Topics for today:

Finish overview

Basics of binary arithmetic and Boolean logic

Recall

Three main types of components:

1. Central Processing Unit (CPU)
2. Memory (main memory)
3. Input/Output (I/O)

1. CPU structure

- Arithmetic Logic Unit (ALU)
  Does arithmetic computations
- Control Unit (or Control Logic Unit, CLU)
  Decides what happens next
- Registers
  Temporary storage locations

+ 1 or more internal CPU buses

A microprocessor is a CPU which is all on a single integrated circuit ("chip").

2. Main memory

- Stored electronically
- Usually volatile – disappears when power is lost

3. Input/Output (I/O)

- Usually in two parts
  - Controller (electronics) ("card")
  - Physical device itself
- In large systems, a more complicated controller handles several devices: I/O channel

II. Digital Level

Basic terminology

- Bit – single piece of binary information
  - 1/0, On/Off, True/False, High/Low
- Byte – sequence of 8 bits
- Nibble – sequence of 4 bits (half a byte)
- Word – # of bits a particular computer uses as its basic unit of information for processing

Basic binary representation of numbers

Each place in the notation, from right to left, represents the next higher power of 2.

Counting in binary notation

1	1	11	1011
2	10	12	1100
3	11	13	1101
4	100	14	1110
5	101	15	1111
6	110	16	10000
7	111	17	10001
8	1000	18	10010
9	1001	19	10011
10	1010	20	10100

Gates

Gates are simple electronic devices that combine digital inputs (representing 0's and 1's) to produce digital output.

Boolean algebra

Functions which take inputs 0,1 and produce outputs 0,1 are called Boolean functions (after George Boole, a 19th century mathematician). The application of theses functions is called Boolean algebra.

Next Time

- No class Monday
- Read Section 3.1-3.4