

00100011

35 196

Binary - Base 2

'#' 'D'

Place value

$$\begin{array}{r}
 & 2 & 7 & 2 & 1 \\
 \frac{1}{10^3} & \frac{1}{10^2} & \frac{2}{10^1} & \frac{1}{10^0} \\
 1000 & 100 & 10 & 1
 \end{array}$$

$$\begin{array}{r}
 0 & 0 & 1 & 0 & 0 & 0 & 1 & 1 \\
 \frac{1}{2^7} & \frac{1}{2^6} & \frac{1}{2^5} & \frac{1}{2^4} & \frac{1}{2^3} & \frac{1}{2^2} & \frac{1}{2^1} & \frac{1}{2^0} \\
 128 & 64 & 32 & 16 & 8 & 4 & 2 & 1
 \end{array}$$

$$32 + 2 + 1 = 35$$

$$0000 \frac{1001}{8+1} 9$$

$$0001 \frac{0101}{16+4+1} 21$$

$$01101101 \\ 64+32+16+4+1=109$$

$$6-4=2-2=0$$

$$18-16=2-2=0$$

$$\dots 32 \underline{16} \ 8 \ 4 \ 2 \ 1$$

$$\dots 32 \underline{16} \ 8 \ 4 \ 2 \ 1$$

$$51-32=19-16=3-2=1-1=0$$

$$\begin{array}{r}
 0 & 0 & 1 & 1 & 0 & 0 & 1 & 1 \\
 \underline{128} & \underline{64} & \underline{32} & \underline{16} & \underline{8} & \underline{4} & \underline{2} & \underline{1}
 \end{array}$$

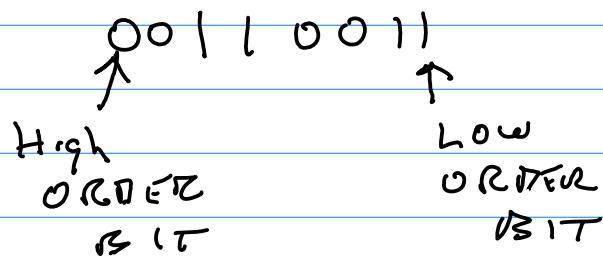
$$\begin{array}{l}
 18 \div 2 = 9 \quad R_0^{\text{low}} \\
 9 \div 2 = 4 \quad R_1 \\
 4 \div 2 = 2 \quad R_0 \\
 2 \div 2 = 1 \quad R_0 \\
 1 \div 2 = 0 \quad R_1^{\text{high}}
 \end{array}$$

00010010

$$\begin{array}{rcl}
 51 \div 2 & = & 25 \quad R\downarrow \quad R=0 \\
 25 \div 2 & = & 12 \quad R\downarrow \\
 12 \div 2 & = & 6 \quad R\downarrow \\
 6 \div 2 & = & 3 \quad R\downarrow \\
 3 \div 2 & = & 1 \quad R\downarrow \\
 1 \div 2 & = & 0 \quad R\downarrow
 \end{array}$$

11:02

left



$$11111111_2 = 255_{10}$$

Hexadecimal

Base 16

$$\begin{array}{ccccccccc}
 0 & 1 & 2 & 3 & \dots & 9 & A & B & C & D & E & F \\
 & & & & & & 10 & 11 & 12 & 13 & 14 & 15
 \end{array}$$

$$\begin{array}{r}
 0 \quad 1 \quad B \quad E \\
 \hline
 16^3 \quad 16^2 \quad 16^1 \quad 16^0 \\
 4096 \quad 256 \quad 16 \quad 1
 \end{array}$$

$$\begin{array}{rcl}
 14 \times 1 & = & 14 \\
 11 \times 16 & = & 176 \\
 1 \times 256 & = & 256 \\
 \hline
 & & 446
 \end{array}$$

0000	-	0
0001	-	1
0010	-	2
0011	-	3
0100	-	4
0101	-	5
0110	-	6
0111	-	7

1000	-	8
1001	-	9
1010	-	A
1011	-	B
1100	-	C
1101	-	D
1110	-	E
1111	-	F

$$000 \left| 0010 = 18$$

1 2

0011 | 0011 33

↓ ↓
9 B 7 A₁₆

1001 1011 0111 1010₂
↑ ↑

Base 8
Octal

ASCII / Unicode

EBCDIC