2. MSB : Most significant Bit. It is the left most bit of a given binary number.

4. (a) 00110101_b ⟹ $32+16+4+1 = 53_d$
       32 16 4 1 b

  (b) 10010110_b ⟹ $128+16+4+2 = 150_d$
      128 16 42

  (c) 11001100_b ⟹ $128+64+8+4 = 204_d$

6. (a) $10101111 + 11011011 = 110001010_b$

  (b) $10010111 + 11111111 = 110010110_b$

  (c) $01110101 + 10101100 = 100100001_b$

8. (a) word   — 16 bits
  (b) doubleword — 32 bits.
  (c) quad word — 64 bits.

10. (a) 4095 ⟹ 2^n ⟹ $2^{12} = 4096$ ⟹ 12 bits.

  (b) 65534 ⟹ $2^{16} = 65536$ ⟹ 16 bits.

  (c) 2134657 ⟹ $2^{21} = 2097152$ (<)
               $2^{22} = 4194304$ (>) ⟹ 22 bits.

12. (a) 0011 0101 1101 1010 = $35DA_{16}$
  (b) 1100 1110 1010 0011 = $CEA3_{16}$
  (c) 1111 1110 1101 1011 = $FEDB_{16}$

16. (a) $62_{16} \Rightarrow 6 \times 16^1 + 2 \times 16^0 = 98_d$

(b) $1C9 \Rightarrow 1 \times 16^2 + 12 \times 16^1 + 9 \times 16^0 = 457_d$

(c) $6A5B \Rightarrow 27227$

18. (a) $-32_{10} \Rightarrow |20_{16}| \Rightarrow 0010\ 0000_b$

1's Comp $- 1101\ 1111$

2's Comp $\underline{1}$

$\underline{1110\ 0000} \Rightarrow E0_{16}$

(b) $-62_{10} \Rightarrow |62_{10}| \Rightarrow 3E \Rightarrow 0011\ 1110$

$1100\ 0001$

$\underline{1100\ 0010} \Rightarrow C2_{16}$

20. (b) $8230 \Rightarrow$

$FFFF$

$\underline{-\ 8230}$

$7DCF$

$\underline{7DD0} \Rightarrow -32208$

(a) ~~8000~~ $7F9B \Rightarrow MSB = 0 \Rightarrow Positive.$

$\Rightarrow \underline{+32667}$ Aₙ

22. (a) $1000\ 0000 \Rightarrow 80 \Rightarrow FF$

$\underline{80}$

$7F$

$\underline{+1}$

$\underline{80} \Rightarrow -128_d$

(b) $1100\ 1100 \Rightarrow CC \Rightarrow FF$

$\underline{-CC}$

33

$\underline{+1}$

$\underline{34} \Rightarrow -52_d$

(c) $1011\ 0111 \Rightarrow B7 \Rightarrow -73_d$

23. (a) $-5 \Rightarrow |5| = 5_d = 0000\ 0101$

$1011\ 1010$

$\underline{+1}$

$\underline{1111\ 1011_b} \Rightarrow$

(b) $-36 = 11011100_b$

(c) $-16 = 11110000_b$

24 (a) $-72 = 1011\ 1000_b$

(b) $-98 = 1001\ 1110_b$

(c) $-26 = 1110\ 0110_b$

26. ASCII value of $M = 4D_{16}$

$= 77_d$