St. Michael's School, Muri

Std. 7 - Computer

Chapter 3.   <u>**Number system an introduction**</u>

A number system is a way to represent numbers. Generally, we use a number system in which there are 10 different symbols 0, 1, 2, 3, - - - -- -9. This number system is known as decimal number system. But computer does not understand decimal number system. It understands a number system that uses only two symbols 0 and 1 and is called binary number system. In addition to these two, there are some more number systems such as octal number System and hexadecimal number system.

The value of each digit in a number can be determined using:

- the position of the digit in the number.
- the digit he base of the number system (where the base is defined as the total number of digits available in the number system).

Decimal Number System : The number system that we use in our day-to-day life is the decimal number system. As it uses total 10 digits from 0 to 9. It has base 10.

Binary Number System : Binary number system is the only number system that a computer understands directly. In this number system, there are only two symbols namely 0 to 1. It is also called as base 2 number system

Octal Number System : Octal number system is a number system that has 8 different symbols namely 0, 1, 2, 3, - - - - 7. It is also called as base 8 number system.

Hexadecimal Number System : Hexadecimal number system is that has different symbols namely 0, 1, 2, 3, - - - - -- 9, A, B, C, D, E, F. Symbols A, B, D. E, F stands for 10, 11, 12, 13, 14, 15 respectively. It is also called as base number system.

Conversion from Decimal to Binary Number System
Rules :
1. Divide the given number with the base of binary number i.e2.
2. Write down the remainder and divide the quotientagainby2
3. Repeat the step 2 till the quotient becomes 0 . Equivalent binary number is obtained by writing sequence of remainders starting from bottom to top .
 Example 1.
 $(12)_{10}= (1000)_2$.
2|12|0   Remainder
2|6|0"
2|3|0"
2|1|1"
 |0|"

Conversion from Decimal to Hexadecimal Number System
Rules :
 1. Divide the given number with the base of Hexadecimal number i.e. 16
2. Write down the remainder and divide the quotient again by 16 .
3. Repeat the step 2 till the quotient becomes 0 .
 Equivalent binary number is obtained by writing sequence of remainders starting from bottom to top .
 Example 1 : $(74)_{10},$ = $(4A)_{16}$.

16|74
 |4<u>10(A)</u>

Conversion from Binary to Hexadecimal Number System

Rules :

 1. To convert a binary into hexadecimal , divide it into groups of four digits starting from right to left .

2. If the number of digits is not a multiple of 4 , prefix the number with O's so that each group contains four digits .

3. For each four digit group , convert the four bit binary number into an equivalent hexadecimal digit

Example 1 : $(111101)_2$, = $(7A)_{16}$,

  0111/7,   1010/10(A)

Example 2 : $(10101101111)_2$, = $(56F)_{16}$

0101/5,0110 /6, 1111 /15(F)

Binary Arithmetic

Binary Arithmetic is essential part of all the digital computers and many other digital system

 Binary Addition

Binary addition is performed in the same manner as decimal addition . However , binary system has two digits (0 and 1) .

Rules

1. 0+ 0 = 0
2. 0 + 1=1
3. 1+0 =1
4. 1 + 1=0 and 1 carry (10)
5.   5.1 + 1 + 1 =1 and 1 carry (11)

Example1 : $(101)_2$+, $(11)_2$, =$(1000)_2$,

11 Carry

1 0 1

        1 1

        1000

Holiday Home work

Exercises:-

A Tick ( ) the correct option :

1. Base 10 refers to which number system
   a) Binary coded decimal b) Octal c) Decimal
2. Octal number system uses _____symbols to represent number
   a) 2   b) 7   c)   8

3. The hexadecimal symbol F is equivalent to decimal numnumbe
   a) 10   b) 15   c) 25

B. Write ' T ' true and P for false statements :

1. Binary digits are 1 and 2 .
2 . Base of binary number system is 2 .
3. Octal number system is also called base 16 number system .
4. In hexadecimal number 16 means F.
5. You cannot convert any decimal number into hexadecimal number system .
6 . 1 + 0 = 0 is binary addition .
7. 0-1 = 1 with a borrow taken from next place i.e. left digit in binary .
8. Binary addition is performed in the same manner as decimal addition .

C. Answer the following questions :

1. What are the types of number system ? Mention their bases also .

2. What are the rules you need to follow to convert a decimal number to its binary equivalent ?

3. Write a note on hexadecimal number system .

4. Write the rules to convert any binary number to decimal number .

5. Write the rules of conversion decimal to hexadecimal number system .

6. What are the rules of conversion binary to hexadecimal number system.