**CompTIA IT Fundamentals ITF+ Udemy Course : Notes**

1. How People Use Computers
   1. What does a computer do?
      1. input, processing, output, storage
      2. Take the process of taking a photo on a smartphone. Pressing the photo app is the input, the process opens the photo app, and the output what’s shown on the phone
2. System Hardware
   1. CPU
      1. central processing unit
      2. speed, how many things it can do
         1. measured in Hertz
         2. measure of 1 cycle per second. A Hert is a cycle
            1. normally measure in GHz (billion)
      3. complexity
         1. 32 or 64 bit processors
      4. CPUs do bulk of processing in computers
   2. Passive and active cooling
      1. Passive cooling
         1. relies on air,
         2. use heat sinks to draw heat away from parts
      2. Active cooling
         1. using a device to push or pull heat away from computing components
         2. liquid cooling
   3. RAM & Active memory
      1. 32-bit OS supports only up to 4GB of RAM
      2. 64-bit supports more than 4GB of RAM
      3. RAM Memory lets you know how much a computer can do things at one time
   4. Motherboards
      1. provides connectivity for all hardware
      2. Types of computer form factors (types of design)
         1. ATX – Advanced Technology Extended
         2. Micro (u) ATX
   5. Power Supplies
      1. AC – Alternating Current
         1. Example, house lamp connected to wall socket. Lamp turns on because of AC
         2. Power plants provide electricity in AC because it’s more efficient to transfer.
      2. Computing devices run on DC – Direct Current
         1. This is because batteries run on DC power.
         2. All devices need a power converter to convert AC power to DC power to power the device.
         3. Desktop PCs use PSU (power supply unit) to convert AC to DC. The DC directly powers the computing components without needed a battery.
            1. Typically, PCs use an ATX PSU.
      3. The reason computing devices need DC is because components are designed in a way that need direct current in order to operate correctly.
         1. They are designed with a specific **polarity** – or direct of the current flow (positive or negative).
3. Device Ports and Peripherals
   1. Ports and Connectors
      1. USB – Universal Serial Bus
      2. PS/2 connector
         1. very old connector for mice and keyboards
      3. Video Connectors
         1. HDMI - High Definition Media Interface
         2. DisplayPort Connectors
         3. VGA Connector – Video Graphics Array
            1. older video connector
         4. DVI Connector – Digital Video Interface
         5. eSATA for connecting external hard drives
         6. Ethernet – RJ-45 Connector for connecting networks
         7. Audio Connectors, that are color coordinated
   2. General use I/O Devices
      1. USB-A, USB-Micro B, USB Type B, USB Mini B (smaller devices), Micro B (3.0) – faster
         1. USB Type C – plugs in either way
      2. Different types of video connectors differ with the type of data they transmit such as quality of signal and type of signal.
      3. A Touchscreen is considered an input and output device because it take input in and results in output on the touchscreen as well
      4. Specialty I/O devices have a specific function. For example, a POS device (Point of Sale) is made only for inputting data such as a pin number and outputting money at an ATM machine.
4. Data Storage and Sharing
   1. Binary Basics
      1. 1 bit can handle 2 combinations. 2 bits can handle 4. Each new bit in a computer system can handle double.
      2. 32-bit OS can handle 4gb of RAM. Does 64-bit handle double? No, 33-bit does.
   2. Storage Technologies
      1. Hard drive – long term storage
      2. For IT fundamentals, understand relative capacity of drives to pick the system that satisfies needs.
         1. to choose the right storage capacity, figure out computer needs. If just word processing or browser use, low storage is ok
      3. 1000 gigabytes = 1 Terabyte
   3. Mass Storage Variation
      1. External Hard Disk Drive
         1. can be exchanged for bigger capacity easily, and accessed from other computers just by plugging in
      2. Optical Media
         1. CD, DVD, Blu-Ray Disc
      3. Both of the above are local storage
      4. May also use Network-Attached Storage
         1. business network could have a server to hold data within the network
      5. Cloud Storage
         1. store data in other servers
   4. Data transfer rates for external hard drive matters with the type of connector
5. Understanding Operating Systems
   1. OS Functions
      1. OS provides UI, coordination among hardware, monitors computer health, and operates storage
   2. OS Interfaces
      1. OSs have similar UI but different names
   3. OS Licenses
      1. legally binding software. Means the software is allowed to work a certain operating system, or that the OS is legit
6. Setting Up and Configuring a PC
   1. Preparing an ideal work area
      1. ideally, temperature should be 72 F and 50% humidity
      2. Ergonomics
         1. monitor should be about 16-24 inches
         2. top of monitor should align with eye level
   2. setup stars with hardware connectivity
   3. Completing PC Setup
      1. Create User account > Personalize (timezone) > Performs computer updates > install security software
         1. Windows Defender already installed in Windows
      2. Make some time to create local users for the computer
   4. Questions
      1. Difference between power strip and surge protector
         1. power strip just has multiple outlets (like an outlet strip)
         2. Surge protector looks similar and prevents high voltage from hitting electrical components
