stable and wired connection. Furthermore, Wi-Fi allows you to the connect to the internet wirelessly due to a wireless access point which is generated from the router. Wi-Fi is the most common use of connection for many people. Finally, Fiber optics use TIR to transfer signals through the light that is trapped which can give you instant access to the internet.

1. Research and summarize the history of how Network Connectivity has changed over the years. Consider the following:
2. Typical speed, size, model numbers in the early 1990’s
3. Typical speed, size, model numbers in the early 2000’s
4. Typical speed, size, model numbers in the current time

At 1990, Kalpana which is a U.S network hardware company, developed and introduced the first network switch in 1990. Majority of people used Ethernet or dial up to get their internet access. However, the connection was very slow and it takes a long time just for a website to load. In 2000, 802.11g devices were available to the public in which provides connection speeds up to 20 Mbps which was a significant improvement over 1990. Now, we have much better Wi-Fi connections and can get over 1 Gb of internet. This means that webpages and downloads will be significantly faster and instant. Fibre optics is also a very good source of internet, it will also make loading significantly faster as you have light travelling through the network.

1. Research and summarize the main features and function of Printer Technology. Consider the following:
2. Printing Technology (e.g. Dot Matrix, Ink Jet, Laser, etc.)
3. Connection Technology (e.g. Parallel Port, USB, WiFi, Network, etc.
4. How printing has changed over the years

Dot Matrix uses a print head which moves back and forth and strikes a ink soaked cloth against a paper to print. This was a very old printer and is very unreliable as it takes a long time to print a sheet of paper. Ink jet printing technology is a computer printing in which a digital image is created by the propelling of ink which drops onto the paper. Ink jet is one of the most common printers in the world and is considered to be one of the greatest printers due to its technology and quick printing. Laser printing produces high quality images and is created by it repeatedly passing a laser beam continuously over the drum. The drum is a negatively charged cylinder which collects electrically charged ink and transfers the image to paper.

Parallel port is a connection technology for connecting peripheral devices and they send multiple bits of data at once. They can achieve this by having multiple data lines in their cables and port connectors. Wi-Fi is when the computer connects to a wireless signal which is produced by the router. You can print using Wi-Fi as the computer send a signal through the wireless network to the printer which prints the image. Before, people would print by hand and draw. Then, the Dot Matrix Printers were used in the early 2000’s and then the Ink Jet printers which majority of individuals use.

1. Explain and justify the processor and memory requirements for your ‘dream machine’ task. Discuss the following:
2. Minimum and “would be nice” requirements for the Computer Display

Dell SE2216HV 22” Screen LED-Lit Monitor, Black 1920x1080 as LED would meet minimum requirements as it uses LED technology instead of OLED. LED is a much cheaper form of OLED and produces high quality images which is similar to OLED. A would be nice monitor would most likely be the Dell Ultra sharp 32 8K monitor. This monitor is very expensive but consists of 8k resolution with 1.07 billion colors. The monitor is also a LED-backlit LCD monitor.

1. Minimum and “would be nice” requirements for External Storage and Backup

Minimum storage and backup for a media production computer could possibly be any 1TB drive. Having an external HDD will be easier to transfer data with a decent amount of space. A “would be nice” external storage will be any storage which consists of 4TB. Due to the high amount of space, it makes it much easier for any individual to store large amounts of data in a matter of seconds.

1. Minimum and “would be nice” requirements for Network Connectivity

A minimum requirement would be Ethernet or Wi-Fi. A would be nice for network connectivity is to have Fibre optics due to it having large amounts of speeds.

1. Minimum and “would be nice” requirements for Printer Technology

A minimum requirement for printer technology would most likely be an ink jet printer since its commonly used by many for a cheap price. Furthermore, it prints decently fast and the image quality is also very decent with color printing. A would be nice printer is a laser printer because the quality is very high with quick printing. Also, it creates such realistic images on the paper.

**Level 3: Building Your Dream Machine**

1. Identify the minimum requirements for each component of your dream machine as follows::
   1. CPU processor chip speed and type

2400G Processor with Radeon RX Vega 11 Graphics

* 1. Motherboard type

ASUS Sabertooth Z77

* 1. RAM memory speed and size

# Corsair LPX 8GB DDR4 DRAM 2133MHz C13 for DDR4 Systems 8 DDR4 2133 (PC4 17000) DDR4 2133

* 1. HDD speed and size

WD Blue 2TB Desktop Hard Disk Drive – 5400 RPM SATA

* 1. Display Monitor resolution, type, and size

Dell SE2216HV 22” Screen LED-Lit Monitor, Black 1920x1080

* 1. Graphics card resolution and type

AMD Radeon Vega 11

* 1. Audio card type

Creative Sound Blaster Audigy FX 5.1 Sound Card SB1570

* 1. Audio Speakers type

# PreSonus Eris E3.5-3.5" Professional Multimedia Reference Monitors with Acoustic Tuning (Pair)

* 1. External backup type and size

Western Digital My Passport 1TB

* 1. Network interface requirements

Intel Gigabit PCI-E Network Adapter

* 1. Printing Technology

# Canon MAXIFY MB2120 Wireless Color Printer with Scanner, Copier & Fax, Black

* 1. Other Peripherals (e.g. mouse, keyboard, joystick, etc.)

