

Practice problems on Number Systems

1. Convert the following hexadecimal number to its binary

59B

Ans: To convert from hexadecimal to binary, we look at each digit in the hexadecimal number and then convert each hex digit to its corresponding binary number in groups of 4 bits (i.e. since $2^4 = 16$)

$\begin{array}{c} \underline{5} \\ 0101 \end{array}$
 $\begin{array}{c} \underline{9} \\ 1001 \end{array}$
 $\begin{array}{c} \underline{B} \\ 1011 \end{array}$
 \longrightarrow
0101 1001 1011

2. Convert the above hexadecimal number to its octal (i.e. base 8) representation.

Ans: From 1., we have the binary number : 0101 1001 1011

To convert to octal, we group the binary number in groups of 3 bits (i.e. since $2^3 = 8$) starting from the right:

010 110 011 011

Hence, we have: 2 6 3 3

So, 59B in hexadecimal is 2633 in octal

Practice problems on Number Systems

3. Convert the decimal number 19.375 to its unsigned binary.

Ans:

	<u>quotient</u>	<u>remainder</u>	
19/2	9	1	→ 10011
9/2	4	1	
4/2	2	0	
2/2	1	0	
1/2	0	1	

$$0.375 * 2 \Rightarrow$$

0.75

$$0.75 * 2 \Rightarrow$$

1.50

$$0.5 * 2 \Rightarrow$$

1.00

→ 011

**we multiply the fractional portion by 2 until the fractional portion equals to zero.

Hence, 19.375 in decimal is 10011.011 in binary