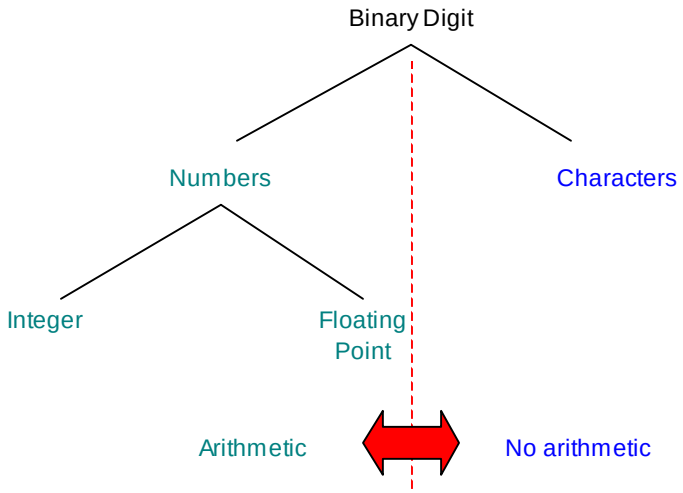
IS 300 — Lecture 2

- How is data represented inside the computer (and what are the implications to users)?
- How is a computer system organized?
- What are the important factors relating to the central processor and primary storage?
- Secondary storage:
  - What is it?
  - Why is it important?
  - What performance factors should we consider?
  - What are the secondary storage options?

How is data represented inside the computer (and what are the implications to users)?

Overview



ANSI "A" = 0100 0001 (binary) = 65 (base 10)
ANSI "5" = 0011 0101 (binary) = 53 (base 10)
Integer 5 = 101 (binary)

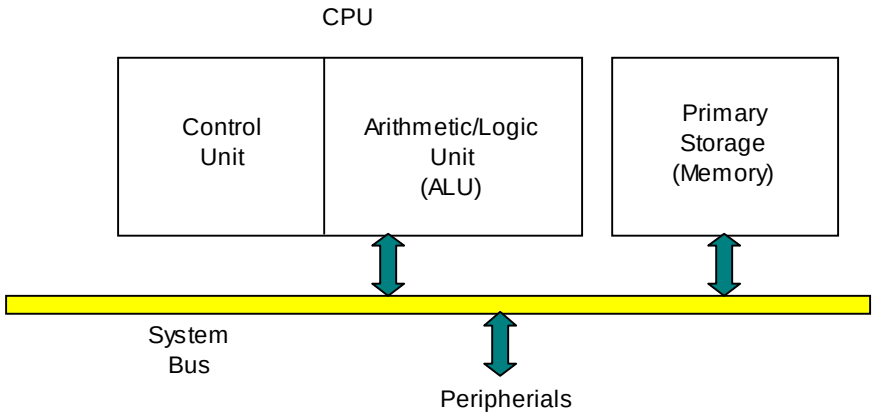
"5" and 5 are not the same!

The more binary bits used, the larger the numeric magnitude

All decimal integers have exact binary equivalents

Most decimal fractions (e.g., 1.1) can only be approximated in the binary number system – using more bits reduces the approximation (representation) error

How is a computer system organized?



Speed is determined by the slowest component

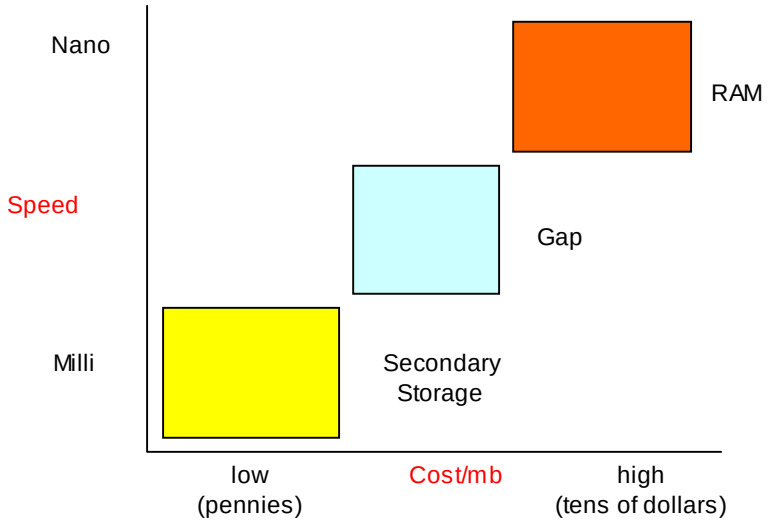
Demo – Configure a new computer

What are the important factors relating to the central processor and primary storage?

- CPU families
- Machine language
- Speed of the CPU
  Hertz (Hz) – cycles per second
  MIPS [Millions] [Marketing] [Meaningless]
  Instructions Per Second
- RISC vs CISC
- Benchmarking
- Demo – iCOMP charts

Secondary storage – What is it/Why important?

Nonvolatile (permanent)



Secondary storage – What performance factors should we consider?

- Capacity
- Access time
- Transfer rate
- Reliability
- Internal versus external
- Fixed versus removable
- Cost factors

Secondary storage – What are the secondary storage options?

Magnetic hard disks (fast, expensive, large capacity, vulnerable to failure)

- Fixed HD
- Removable HD

Flexible magnetic disks

- Floppy (slow, cheap, low capacity, vulnerable to failure)
- Bernoulli (similar to HD – slightly below HD except cost)

Optical (high capacity, slower, cheap, high reliability)

- CD-ROM
- CD-R
- Erasable
- CD-DVD (Sony DDU100E — 4.7GB, $599)
  - Others estimate 17 GB (double sided/double layers)

Other

- Flash memory (new developments – Intel StratFlash)