ROSEWILL NEON K51 - Hybrid Mechanical RGB Gaming Keyboard / Multicolor Backlit Keyboard (Black)

# Logitech® MX Master 2S Wireless Mouse, Graphite (910-005131)

1. Prioritize you list of components from question #1 from those that are essential down to those that would be nice.
2. Establish a target budget (cost) for your dream machine.
   1. Justify your cost based on your projected component needs.
   2. Justify your cost based on a realistic assessment of your application and target user
3. Build your dream machine or locate a ready to buy machine using on-line vendor web sites.
   1. Find at least two sources for your dream machine

# HP Pavilion Desktop PC - Silver (AMD Ryzen 5 2400G/2TB HDD/8GB RAM/AMD Radeon Vega 11) – English. This desktop costs roughly $699.99.

CyberPowerPC Gamer Master Desktop - AMD Ryzen 5 2400G 3.6GHz CPU, 16GB DDR4, 1TB HDD, 2GB NVIDIA GeForce GT 730, 6x USB 3.1, 1x HDMI, GigE, WiFi, Win 10 Home 64-bit - GMA6800CPG.

* 1. Provide a copy of the cost and feature list summary for each source
  2. Explain how the machine from each source matches (or is different) from your ideal configuration.

The HP pavilion Desktop is very similar to what the minimum specs are. It has the same processor, ram, graphics and hard disk drive. The CyberPowerPC is somewhat different from the minimum specs as it has the same processor AMD Ryzen 5 2400G 3.6GHz CPU. However, majority of the other specs are different like the RAM, hard disk drive, graphics card, internet and USB. 16GB DDR4, 1TB HDD, HDD, 2GB NVIDIA GeForce GT 730, 6x USB 3.1, 1x HDMI, GigE, WiFi, Win 10 Home 64-bit - GMA6800CPG.

Suggested on-line computer sources:

* [www.bestbuy.ca/](http://www.bestbuy.ca/)
* [www.dell.com/en-ca](http://www.dell.com/en-ca)
* [www.staples.ca](http://www.staples.ca)
* [www.tigerdirect.ca/](http://www.tigerdirect.ca/)

**Level 4: Sharing Your Dream Machine**

1. Prepare a brochure documenting your dream machine options and choices.
   1. The target audience is other students in the class
   2. You should explain your target task (e.g. game computer) and how this affects configuration choices.
   3. You should explain your configuration choices in greater detail
   4. Your two purchase options should be explained and compared
2. Share your brochure
   1. By uploading it to your repository
   2. By presenting it during the in-class tradeshow (date TBD)
3. Visit and report on other trade show presentations / brochures
   1. Complete the Passport Template (TBD) as you participate in the in-class tradeshow.

**Task & Function Signup**

|  |  |
| --- | --- |
| **Task** | **Student Name** |
| ***Game Computer*** |  |
| **Photo Editing & Organization** |  |
| ***Business Office Computer*** |  |
| ***Student Home Computer*** |  |
| ***Factory Floor Computer*** |  |
| ***Media Production and Streaming Computer*** |  |
| ***Web Surfing Computer*** |  |
| ***Game Computer*** |  |
| **Photo Editing & Organization** |  |
| ***Business Office Computer*** |  |
| ***Student Home Computer*** |  |
| ***Factory Floor Computer*** |  |
| ***Media Production and Streaming Computer*** |  |
| ***Web Surfing Computer*** |  |
| ***Game Computer*** |  |
| **Photo Editing & Organization** |  |
| ***Business Office Computer*** |  |
| ***Student Home Computer*** |  |
| ***Factory Floor Computer*** |  |
| ***Media Production and Streaming Computer*** |  |
| ***Web Surfing Computer*** |  |
| ***Game Computer*** |  |
| **Photo Editing & Organization** |  |
| ***Business Office Computer*** |  |
| ***Student Home Computer*** |  |
| ***Factory Floor Computer*** |  |
| ***Media Production and Streaming Computer*** |  |
| ***Web Surfing Computer*** |  |
|  |  |
|  |  |