**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

-Square

- 3 cm

* 1. Processing speed and power

64-180 wattts

* 1. Memory speed and size

2.8 GHz to 4.6 GHz

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

Speed:

150 MHz

Size:   
12 × 9.6 in 305 × 244 mm

Model Number:

 Alpha EV5 21164-BA 300 MHz 21-40658-17

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

Speed:

1.0 GHz to 3.2 GHz

Size:

130nm to 65nm

Model Number:

AMD Athlon 64 X2 5200 Brisbane Dual-Core 2.7 GHz Socket AM2 65W ADO5200DOBOX Processor

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

Speed:

2.8 GHz

Size:

3 cm

# Model Number:

# Intel Core i5-8400 Desktop Processor 6 Cores up to 4.0 GHz LGA 1151 300 Series 65W

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

Shape: Rectangle

Size: (305 × 244 mm)

* 1. Speed and size

Speed: Dual-Channel DDR4

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

Speed:

33MHz

Size:

512KB

254mm x 218mm

Model Number:

PBA 620119-205 AA 622115-205 Socket 3 Motherboard (For Intel 486 etc.)

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

Speed: 200 MHz System clock

1000 MHz

Size:

254mm x 218mm

Model Number:

HP Compaq SOCKET 939 MOTHERBOARD 651358-001 FOR 2560P

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

Speed:

DDR4 4400MHZ+

Size:

254mm x 218mm

Model Number:

ASUS ROG Maximus XI Hero (Wi-Fi) Z390 Gaming Motherboard LGA1151 (Intel 8th 9th Gen) ATX DDR4 DP HDMI M.2 USB 3.1 Gen2 802.11ac Wi-Fi

1. Research and summarize the main features and function of RAM memory. Consider the following:
   1. Physical packaging shape and size

Rectangle and 5.5 inches

* 1. Speed and size

2133 MHz

DIMM

1. 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

Speed: 33MHz

Size: 5.5 inches

Model Number: 2GB Memory RAM for Lenovo ThinkCentre M77 1995-A9U by Arch Memory

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

Speed: 133MHz

Size: 3.5 inches

Model Number: 1GB RAM Memory for Advent 2005 (PC2700 - Non-ECC) - Desktop Memory Upgrade from OFFTEK

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

Speed: 2133 MHz

Size: 3.5 inches

DIMM

Model Number: G.Skill Ripjaws V 16GB (2 x 8GB) DDR4-3200 Memory

1. Research and summarize the main features and function of Hard Disk Drives (HDD). Consider the following:
   1. Physical packaging shape and size

Square and 3.5in

* 1. Speed and size

1 gigabyte

5,400 RPM to 10,000 RPM

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

Speed: 1 to 15 terabytes

Size: 6 in

Model Number: Ibm 49Y1991 300gb 10k 6GBP/s 2.5" SFF SAS Hard Drive 49y1992 49y1995 ST9300603SS

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

Speed: PMR 1.8

Size: 5.5in

Model Number: Seagate 3.5" Cheetah ST3146855LW 146GB 9Z2005-002 68Pin SCSI 15K U320 HDD

