NUMBER SYSTEMS

CLASS 1

DEFINITION

* IT IS A SET OF SYMBOLS(NUMBERS, ALPHABETS Etc.) USED TO EXPRESS QUANTITIES AS THE BASIS FOR
  - COUNTING
  - COMPARING AMOUNTS
  - PERFORMING CALCULATIONS
  - REPRESENTING VALUES ETC.

❖ NUMBER SYSTEMS ARE USEFUL IN DIGITAL COMPUTER TECHNOLOGY. THE KNOWLEDGE OF THESE SYSTEMS ARE VERY ESSENTIAL IN DESIGNING DIGITAL SYSTEMS TO PERFORM RELIABLE AND ECONOMIC OPERATIONS.

TYPES OF NUMBER SYSTEMS

* POSITIONAL NUMBER SYSTEM

EX. DECIMAL NUMBERS LIKE 0,1,… ,9

89=8X10 +9X1 = 80+9

123=1X100 + 2X10 +3X1 =100+20+3

* NON- POSITIONAL NUMBER SYSTEM

EX. ROMAN NUMBERS LIKE V,I

5= V 1=I

6=VI 5+1

4=IV 1+5

POPULAR NUMBER SYSTEMS

* DECIMAL SYSTEM.
* BINARY SYSTEM. 10001001001001100010101010
* OCTAL SYSTEM. 100 010 010 010 011 000 101 010
  0-7 4 2 2 2 3 0 5 2
* HEXADECIMAL SYSTEM. 16 0-9 ABCDEF
* 1000 1001 0010 0110 0010 1010
* 8 9 2 6 2 A
* BINARY CODED DECIMAL SYSTEM (BCD)

BASE OR RADIX

* THE BASE OR RADIX OF A NUMBER SYSTEM IS THE NUMBER OF DIGITS AVAILABLE IN THAT SYSTEM.
* EXAMPLE:
  - THE BASE OF DECIMAL SYSTEM IS 10 EX 89
  - THE BASE OF BINARY SYSTEM IS 2 EX 0 OR 1
  - THE BASE OF OCTAL SYSTEM IS 8 EX 0-7
  - THE BASE OF HEXADECIMAL NUMBER SYSTEM IS 16 EX 0-9 ABCDEF

REPRESENTATION OF BASE OR RADIX

* BINARY (XXXX) 2 OR XXXX b 0101 2 0101 b
* DECIMAL (XXX) 10 OR XXX d OR SIMPLY XXX
* OCTAL (XXX) 8 OR XXXX O 67 8 67 o
* HEXA DECIMAL (XXX) 16 OR XXXX h 89A 16 89A h

* Binary number

$(10101010)_2$

Octal

53

$(53)_8$ 53 o