Computers in today's world

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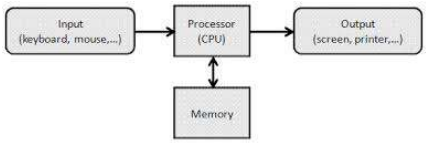
What is a Computer?

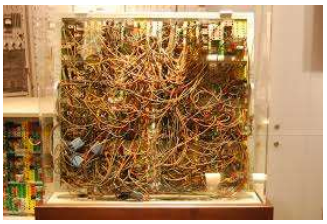
- A Simple Computer definition
  - Computers accept information
  - They process that information based on a program written by a person (at least today).
  - They do something with the result of processing the information.
    - Turn something on or off
    - Manipulate a setpoint
    - Print something on an output device

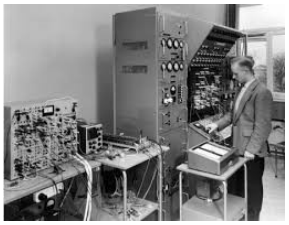


We're getting closer to where computers write their own programs.

Examples of Computers

- A Laptop/Desktop computer
- A Smartphone or Tablet
- Wearables (Smart Watches, Smart jackets, etc.)
- Your car (unless it's a classic)
- TVs
- Thermostats (could be a digital or analog computer)
- Computer printers
- Smart switches
- Smart lights
- Traffic signal controllers





Today, Tablets are basically really big smartphones. There are some exceptions – there are a couple of Windows tablets out there….
Thermostats are a computer, but they might not be digital, which is how we normally think of computers.
In the early days, computers were normally analog.
The first computer was analog and was created in ancient Greece, called the Antikythera mechanism – it was an orrery used to predict astronomical events.
From one point of view, things like Stonehenge could also be a computer.

- Cheaper to implement than “discrete” logic or “analog” circuitry
- Can fix many issues by updating the software/firmware rather than new hardware
- Can update abilities by updating the software/firmware
- Fewer parts to go wrong

The insides of an analog thermostat. Note how the lever changes the tilt of the mercury switch (in orange circle).

Consider a windshield wiper switch. You need a direct link between the switch and the wipers. With a computer at the heart, the computer “reads” the switch, much like a keyboard press, then tells the windshield wipers to go on.
With a computer you could actually change it so that the light switch turns the windshield wipers on (granted, probably not a good idea).

Look at an analog thermostat – it had mercury switches in it and metal that bent as it got colder. This was used to tilt the mercury switch, which would turn on the thermostat when it tilted to a certain level. When you changed the temperature, You were just changing how much the mercury switch was tilted. With a computer and a solid state temperature sensor – it becomes much simpler – read the sensor, compare to what temp you set, and turn heater/air conditioning on or off (in practice,
It’s a little more complicated since you don’t want to switch the A/C on or off too quickly, but this gives you the idea.

Traditional Computers

Basic parts

- Main Board/Motherboard
- CPU + Cooler
- Power Supply
- RAM
- Disk/SSD/DVD/Bluray

Optional parts

- Graphics card/chip
- Sound card/chip
- Network card/chip
- Monitor
- Keyboard
- Mouse
- Speakers
- Microphone
- Operating System

For most digital computers, you need the basic parts listed above. This creates an "unattended" computer (often called a "server"). However, servers typically need a network card in order to do anything useful.

Operating Systems, which optional, exist on every consumer computer. Computers like Thermostats and smart bulbs don't need an operating system if their operation is simple enough.

Operating Systems

An operating system (OS) is **the program that, after being initially loaded into the computer, manages all of the other application programs in a computer**.

The application programs make use of the operating system by making requests for services through a defined application program interface (API).

It gives the programmers a set of rules to help them write programs.
The rules between operating systems are similar, but different, and this is why sometimes a program is only available for one operating system

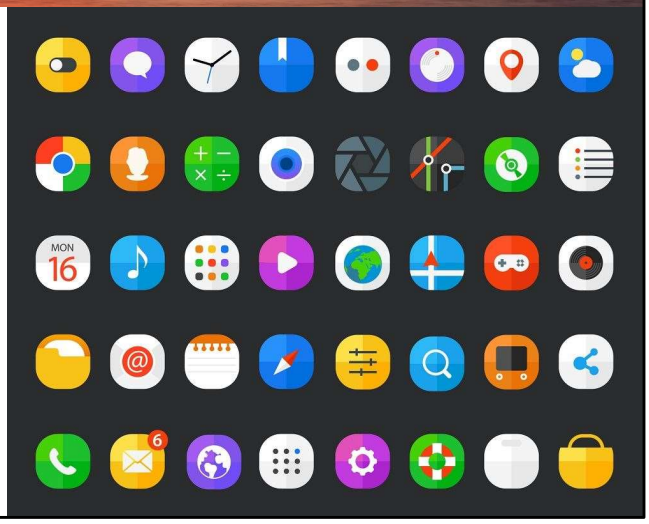
Operating Systems

- Windows
- Mac OS
- Android
- iOS
- Linux
- Chrome OS
- VMWare (for Virtual Machines)
- OS/2
- NeXt (gone)
- Embedded OSs for devices
  - VRTX, PSOS, RT Linux, LYNX

