CSC104 winter 2013

Computational thinking
week 7

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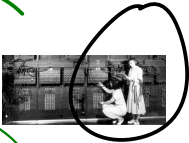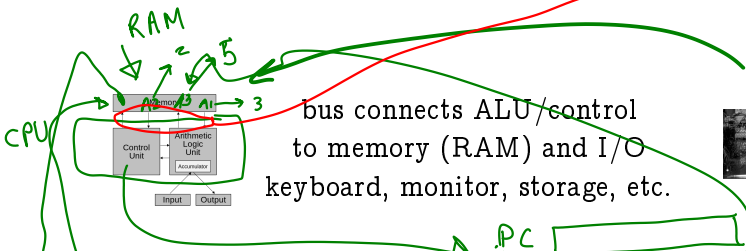BA4270 (behind elevators)

http://www.cdf.toronto.edu/~heap/104/F12/

416-978-5899

Text: Picturing Programs

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Outline

what Von Neumann looks like

bottleneck .

RAM

CPU

bus connects ALU/control
to memory (RAM) and I/O
keyboard, monitor, storage, etc.

1. LOAD A1 R1
2. LOAD A2 R2
3. ADD R1 R2 R3
4. STORE R3 A3
5. HALT

PC

IR   HALt

R1   3

R2   2

R3   5

(define A3 (+ A1 A2))

Fetch

execute

decode
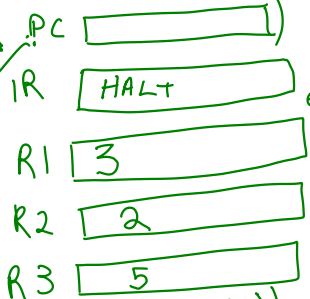
where Von Neuman's going

There are some issues

- Von Neumann bottleneck

- mortality of Moore's Law

may be Quantum computing
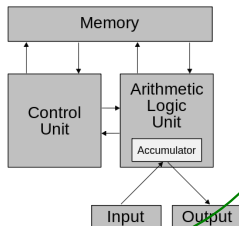
dimit resolution possible for light's wave length

photo lithography and heat.
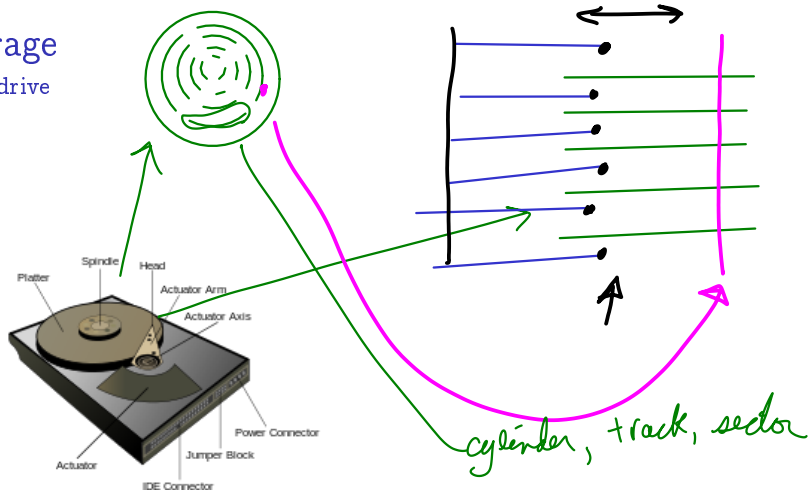
wave length

input, output

for geezers

Memory

Arithmetic Logic Unit

Control Unit

Accumulator

Input Output

what will be new human input / output,

lots of real estate
to get ideas in, out
doesn't fit in pocket

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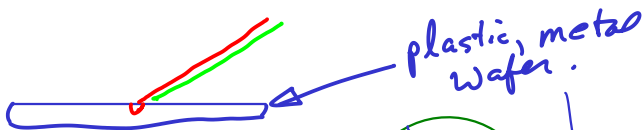UNIVERSITY OF TORONTO

storage
hard drive

cylinder, track, sector

Platter
Spindle
Head
Actuator Arm
Actuator Axis
Power Connector
Jumper Block
Actuator
IDE Connector

storage

compact disc

plastic, metal wafer.
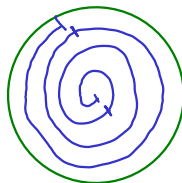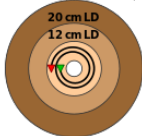
heat, humidity, time

storage

flash drive — solid state.

no macroscopic moving parts.
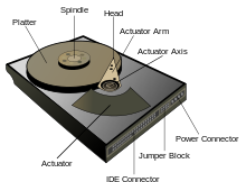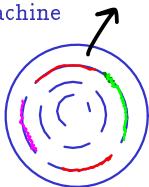
expensive vs hard drives.

promising form of storage.

similar to transistors, faster than magnetic storage.

bits, files, buffers

protect us from the machine

with meaningful names

→ combine fragmented.

Spindle

Platter   Head

Actuator Arm

Actuator Axis

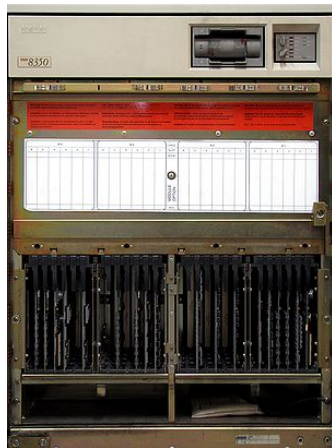Power Connector

Actuator   Jumper Block

IDE Connector

machines take over in batches

Machines began to take over setting the program counter to a new job, collecting the output, fetching memory...but it was still one job at a time.
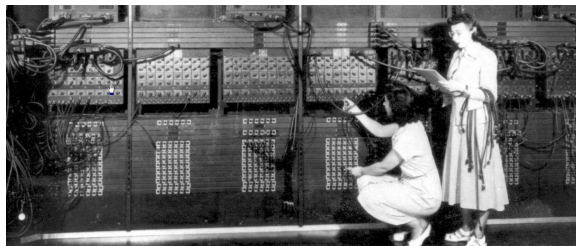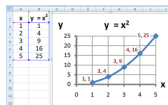
time sharing, version 0.1

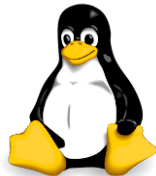# one user, one program, one computer

task-switching to time-splitting, v 1.0

Does one task stop, or only appear to stop, for the other?

unix (mostly) to the desktop
GUIs, time-sharing, networking, flame-wars

an operating system should have

- kernel (shell, shielded access to hardware, referee sharing)

- utilities

Notes