Representing Characters

- **ASCII:** American Standard Code for Information Interchange
- EBCDIC: Extended Binary Coded Decimal Interchange Code (IBM)
- ASCII: Fits in one byte but is a 7-bit code
- $2^7 = 128_{10}$ characters
- 95 printable characters
- 33 control characters for communications and peripheral interface controls
- A $= 41_h$; Z $= 5A_h$; a $= 61_h$; z $= 7A_h$
- Adding $32_{10} = 20_h$ converts from Upper case to Lower case for the letters of the alphabet

$\mathrm{B} = 42_h = 0100\,0010$

$\mathrm{b} = 62_h = 0110\,0010$

- Lower-order 4 bits are the same

ASCII DIGIT $8_{10} = 38_h = 0011\,1000$

- Lower-order 4bits (nibble) $1000_2 = 8_{10}$

- Control Characters

1. BEL $= 07_h$ (Ring bell)
2. BS $= 08_h$ (Backspace)
3. HT $= 09_h$ (Horizontal tab)
4. LF $= 0A_h$ (Line Feed)
5. FF $= 0C_h$ (Form Feed)
6. CR $= 0D_h$ (Carriage Return)

$\boxed{\text{Bit Manipulation}}$

Upper to Lower case: Change bit 5 from 0 to 1

Test if even or odd integer

- YOU must learn how to do BIT OPERATIONS

- **Masks:** A sequence of bits designed to target a set of bits in another number
- You already know the truth tables for **NOT, OR, AND, EOR**
- Bit value 1 == TRUE
- Bit value 0 == False

1. The AND operation sets the bits of X to 0 for 0 in the mask. For bits 1 in the mask, the bits of X are unchanged. X = AC26, MASK (M) = FF00

   X AND M = AC00

2. The OR operation sets the bits of X to 1 for 1 in the MASK. For bits 0 in the mask, the bits of X are unchanged

   X OR M = FF26

3. The EOR operation reverses the bits of X for 1 in the mask. For bits 0 in the mask, the bits of X are unchanged

   X EOR M = 5326

4. Store value 5 in bits 3 to 5 of an 8-bit register R without affecting the rest of the bits in R