Embedded OSs are for devices that typically have no keyboard or screen (or it might be part of the device itself). Things like Routers, Switches, Set-Top Boxes (like Roku, ChromeCast, Xfinity, DirectTV, or Dish boxes).
OS/2 is still around – IBM stopped working on it in 2001, but it has been licensed by others that continue to work on it and use it.

Most Common Uses (for non-business, general purpose computers)

- E-mail
- Browsing
- Documents (Word, Excel, Notepad)
- Money mgmt (Quicken, TurboTax, Mint, etc.)
- Photos
- Conferencing (Zoom, Facetime)
- Video Editing
- Games
- Watch Videos
- Listen to Music



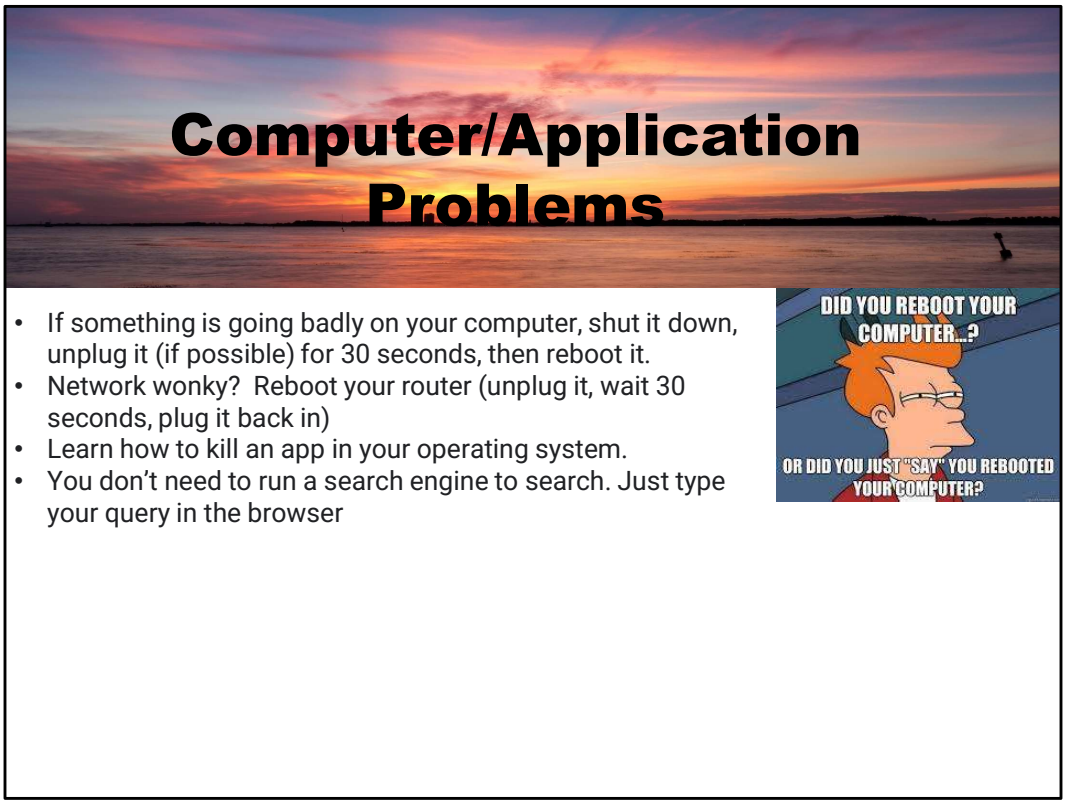
- Browsing
- Clicking on links in emails or documents
- Opening unknown PDFs, Word documents, Excel documents, etc.
- Running unknown executables

Browsing because a website can download stuff onto your computer without your knowledge. They can also fool you into giving up your information. Make sure you're using https:// to browse important websites,
And ensure that the lock icon is there. Most recent browsers do this automatically, and will throw up a dialog box if https:// is not secure.

Clicking on links is problematic because it is "browsing" when it opens the browser.

