Question No: 01

Question: Suppose that a byte contains the ASCII code of an uppercase letter. What hex number should be added to it to convert it to lower case?

Answer:

For converting ASCII code of an uppercase letter to lower case letter 32d should be added.
So now converting 32 in hexadecimal form

16	32	
16	2	0
	0	2

So, the hexadecimal value is $(20)_{16}$

So, 20h should be added to ASCII code of an uppercase letter to convert it to lower case.

Question No: 02

Question: For each of the following 16-bit signed numbers, tell whether it is positive or negative a) 78E3h b) 9AC4h

Answer:

a) Here, Decimal to binary for the following numbers,

7 = 0111
8 = 1000
E = 1110
3 = 0011

78E3h = (0111100011100011) b

As Most significant bit is 0. So it is positive.

b) Here, Decimal to binary for the following numbers,

9 = 1001
A = 1010
C = 1100
4 = 0100

9AC4h = (1001101011000100) b

As Most significant bit is 1. So, it is negative.

Question No: 03

Question: Give the unsigned and signed decimal interpretations of each of the following 16-bit or 8-bit numbers a) 7FFEh b) A9h

Answer:

a) Here, Decimal to binary for the following numbers,

7 = 0111
F = 1111
E = 1110

7FFEh

$= (0111111111111110)_b$

$= 0*2^{15} + 1*2^{14} + 1*2^{13} + 1*2^{12} + 1*2^{11} + 1*2^{10} + 1*2^9 + 1*2^8 + 1*2^7 + 1*2^6 + 1*2^5 + 1*2^4 + 1*2^3 + 1*2^2 + 1*2^1 + 1*2^0$

= 32766d

Here the most significant bit is 0, the number is positive, and the signed decimal is the same as the unsigned decimal.

b) Here, Decimal to binary for the following numbers,

A = 1010
9 = 1001

A9h $= (10101001)_b$

$= 1*2^7 + 0*2^6 + 1*2^5 + 0*2^4 + 1*2^3 + 0*2^2 + 0*2^1 + 1*2^0$

=169d

It is the unsigned interpretation.

Here the most significant bit is 1, the number is negative. So to find the signed decimal ,

1's complement $= (01010110)_b$

2's complement $= (01010111)_b$

$= 0*2^7 + 1*2^6 + 0*2^5 + 1*2^4 + 0*2^3 + 1*2^2 + 1*2^1 + 1*2^0$

= -87d