         3. uninterruptable power supply
7. Setting up and configuring a mobile device
   1. EULA – end user license agreement
      1. needs to be accepted in order to use
   2. connect to a network, usually WiFi and update OS and firmware
   3. Then start setting up account on mobile device such as Google account for Android or Apple ID for iOS.
8. Managing Files
   1. Select multiple files > drag to desired folder > hold Ctrl to copy files Not move them
   2. Shift + Del to bypass moving file to Recycle Bin
   3. Backups
      1. Run regular backups
      2. always verify backups
      3. indexing
         1. computer keep track of files by contents of file
9. Using and Managing Application Software
   1. Managing Applications
      1. UAC notification for downloading software – User Account Control
         1. stop software from installing without permission from the user
   2. Applications and Extensions
      1. When files opens up automatically with their preferred application, it’s called file association
   3. Open Source doesn’t always mean free
10. Configuring Network and Internet Connectivity
    1. WiFi SetUp
       1. Wireless -> 802.11ac wifi.
       2. SOHO router
       3. When setting up the router, connect it via ethernet cable. Then configure settings.
          1. Change network name or SSID (service set identifier).
          2. Turn on wifi security
    2. Going High Speed
       1. Criteria to determine best connection to use:
          1. mobility
             1. how far you can travel and still access the network
          2. availability
             1. how dependent is the network. How often will you be able to connect.
          3. reliability
             1. the quality of the data received
          4. throughput
             1. data transfer rate
          5. connection delay - latency
          6. # of concurrent connection
             1. # of simulataneous users to connect to it
          7. security
    3. Setting up and sharing Printers
       1. control panel
    4. Questions
       1. Difference between Switch and Router
          1. Switch enables you to create a LAN to connect devices together.
          2. WAP – wireless access point
             1. creates a network as well wirelessly
          3. Router
             1. connects a network to another network (the internet via a modem). It routes data to another network based on IP address.
             2. You need a router to exchange data outside your own network.
       2. What is the difference between a WAP and WiFi? What is a WAP, wireless access point?
          1. WAP only extends the WiFi signal but directly connects to a router via Ethernet cable.
       3. Too many concurrent users will sometimes be too much for your WAP to handle, and so certain users will not be able to connect to the network.
       4. How do you connect a desktop pc wirelessly to the Internet?
          1. Can buy an expansion card to connect to wifi
          2. Or addon a Wireless Network Interface Controller (WNIC)
             1. plugs to USB and connect via wifi
       5. WiFi depends on geography.
       6. What is a WiFi repeater?
          1. This connects to the wifi connection and then broadcasts the wifi even more. Basically, just extends the wifi network connectivity or wifi coverage to more areas.
       7. What is the difference between a WAP (wireless access point) and a WiFi repeater?
          1. WAP connects devices to the internet wirelessly but needs a physical ethernet cable to connect to the router. The devices connect wirelessly to WAP. Big difference is that WAP allows for more devices to connect to it.
          2. A Wifi Repeater/extender, just extends the wifi range, connecting to the router wirelessly, but has a small bandwidth. WAP allows for greater bandwidth.
          3. <https://www.linksys.com/us/r/resource-center/what-is-a-wifi-access-point/>
    5. Cellular connections allows for the most concurrent (at the same time) users. Think about cell towers.
       1. Wireless connections depend on its bandwidth.
11. IT Security Threat Mitigation
    1. Physical Security
       1. Phishing scam
          1. telephone scams as well as emails
       2. unauthorized access
          1. lock computers at all times
       3. Shoulder surfing
          1. invest in screen filter
       4. Dumpster diving
          1. digging through trash for sensitive information
             1. make sure to shred any valuable trash
    2. Dealing with Malware
       1. <https://www.mcafee.com/enterprise/en-us/security-awareness/ransomware/malware-vs-viruses.html>
          1. Good to know:
       2. Spyware
          1. gathers information about the system such as websites visited or purchases.
          2. keylogger
             1. log the keystrokes you make
       3. Ransomware
          1. installs and locks data and asks for a ransom in order to access the data again.
       4. One way to deal with malware is of course, using anti-malware software.
       5. Another is to keep the OS and applications updated.
       6. Keep definition files updates for anti-malware software.
       7. How to recover from a malware attack? There’s 5 steps:
          1. recognize
             1. recognize the symptoms of infected computer.
          2. quarantine
             1. disconnect the computer from any network
          3. search and destroy
             1. run anti-malware software
          4. remediate
             1. restore lost files or corrupted files
          5. educate
             1. learn how to deal with malware and prevent it in the future
    3. Password Management
       1. Authentication
          1. single factor authentication
