**Design Document: Streaming Media Basics**

Class Description

**Curriculum Track**

**Audience**

Teens, College students, and Adults

**Course Length**

90 minutes

**Training Method**

Lecture

**Purpose**

To inform customers on how to purchase parts for a new computer

Equipment Requirements

Projection screen, projector, computer

Software Requirements

PowerPoint

Material Requirements

Handout

**Learning Objectives**

At the end of the session, learners will be able to:

1. Name of all of the parts in a computer
2. Make informed decisions about what computer parts will be right for their computer
3. Identify what operating system is right for them
4. Identify what peripherals are right for them
5. Name stores to buy parts from
6. Identify the best brands
7. Identify where to buy used parts
8. Know how to plan for future upgrades.

**Assessment Technique(s)**

Question and answer

Content Outline

***Prep (5-10mins.)***

* Start up the Powerpoint
* Start up your web browser and load up Newegg and Amazon
* Bring in a pre-disassembled computer to show and pass around parts to the class.

***Agenda (2-3 mins.)***

* What are you looking for?
* Computer Parts
* Operating system
* Peripherals
* Purchasing
* Trusted Brands
* Buying Used
* Upgrading

***What are you looking for? (5 mins.)***

* The first step before buying or looking at any computer parts is to think about the purpose of building a computer.
  + Are you building a family computer, work station, gaming computer, internet browsing, media center, audio and video editing station, or a school computer?
  + Consider the other following aspects of a computer
    - Price
    - Size
    - Speed/Performance
    - Noise Levels
    - Aesthetics

***Computer Parts (45 mins.)*** *Note: When talking about specific parts pass an example around for people to see, and/or show an example on Newegg.*

