

Assembly - 8.28.11

CSCI 2160

* Hollerith Code

- 1880 census took 10 years to calculate
- Hollerith came up tabulating mach
- the card had 80 columns
- 12-1 was A, 12-2 was B
- I was 12-9
- only did uppercase
- J was 11-1, R was 11-9
- S was 0-2, Z was 0-9

* Number Systems

$$476_9 + 583_9$$

$$\begin{array}{r} 476_9 \\ + 583_9 \\ \hline 1110_9 \end{array}$$

$$467_8 + 557_8$$

$$\begin{array}{r} 467_8 \\ + 557_8 \\ \hline 1246_8 \end{array}$$

$$\begin{array}{r} 1011_2 \\ + 1101_2 \\ \hline 11000_2 \end{array}$$

$$\begin{array}{r} 31215 \\ 888_7 \\ - 146_7 \\ \hline 256_7 \end{array}$$

$$\begin{array}{r} 1011 \\ 214_4 \\ - 132_4 \\ \hline 13_4 \end{array}$$

$$!0H = 2560 + 0 + 11 = 2571_n$$

- needed 8 bits in a byte so that all characters on a keyboard could be represented
- addresses are binary also
- $1100_2 = 12$

* EBCDIC

- 12-1 - $1100_2 | 0001_2$ - A
- 12-2 - $1100_2 | 0010_2$ - B

- when reading memory, you need to know context

- 11010001 - J in EBCDIC
- 11100001 - S in EBCDIC
- EBCDIC has gone and digit, derived from Hollerith

* ASCII

- starting with capital A, 0100 0001 (65 in decimal) + 4_h
- letters after are incremented
- for ASCII, turn on 3rd bit
- lowercase a = 0110 0001 - 97 + 6_h
- for lowercase, add 32 in decimal or 20_h

* Numbers in EBCDIC

- 0 - F0 in EBCDIC
- 9 - F9 in EBCDIC
- EBCDIC, characters precede numbers when sorting
- ASCII - numbers precede characters

* Numbers in ASCII

- 0 is 30_h in ASCII
- 9 is 39_h in ASCII