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

Speed: 7,200 RPM to 15,000 RPM

Size: 1 gigabyte

Model Number: Team L5 LITE 480 GB 2.5" Solid State Drive

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

least a 2.5Ghz processor

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

least 4GB of RAM

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

least 4GB of RAM

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

Processor: Intel Core i5 2400s at 2.5 Ghz or AMD FX-4100 at 3.6 Ghz

Memory: 6GB

Video Card: GeForce GTX560Ti or AMD Radeon R7 260X

DirectX: DX 10

Hard Drive Space: 25 GB

**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
2. 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
3. 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
4. Research and summarize the main features and function of External Storage and Backup. Consider the following:
5. Removable media (e.g. floppy disks, CD/DVD-RW, CompactFlash, etc.)
6. USB media (e.g. Memory Stick, External HDD, etc.)
7. Cloud based storage
8. Research and summarize the history of how External Storage and Backup has changed over the years. Consider the following:
9. Typical speed, size, model numbers in the early 1990’s
10. Typical speed, size, model numbers in the early 2000’s
11. Typical speed, size, model numbers in the current time
12. Research and summarize the main features and function of Network Connectivity. Consider the following:
13. Connection technology (e.g. Dial-Up, Ethernet, WiFi, BlueTooth, Fibre, etc.)
14. Upload and download speed
15. Security
16. Research and summarize the history of how Network Connectivity has changed over the years. Consider the following:
17. Typical speed, size, model numbers in the early 1990’s
18. Typical speed, size, model numbers in the early 2000’s
19. Typical speed, size, model numbers in the current time
20. Research and summarize the main features and function of Printer Technology. Consider the following:
21. Printing Technology (e.g. Dot Matrix, Ink Jet, Laser, etc.)
22. Connection Technology (e.g. Parallel Port, USB, WiFi, Network, etc.
23. How printing has changed over the years
24. Explain and justify the processor and memory requirements for your ‘dream machine’ task. Discuss the following:
25. Minimum and “would be nice” requirements for the Computer Display
26. Minimum and “would be nice” requirements for External Storage and Backup
27. Minimum and “would be nice” requirements for Network Connectivity
28. Minimum and “would be nice” requirements for Printer Technology

**Level 3: Building Your Dream Machine**

1. Identify the minimum requirements for each component of your dream machine as follows::

|  |  |  |  |
| --- | --- | --- | --- |
| CPU processor chip speed and type | AMD Ryzen 5 2600 3.4GHz 6-Core Processor | $164.89 | Amazon |
| Motherboard type | MSI Arsenal Z270 Gaming Plus | $137.82 | Amazon |
| RAM memory speed and size | G.Skill Ripjaws V 16GB (2 x 8GB) DDR4-3200 Memory | $104.99 | Amazon |
| HDD speed and size | Team L5 LITE 480 GB 2.5" Solid State Drive | $48.99 | newegg |
| Display Monitor resolution, type, and size | Acer ED242QR Abidpx Black 24" 144Hz AMD FreeSync VA Curved Widescreen LED backlight Monitor, HDMI, DisplayPort, Tilt | $196.83 | newegg |
| Graphics card resolution and type | XFX Radeon RX 580 DirectX 12 RX-580P8DFD6 XXX Edition 8GB 256-Bit GDDR5 PCI Express 3.0 CrossFireX Support Video Card | $187.99 | newegg |
| Audio card type | Creative Sound Blaster AUDIGY FX Sound Card with SBX Pro Studio - OEM | $46.03 | newegg |
| Audio Speakers type | Logitech Z130 5 Watts Speakers | $24.17 | newegg |

|  |  |  |  |
| --- | --- | --- | --- |
| External backup type and size | Silicon Power 1TB Black Rugged Portable External Hard Drive Armor A60, Shockproof USB 3.0 for PC, Mac, Xbox and PS4 | $69.99 | Amazon |
| Network interface requirements | Intel EXPI9301CT Desktop Adapter Gigabit CT 10/100/1000Mbps PCI-Express 1 x RJ45 | $36.41 | newegg |
| Printing Technology | DIYPC DIY-Model X-W-RGB White Steel / Tempered Glass ATX Mid Tower Computer Case with 2 x RGB LED Ring | $57.97 | newegg |
| Other Peripherals (e.g. mouse, keyboard, joystick, etc.) | Crack Backlit Gaming Keyboard Mouse and LED Gaming Headset Combo,BlueFinger 114 Keys USB Wired Mechanical Feeling Keyboard,3 Color Blue/Red/Purple LED Backlit,Gaming Mouse Pad for Gamer Office | $47.99 | Amazon |

1. Prioritize you list of components from question #1 from those that are essential down to those that would be nice.

1.Graphics card resolution and type

2. CPU processor chip speed and type

3. RAM memory speed and size

4. Motherboard type

5. Display Monitor resolution, type, and size

6. HDD speed and size

7. Network interface requirements

8. External backup type and size

9. Audio card type

10. Audio Speakers type

11.Printing Technology

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

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

Done

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/)
* [www.canadacomputers.com](http://www.canadacomputers.com)

**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*** | Manvir |
| **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*** |  |
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Cites:

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<https://en.wikipedia.org/wiki/Computer_form_factor>

<https://www.amazon.ca/Intel-i5-8400-Desktop-Processor-Cores/dp/B0759FGJ3Q/ref=sr_1_2?keywords=Intel&qid=1553539463&s=gateway&sr=8-2&tag=tomshardware-geoca-20>

<https://www.tomshardware.com/reviews/cpu-buying-guide,5643.html>

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<https://www.youtube.com/watch?v=YkvQfAwr9fc&index=2&list=WL&t=112s>

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