* **Computer Cases:**
  + Talk about the differences of each different case and explain that the case will decide how many and what components will fit in your machine.
    - Mini- ITX
    - ATX mini:
    - ATX mid:
    - ATX Full tower:
    - ATX Super tower:
  + Besides side you should choose a case based off of the following questions
    - Does it have enough room for the components I want?
    - Will it be large enough for future upgrades?
    - Do I think it looks good?
    - Will it fit in the location I want to place it at home?
    - Do I want a tool free design?
    - Price
* **CPU/APU**
  + CPU = Central processing unit: Main processor that runs everything in your computer
  + APU= Accelerated Processing unit: Just like a CPU except it includes a graphics processor on the chip
    - Cores: More cores = faster, better at multitasking
      * Minimum purchase: 2 cores, preferred 4 or more.
    - Speed is measured in GHZ (gigahertz) this is useful to compare similar processors
      * I7 @ 3ghz < I7 3.5 ghz
      * A10 @ 4ghz < I7 @ 3ghz
      * To compare processor speeds easily, go to Passmark.com
  + When you pick a processor it will say what socket type it is. Make sure to buy a motherboard that is compatible with that socket type or your processor will not fix
    - Examples: FM2+, AM3, LGA 1155, LGA 2011, etc.
  + If you are worried about electricity bill choose a processor with low power consumption. An APU is a good choice because you will not need a graphics card.
    - Power is measured in Watts. Lower Watts will result in less heat as well as lower bills.
* **Motherboard**
  + There are two main Motherboards an AMD or Intel compatible board.
    - When choosing a board make sure to pick a board that is compatible with the brand and socket of your CPU/APU
  + Next you need to pick a board that is will fit in your computer case. Check the specifications of your case and purchase a board that will fit in it.
    - ATX, Micro ATX, Mini ITX, uATX, or Extended ATX
* **Motherboard Features**
  + Finally think about upgrades and other hardware. If you are going to add a wireless card, graphics card, audio card, more ram, etc. Make sure you have slots on your motherboard to accommodate them.
  + If you purchase an APU to utilize the graphics make sure the motherboard has HDMI, DVI, or Display Port out option.
* **GPU**
  + GPU= Graphics Processing Unit
  + If you have an APU and are not using a 4K display, gaming, 3D modeling you are fine without one.
  + If you are gaming purchasing the best card for your money is important. The greatest value per dollar is around the $150-200 range. This will last you about 4 years.
    - Buying one powerful GPU is > then 2 GPUs in SLI or Crossfire
    - You can always buy a second card later if your motherboard supports it
  + If you are working with video editing, 3d modeling, etc. get a work station card. Before buying a workstation card look up your software and what kind of card it recommends.
  + AMD vs Nvidia
    - Both are great companies and make great products
    - On Average you get more power for your money with AMD
    - Nvidia has the most powerful cards Nvidia Titan, 980ti, etc.
* **Cooler**
  + Most CPU’s and GPU’s come with an adequate cooling
  + Buy a 3rd party cooler if…
    - You want a quieter cooler
    - You want cooler temperatures for longer hardware life
    - If you are going to overclock your hardware
  + Liquid cooling leads to the lowest temperatures, but it is the most expensive option and can fail leading to water damage and/or overheating.
* **Thermal Compound**
  + Thermal Compound: allows heat to transfer more easily from your hardware to the cooler.
  + What comes with your cooler is adequate
  + For best temperatures and extreme overclocking try the following products
    - Artic Silver 5
    - Arctic cooling MX-2
    - Cool Master Thermal fusion 400
    - Tuniq TX-4
* **RAM**
  + RAM= Random Access Memory: Ram is memory used to run programs, keep internet tabs up, play games, etc. The more you have running at once the more RAM you need.
  + Right now there is DDR3(old) DDR4(new). You will only see a difference in performance if you have an APU. Otherwise go for the cheaper option DDR3. Or DDR4 for future upgradability
  + If possible buy RAM sticks of the same brand, Speed, and voltage
  + Buying RAM in 2s will lead to the best performance
  + Consider leaving RAM slots open for future upgrades
* **Hard Drives**
  + 3 Types of Drives
    - Mechanical Hard Drive(standard): Large sizes for low prices, but is slow
    - SSD = Solid State Drive: Very fast speeds expensive for large size
    - Hybrid Drive: Half Mechanical half SSD. Faster speeds with lower cost for storage
  + If you need to store a lot of files get a standard or hybrid hard drive
  + If you want fast speed with little storage get an SSD
  + If you want the best of both worlds buy an SSD to install Windows and programs on and get standard drive for Storage.
* **DVD/Blu-ray drives**
  + Most software can be downloaded from the internet so an optical drive is not needed.
  + If you are going to burn CDs, DVDs, or Blu-rays, or use old software get an optical drive that supports your needs.
* **Cooling Fans**
  + Most computer cases come with a case fan this is adequate for most computer systems
  + If you have a high end computer 2 or more
  + Fans can get incredibly loud. If you have your computer near you it is a good idea to get fans that are very quiet. Cheaper louder fans will cause you to quickly spend more money on quieter fans.
    - Look for fans 17dBs or less
  + Some fans will tell you how much air they can move per second, but most of the time they will not. Remember that the bigger and faster the fan is the more air it moves
  + Not all cases can fit any size fan. Looks up what fan sizes can fit in your case and buy those.
    - Typical sizes are 92, 120, 140, and 200mm
    - 120mm will fit in 99% of cases
  + Many fans come with LEDs, so make sure to pick a good aesthetic choice if you go that route
  + Best Configuration
    - Cold air intake in the front
    - Have the top case fans pushing out hot air
* **PSU**
  + PSU=Power Supply Unit
  + Add up the wattage of all of your items and get a PSU that has more watts then that
  + If you are getting a graphics card, make sure your PSU has the necessary power cords to power it as well as the correct amps on the 12-volt rail
  + If you plan on upgrading in the future get a PSU with more wattage, then you need
  + Never buy a cheap PSU from an Untrusted brand! Cheap power supplies provide inconsistent power that can burn out prematurely and/or damage your computer.
* **Sound Cards**
  + This is only for extreme audiophiles and music producers
  + The best brands are made by Creative and Asus
  + Look for a model that has the features, sound quality, and outputs you need for your setup.
* **Alternative Options: Bare Bones**
  + This option is a case that already has a power supply, fan and a motherboard preinstalled.
  + This is a good beginning for a new computer builder. This can also be a way to save money
  + If you want a very small computer this is a great way to go. The smallest computers are almost always barebones computers.

**Operating Systems (5-7 mins.)**

* **Windows**
  + Windows 7 and 8 can be upgraded to Windows 10 until July 29th, 2016 for free
  + For the longest security support and best software support purchase Windows 10
  + If you prefer Windows 7 or 8 Feel free to purchase those, but keep in mind the security updates and when they end.
* **Linux**
  + For a free alternative to Windows try Linux
  + The best versions are
    - Mint
    - Ubuntu
    - Chrome OS
    - Lumbuntu
  + There are many more Linux distributions then those 4 feel free to investigate and look for one that suites your specific needs.