             1. just 1 thing that you know
          2. multifactor authentication
             1. 1 thing that you know and using something else that you have
       2. a good password has a mix of symbols and cases
    4. Clickworthy
       1. Spoofing
          1. fake emails made to seem real. Like a message from a coworker telling you to click on something.
             1. delete unsolicited emails.
          2. Be sure to ask the coworker if they really sent that message. Be careful who the sender actually is.
       2. An expected email from a safe source is clickworthy. DO NOT click on emails that seem random.
       3. Anything unexpected on web browser or email is totally fake.
          1. i.e pop up ads
          2. On Windows, Alt + F4 to to force quit a browser
             1. Command + Q to force quit on Mac
       4. Piracy websites are normally bad websites.
    5. Perils of Public Internet
       1. HTTPS – hypertext transport protocol
          1. with additional secure protocols to connect to an internet website safely
          2. enables you to connect to website with security.
       2. When using a public internet device, assume the device has **negative security**, which means the machine will have keylogging software.
       3. For email, use IMAP rather than POP3.
          1. <https://support.office.com/en-US/article/What-are-IMAP-and-POP-ca2c5799-49f9-4079-aefe-ddca85d5b1c9>
    6. Questions
       1. Software to store passwords
          1. Apple -> keychain
          2. Web browsers store passwords
          3. Safe when you’re the only user on the certain computer. ***Always*** make sure to log off
       2. How to get back software licenses? i.e. laptop gets stolen
          1. could download and reinstall if downloaded software from websites
       3. What is local encryption?
          1. When a file or folder is converted in an encoded form where only a key can decode it.
          2. How to locally encrypt your files?
       4. What is a firewall?
          1. stops bad things from coming into system. Can be adjusted (exceptions)
12. Computer Maintenance and Management
    1. Power Management
       1. control panel > power options OR Power & Sleep Settings
    2. Cleaning and Maintaining Computers
       1. microfiber cloth
          1. best for cleaning computer
       2. commercial cleaner designed for electronics
       3. Need compressed air to clean out dust
       4. don’t use glass cleaner on monitors
    3. Trash it or Stash it?
       1. Restriction of Hazardous Substances (RoHS) Directive
       2. batteries are safe to put in trash
       3. Lithium-ion battery should be recycled
       4. CRT monitors have lead and should be recycled
       5. Hard Drives are fine to trash, but could be retrieved and is vulnerable to old data
    4. Questions
       1. When recycling, make sure to run a factory reset.
          1. Be very careful after running a factory reset, deleted files can still be accessed from old computer hard drives.
       2. Should you shut down computer all the time?
          1. Patching. Patches may be pushed to users when the computer is on sleep mode.
             1. so it may be a good idea to leave computer on
       3. Difference between sleep and hibernate?
          1. both are low power modes of the computer.
          2. Sleep keeps information on the RAM. Important information that you need.
          3. Hibernate
             1. long term sleep mode
             2. all the data that’s in RAM is saved to a special spot on the hard drive, and then everything else is shut down.
       4. It’s fine to use a vacuum cleaner on the ***outside*** of a computer. It’s bad to use on the internal components because the vacuum can create static electricity that may damage the internal components.
          1. Should use a special electronics vacuum that does not build static electricity.
          2. Even a little static electricity can damage computer
       5. Anti-static wrist strap
          1. contains a resistor that when it touches the skin, keeps your body and metal attachment at the same electrical level or the same electrical potential.
          2. keeps you and the computer safe
13. IT Troubleshooting
    1. Troubleshooting 101
       1. Central Machine
          1. Power and connectivity. Make sure all cables are plugged in
       2. Input and Output Devices
          1. Check your cables. If power is there but things aren’t working, exchange out cables.
       3. Operating System
          1. Operating system glitch 🡪 solved with a reboot. If OS is stuck somewhere
       4. Applications
          1. If application won’t do what it needs to do, use the Help Menu or Help on website.
          2. do a web search
    2. Questions
       1. How to troubleshoot?
          1. **Get specific**. Really figure out what the issue is and what type of problem it is.
          2. Always ask **leading** questions, don’t just ask “What did you do?” Inquire about the steps that were taken and things that happened, or even any error messages.
       2. How to trouble shoot email?
          1. could be a network issue
          2. could be end user issue. Make sure to ask end user to check their spam folder.
          3. could be email could be type incorrectly
          4. could be different Internet Service Provider, where the file might be too big
             1. the received could be limited by file size
          5. restricted file types
       3. If disk space is too full, there won’t be enough reserved space for other things in the computer and thus will slow the computer down.
          1. For Windows, there’s a lot of temporary files that it holds onto.
             1. **Disk Cleanup**