Unknown documents can be a problem because many documents (like Microsoft office) can have macros attached to them that execute on opening. Office has dealt with this by opening unknown documents in read-only mode, and requiring you to click something to execute macros and edit the document.

Running unknown executables is risky because they can do anything they want. However, most operating systems now require you to be running as an administrator to make significant changes and throw up a dialog box to ask you if the application is allowed to run as administrator.



Sometimes applications go bonkers, or just stop doing anything. You can reboot your computer, but if you know how to kill an app, you won't need to lose everything else going on on your system.

Windows: Ctrl-Alt-Del, then find the app in the list, right click it and choose "End Task"

iPhone – flick up from the bottom of the screen and pause in the middle. You'll get a list of running apps. Find the app and flick it up to the top of the screen.\

MacOS – Option-Command-Esc (or choose Force Quit from the apple menu at the top right of the screen). A force quite menu will appear – choose the app to quit and click "Force Quit"

Android- open Setting, tap (Apps, Applications or Manage apps- depends on the android version). Scroll the list of apps and click on the app. Tap "FORCE STOP"

Browser Tips

- You don't need to run a search engine to search. Just type your query in the browser address bar – it will search using the configured default search engine (changeable by finding preferences)
- Recently visited a web page and you can't remember its name. Use "History" to see the web pages you've been to.
- Lots of tabs open = slow browser. Use Bookmarks to save the websites.
- Most browsers allow you to have a bookmark bar that you can set up with your most used bookmarks.
- Private browsing allows you to log onto a site a second time with a different login.

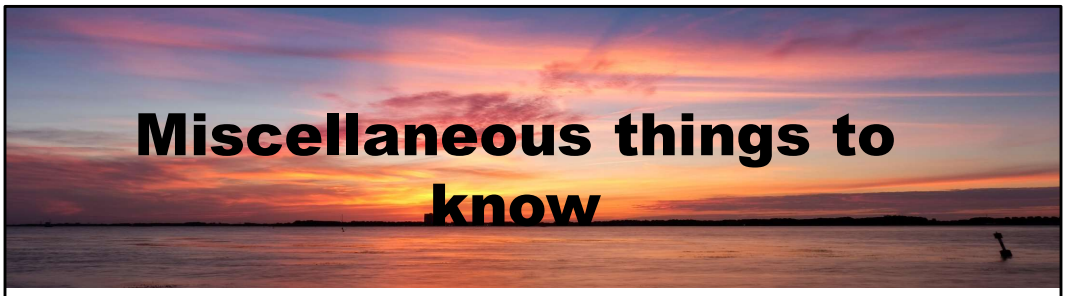
- The longer the better.
- The harder to guess the better
  - No relative names, street names, addresses, birthdays, etc.
  - Common one is 3 or 4 words separated by a character
    - Muskrat#Olive#Beach
  - Random passwords are even better
- Use a password manager, and let it suggest random passwords (some will also suggest 3- or 4-word passwords)
- On websites with no money involved, you can use a simple password, and even use the same password as other no-money websites.
- Every money website should have a different password.
- Make sure you can recover your password if it's lost or forgotten

Money websites = banks, brokerages, government websites, store websites where you leave a credit card attached.

Make sure websites have a good email address or phone number (depending on how they do password reset). For email websites, it's actually important to have a 2nd email on a different service if there's any chance of losing your password (i.e. if you lose your gmail password, they need to email the prompt somewhere else, unless they allow texts, in which case, make sure they have your text phone number)

Batteries

- Battery devices should not be left charging at 100% for long periods of time.
  - Risk of fire
  - Lower battery life. 20% to 80% is optimal for battery life
- Don’t use a device while charging it
  - Lowers battery life due to excess heat
  - Risk of fire



Miscellaneous things to know

- Leaving a computer on is not harmful.
  - There are still arguments today as to whether you leave them on or turn them off.
  - Probably ok to turn it off overnight.
  - Usually need to reboot a computer at least once a week (smartphones too!) to deal with stuff the doesn't get cleaned up.
- Leaving printers plugged in is a MUST.
  - Ink will dry in the printheads, and you'll need a new printer
- Keep operating system updated for least risk of malware and viruses
- Use different (and good) passwords for any site that keeps a credit card on file, or handles your money (banks, brokerages, etc). Use 2FA if possible.

Before you call support

- SAVE ALL YOUR WORK!!!
- Look for clues
- Exit and Relaunch your application
- Reboot the device
- Make sure the device is up to date
- Google the problem
- Run an anti-virus and Malware Scan

Thanks for attending

If you have any questions, or would like to see some specific apps or app types demonstrated, please email

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