

Chap. 1
Computers and Information

EE2030h
Dr. John A. Copeland
Slide Set 1

<http://www.ece.gatech.edu/academic/courses/ece2030/>
<http://www.csc.gatech.edu/~copeland/2030/>

1

Signals

Physical Types

Voltage

Current

Photons

Fixed Number of Discrete Levels (**digital**, not analog)

2 levels - binary (simpler circuits for computers)

Called (true, false), (high,low) or (0,1)

multi-level - good for communications (EE4604)

2

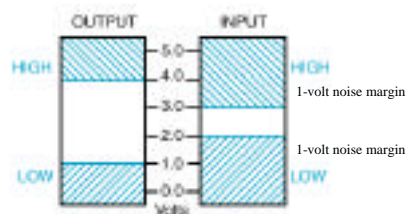


Fig. 1-1 An Example of Voltage Ranges for Binary Signals

3

A binary number is called a "Bit".

Eight bits as a unit are called a "Byte"

Bits may reside:

- on different memory elements in a semiconductor memory chip (C charged or not),
- on different spots on a magnetic disk (M + or -)
- on different spots on a CD (pit or no pit),
- on the input and outputs of "logic gates" in a computer "register" or "on a bus"

4

Floppy disk, hard drive, RAM (semiconductor IC), CD ROM

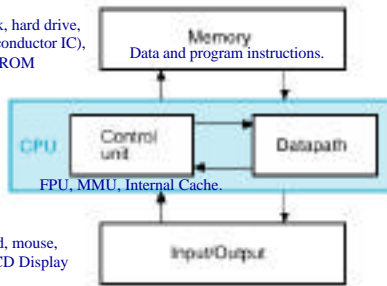


Fig. 1-2 Block Diagram of a Digital Computer

5

TABLE 1-2 Numbers with Different Bases

Decimal (base 10)	Binary (base 2)	Octal (base 8)	Hexadecimal (base 16)
00	0000	00	0
01	0001	01	1
02	0010	02	2
03	0011	03	3
04	0100	04	4
05	0101	05	5
06	0110	06	6
07	0111	07	7
08	1000	10	8
09	1001	11	9
10	1010	12	A
11	1011	13	B
12	1100	14	C
13	1101	15	D
14	1110	16	E
15	1111	17	F

If base > 10 new symbols must be defined for 11, 12, ...

$1 \times 8 + 3 = 11 \text{ base } 10$
 $1 \times 8 + 0 \times 4 + 1 \times 3 + 1 = 11 \text{ base } 10$

Table 1-2 Numbers with Different Bases

6