This is a great Windows application that can delete a lot of unnecessary files.

* + 1. PC is running slowly
       1. To view health of PC, use the app, Task Manager.
          1. CTRL + SHIFT + ESC
          2. CTRL + ALT + DEL

Prompt to open Task Manager

* + 1. My Internet isn’t working, what do I do?
       1. If multiple servers are down, it can take out ISP servers down for everyone.
       2. Think about the small pieces that are connected with each other first, to see which is the issue.
          1. Can your computer connect to the router or even other computers?
          2. Rebooting the router.
          3. Check with ISP to see if the issue is directed to your specific house/area.
  1. Understanding Databases
     1. Intro to Databases
        1. Flat file storage
           1. basic storage in plain text
        2. Once you need to scale up in data collection, a database is the preferred method.
        3. Database in the sense, functions like a giant spreadsheet.
        4. can handle input from many users
        5. Can handle queries – questions for the database to get specific information
     2. Database Details
        1. Relational database
           1. each database holds tables, which holds multiple information
           2. Have primary keys
           3. foreign keys

foreign keys create the relationship between 2 tables

primary keys used as a field in another table.

* + - * 1. A constraint determines the **type** of data in a field.
        2. all the above components of a database are called the schema
    1. Questions
       1. How do I know a databased is saved?
          1. changes are saved automatically.
          2. IOPS

input output per second

* + - 1. How to get information into a database?
         1. through a .csv table

comma separate values

* + - 1. CREATE or GRANT command in SQL
         1. allow permissions to edit data
  1. Developing and Implementing Software
     1. Intro to Programming
        1. App – specific task that the computer enables you to do
        2. Computers understand Machine Language.
        3. We use programming languages to translate what we want the computer to do.
           1. Assembly language is the closest we can get to machine language.
        4. Compiler
           1. takes high level programming language to take the language into machine language
     2. Programming with a PBJ Sandwich
        1. Programmers often start with a flow chat.
        2. Writing in pseudocode
           1. step-by-step process in English – that’s readable
           2. provides a roadmap that other programmers could follow
           3. makes steps in a program understandable
        3. Object
        4. Branching
           1. if making a pbj, go to option 2 OR if making cheese sandwich, go to option

each option is a branch

* + - 1. When you create specific steps for a program using programming language, it is called an algorithm.
  1. Questions
     1. Array is a fixed size of space, and a vector is variable
     2. HTML is markup language, but in the exam, can be an interpreted language.