

# LIS-3353

## Hardware



# What is a computer?

Must it be “general purpose...?”

or must it merely just have all the parts?



# We know about these:

Macs

Dells



# What about these?

Nintendo

Xbox

Router

mp3 player

ipad

- ...



# Oven...





- Here comes a rant....



- Weird, how it makes more sense (cents? Dollars?) to throw in a general purpose computer, then deliberately disable parts of it.



- If you have to manually root, jailbreak, unlock, or letterbomb it to make it do **exactly** what you want (or even worse, if you **can't**) maybe it shouldn't be considered a computer.

Perhaps, an appliance.



- Don't get me started on the idea that a private company (as opposed to public law) can dictate what I do with legally obtained data or software...

...also, environmental impact



# Super Basic List

PROCESSOR

STORAGE



# Slightly Less Basic

INPUT

PROCESSOR

STORAGE

OUTPUT

(power)

(“glue”)



# PROCESSOR (CPU)

Brains of the operation. “Does” the things.

(GPU's are quite similar; just slightly more optimized to make pretty pictures and animations)



# Power

Lately, not a lot. At all.

Even old computers - generally less than a lamp.



- ..touch it. :)



# STORAGE

- Permanent (REALLY BASIC)
- Semi-Permanent (Firmware/ROM/Bios)
- Changeable

Short-Term (RAM)

- Long-Term (All them “drives”)



# PERMANENT

- The “Board.” That's about it.
- Reliance on this layer is increasingly rare, for obvious reasons.

(ROM used to mean this, now it usually means the next thing...)



# Semi-Permanent Storage (Firmware)

- Much of what you think of as “permanent” is more likely “firmware”

That is, technically changeable, but you don't do it a whole lot, only when you want to make deep, fundamental changes/updates to how the hardware operates.

- BIOS
- ROMS
- Devices (routers, cameras, dj equipment, etc)



# “Changeable” storage

So, you're in the library using books to work on a paper like it's ancient history or something...



# RAM





# RAM

(when people say “memory”)

- what you're working on now



- (short term memory)



# DRIVES (hard, solid-state, CD, etc.)

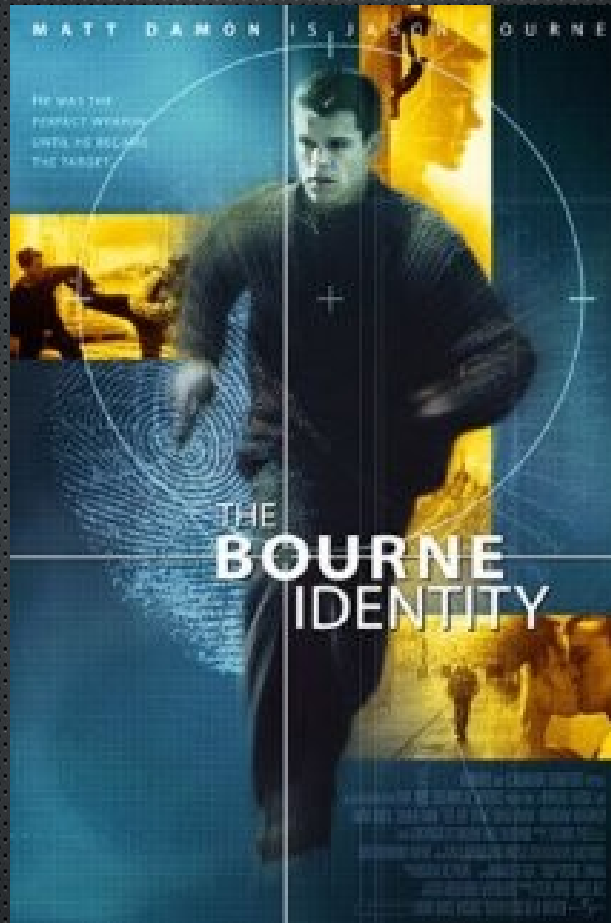
All (usually local) information that you can get to.



– (long term memory)



Hard drive was accidentally rm -rf-ed, he's trying to recover it. His RAM is fine.





All data was preserved, but his hard drive is now read only. Also, has minimal RAM.





# “Drives”

(floppies?)

HD's – IDE v. SATA

CD-ROM, DVD-ROM (blu-ray ROM?)

USB

SD/CompactFlash, etc.

SSD's (the future! Possibly identical to RAM, soon)



# INPUT - OUTPUT

Human Input

Human Output

Digital Input

Digital Output

(Increasing trend towards “digital until the very last possible second...”)



# Human Input (analog)

## Keyboard

- Touchscreen
- Webcam
- Microphone
- Motion-Sensor
- Mouses/Buttons/Sticks
- Thermometers?

(and other “Internet of things” stuff”



# Human Output (analog)

- Screen\*
- Speakers\*/Headphones\*
- Paper
- “Internet of things” stuff here too?  
Oculus Rift, Drones, lights/temp in your house, etc.

\*but what are the “wires” lately? More to come



# Digital Input/Output

- General purpose:

Old-school – *Serial and Parallel*

New hotness: *Universal Serial Bus! (USB)*

Input, output, charging, various sizes

(oh, and also whatever Apple's things are that should probably just be USB, but they're jerks - Europe's cell phone chargers are, by law, ALL Micro USB....discuss)



# Digital Input/Output

Internet Data Oriented:

Phone line

Ethernet (wire)

Wireless (802.11 and bluetooth)



# Digital/Analog Stuff

Generally, the wires going to the outputs are moving from analog to digital.

Advantage: Signal Quality.

(Monster Cables are definitely a ripoff here)

Disadvantage: Sometimes, reduced interoperability, opportunity for DRM. (though, this is rare)



# Audio

Analog: “RCA” – usually the “1/8” in jack, sometimes 1/4  
(arguably the best standard ever created....?)

Digital: Bluetooth, USB, occasionally Ethernet and others



# Video

## ANALOG

TV Video: Cable cord, but lately the RCA A/V (Red / White / Yellow)

(also, occasionally “composite,” RGB)

Computer Video: VGA

## DIGITAL:

DVI

HDMI



“glue”

Motherboards. Where it all comes together.

