Ops 102: Intro to Computer Operations

Class 02

Ops 102 Overview

Ops 102 Overview

- What is a computer?
- **Build a computer**
- Startup sequence and BIOS
- Windows OS
- Devices, Drivers, and Software in Windows
- Security Controls
- Network Fundamentals
- Virtualization of Ubuntu Linux
- Command Line Interface

Agenda

1. Review of previous class
    - Share your learning
2. Build a computer
    - USB Security
    - Bootable Windows 10 flash drive
    - Lab Assignment
    - Interfaces
    - Hardware components
3. Open Lab Time
    - Get all caught up!

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Review

What did you learn?

Review - What is a Computer?

1. What is a Computer?
    - Binary & Data
    - Circuits & Logic
    - Lab assignment
2. Inside a Computer
    - Disassembly
    - Lab assignment

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USB Security

- USB interface
  - Common peripherals
  - Can be “locked” by security software
  - Threat vector for malware, data exfiltration

Warmup: Bootable USB

Take note!

Activity: Bootable Windows 10 USB

- Create a Windows 10 bootable USB
  - Download Windows Media Creation Tool
  - Plug in a new USB and run Tool
  - Select Installation Media - USB

Build a Computer

Take note!

Build a Computer

- Why might we assemble a desktop computer?
  - Enthusiast PC
  - Component swap or upgrade
  - Enterprise with desktops on-site
  - Value - Components more affordable
- What types of desktop computers are there?
  - Gaming
  - CAD Workstation
  - Office
  - Thinclient

Memory

- How do computers store data?
  - Volatile memory
    - CMOS
    - Random access memory (RAM)
    - Cache memory
  - Non-volatile memory
    - HDD, SSD
    - Read only memory (ROM)
    - Optical
    - Magnetic (Floppy, Tapes)

Hard Drives

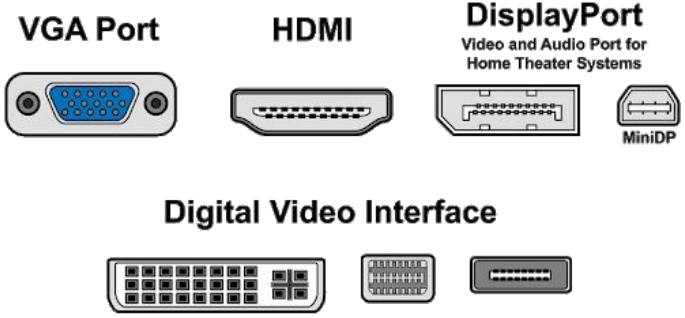
- Platter drive (HDD)
  - Older, slower
  - Cheapter (gap is closing)
- Solid state drive (SSD)
  - Much faster than HDD
- M.2 drive
  - Slightly faster than SSD (often not appreciable difference)
  - Most expensive

Interfaces

- Why do computers have various interfaces?
  - Transfer data
- Types
  - User interface
  - Software interface
  - Hardware interface
- In our case we are studying hardware interface.

USB, Video Interfaces

- USB interfaces common for
  - Power charging
  - Data transfer



Source: [The Computer Guy Blog]

Source: [L-COM What is a USB Cable]

Analog VS Digital

- Both Analog and Digital signals use electricity to transmit information
- **Analog Signal**: Information translated into electric pulses of different amplitudes.

  Examples: VGA interface, old stereo receivers
- **Digital Signal**: Information is in binary format (0 and 1) and there are only two amplitudes.

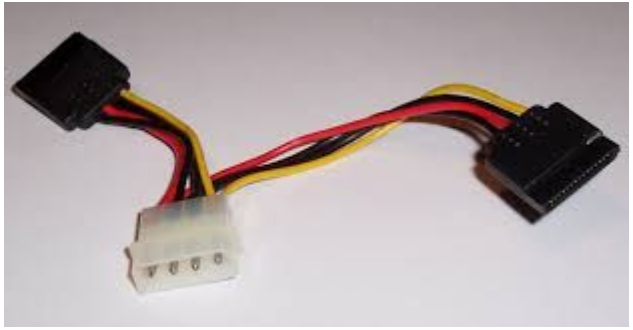
  Examples: HDMI, modern stereo decks

Data, Power Interfaces

- Data interfaces
  - Serial ATA (SATA)
- Power interfaces
  - Serial ATA (SATA) power
  - Molex
- Power supply unit (PSU)
  - Convert Alternating Current (AC) to usable Direct Current (DC)
  - Newer units are modular
  - Motherboard, component power

Source: Wikimedia Commons

Source: Public Domain Pictures



Source: Wikimedia Commons

Build a Computer - Steps

- Setup a PC case and power supply
- Install the CPU and heatsink + fan to motherboard
- Install memory components (RAM, SSD/HDD)
- Install all other components (GPU, Cooling, Sound Card, etc.)
- Attach power cabling from PSU to component
- Attach data cabling

Demo - Build a PC

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Lab

Wrap up your submissions!