**Peripherals (10 mins.)**

* **Display**
  + TV and Monitors are pretty similar now a days. Either can be used with a computer.
    - TV pros
      * Larger screen
      * Cheaper
      * Speakers
      * Multi use
    - Monitor Pros
      * Better image quality
      * Better colors
      * Higher frame rates
      * Better response times
      * Usually adjustable
  + When buying a display consider the following
    - Refresh rate: The time between you making an action and it showing up on screen. 10ms is not noticeable my most human eyes.
    - Contrast: The difference in color between the darkest and lightest colors. The higher this color the truer to real life colors are. Very important for photo editing
    - Screen size: something that will be comfortable for the distance you are from the screen. Personal preference
    - Input: Make sure the display is compatible with the output of your computer such as HDMI, DVI, DP or VGA
    - LCD vs LED vs IPS
      * IPS has the most vibrant colors but uses more electricity and has a slower response rate
      * LED has the fastest response rate and the lowest energy consumption
      * LCD standard display used by most devices average all around
* **Mouse and Keyboard**
  + Testing a mouse and keyboard at a store like Fry’s is the best bet way to know if you will like it. Comfort is the most important part of a mouse and keyboard
  + Things to consider when buying a Mouse
    - Wireless or wired?
    - Short cut buttons
    - Size to fit your hands
    - Speed (DPS): how fast the arrow can move on the screen
  + Things to consider when buying a keyboard
    - Wireless or Wired?
    - Full size or small keyboard
    - Included USB ports?
    - Back lighting?
    - Type of keys
      * Standard dome: plastic domes that touch a circuit board most keyboards are this type
      * Chicklet keys: Dome keyboards with very shallow keys similar to a laptop keyboard
      * Mechanical: Mechanical switches that are full size. Usually click and need very light pressure to press. Preferred by gamers and heavy typers for speed and less fatigue.
* **Speakers**
  + Cheap Standard 2.0 speakers or those built into the display are fine for most people
  + For best sound look for 3.1 or 5.1 speakers around $75-100
  + If you live with people, consider getting a headset for the best audio quality without bugging anyone.
  + Best Microphone brands are Blue, Audio-Technica, Sony and Logictech is a good budget brand

**Purchasing (5 mins.)**

* Best physical store is Fry’s Electronics. It will have everything plus they price match, have friendly staff that knows their stuff, have products to touch and test, and they have a massive selection.
* Best online retailers
  + Amazon: Good prices, customer service, and helpful reviews
  + New Egg: Good prices, fast shipping, reviews by tech people, and they have great customer service

**Trusted Brands (5 mins.)**

* Asus: Arguably the best company on the market
* Gigabyte: Some of the best products on the market
* MSI: Personal favorite. Great products and great customer support
* Kingston: Great midrange products with nice warranties
* Corsair: Great mid range brand with dependable products
* Adata: Cheaper and reliable brand
* Western Digital: Best mechanical hard drives
* EVGA: Great products, great quality
* XFX: Good midrange price and quality
* Zotc: Good midrange price and quality
* **Worst Brands Avoid at all costs**
  + Patriot
  + (ECS) Elite-Group
  + Biostar
  + Leapr
  + Logisys
  + Super Talent
  + Or anything you never heard of
* If you not sure purchase the item with the best review and warranty.

**Buying Used (5 mins.)**

* Pros of buying used parts
  + Cheaper
  + Still great condition
  + Get better parts for the same price as new slower parts
  + Can purchase refurbished parts off Newegg for lower price, but still has a warranty
* Cons
  + Poor condition
  + Don’t know how they were treated before you got the item
  + Don’t know how much life is left in the item
  + Scams
  + Hard drives with viruses pre-installed. Wipe all used hard drives you purchase.

**Upgrading (3 mins.)**

* When building a computer think about will I upgrade in the future? If the answer is yes, then make sure to purchase items that will allow you to expand in the future. Make sure to get a larger PSU then necessary, have a case large enough to accommodate changes, and get a motherboard that are compatible with more powerful CPUs, have extra RAM slots, and extra PCI slots to upgrade to.