234 ======= (234)10

Convert Decimal 234 into binary

Convert (234)10 into binary

110011 ===== (110011)2

237 =======(237)8

A12 =======(A12)16

0 to 15

0 to 9 , 10 to 15 (A to F)

Conversion of Binary to Decimal

101 = (101)2

101 ==>

1\*2^0 = 1

0\*2^1 = 0

1\*2^2 = 4

1+0+4 = (5)10

1101 1111

1\*2^0 =1

1\*2^1 =2

1\*2^2 =4

1\*2^3 =8

1\*2^4 =16

0\*2^5 =0

1\*2^6 =64

1\*2^7=128

223

Octal to Decimal

(235)8

5\*8^0 = 5

3\*8^1= 24

2\*8^2=128

5+24+128 = 157

(7512)8

7\*8^3 + 5\*8^2 + 1\*8^1 + 2\*8^0

3584+ 320+ 8 + 2

3914

(A3F)16

A =10 => 10\*16^2 =======2560

3 => 3\*16^1 ======= 48

F=15 => 15\*16^0 =======15

2623

=================================================================================

Decimal to Binary

(125)10

125 /2 ====> Remainder = 1

62 /2 =====> 0

31/2================> 1

15/2 ================>1

7/2==================>1

3/2==================>1

1/2 =================>1

1111101 (answer)

Shortcut method to find decimal equivalent of Binary :

8421 method

1 1 1 1 1 0 1

64 32 16 8 4 1 =>125

1010 1111

===========================================================================

Octal to Binary

(24)8

1) Convert to decimal =====> 2\*8^1 + 4\*8^0 = 20

2) Convert decimal to binary => 20 => 20/2 =0

10/2 ===== 0

5/2 ===== 1

2/2 ====== 0

1/2 ====== 1

10100

Shortcut method (octal to binary):

2 4  
 010 100

010100

2/2 ==== 0 4/2 = 0

1/2 ==== 1 2/2 = 0

010 1/2 = 1

100

Hexadecimal to binary

D45 = >110110101001 (Abhishek)

110101000101 (Nilesh)

1101 0100 0101 (Hemant)

1011100101 (Nimesh)

110101000101 (Vishal)

1101100101 (Josephine)

110101000101 (Saloni)

D\*16^2 + 4\*16^1 + 5\*16^0

13\*256 + 64 + 5 ==3328 + 69 => 3397

3397/2 = 1

D 4 5

13

1101 0100 0101

110101000101

456 into octal ,Hexadecimal

456 /16 => 8

28 /16 => 12 ====> C

1/16= 1

1C8

======================================================================

1100111001 == Decimal, octal , Hexadecimal

1 1 0 0 1 1 1 0 0 1

512 256 32 16 8 1

512+256+32+16+8+1 = 825 (decimal)

1 1 0 0 1 1 1 0 0 1

0 0 1 1 0 0 1 1 1 0 0 1

1 4 7 1 (octal)

1 1 0 0 1 1 1 0 0 1

0 0 1 1 0 0 1 1 1 0 0 1

3 3 9 (Hexadecimal)

FA4 --> decimal , binary, octal

271 --> decimal, binary, hexadecimal

192 --> binary, octal , hexadecimal

1100 --> decimal, octal, hexadecimal

4/2 ===== 0

2/2 =====0

1/2 ====== 1

0100

==================================================================

Convert into decimal

(0111.110)2

1) 0111 => 7

2) 110 => 1 \* 2 ^ -1 + 1 \* 2^ -2 + 0 \*2^ -3

=> 1\*1/2 + 1\* 1/4 + 0\*1/8

=>1/2+1/4

=>3/4 => 0.75

(7.75)10

===========================================================================================================

Binary Arithmetic operation :

Addition

Subtraction

Multiplication

Division

Addition

0,1

0+0 = 0

0+1 =1

1+0 =1

1+1 = 0 (sum) with a (carry) 1

================================

1 0 1 1 =3

1 1 =1

------- ---------

1 1 1 0 0 =4

=================================

101 === 5

11 === 3

=========

10 0 0==8

1+1+1=====sum(1) , carry(1)

===========================================

1 1 0 1 0 1 1000100(nimesh), 1100100(nilesh), 1011100(Josephine),1100100(

1 0 1 1 1 1 1010100(A), 110010(s),1100100

========

1 1 0 0 1 0 0

Subtraction

0-0 = 0

1-0 =1

1-1=0

0-1 = 1 with borrow 1

1 0

1

===

1

=======================================================

1

1 0 1 1 1 1

1 1 0 1 0 1

========

1111010

1 1 0 1 0

1 0 1 1 0

====== 00100

=========================================================

Multiplication

0 \* 0 =0

0\* 1= 0

1\* 1=1

10110

1101

=======

1 0 1 1 0

0 0 0 0 0

1 0 1 1 0

1 0 1 1 0

-------------------------------

100011110

=======================

Multiply

111 with 101 ( 100011)

====================================================================

Division

11001 / 101

101 1 1 0 0 1 Answer ( 1 0 1)

1 0 1

-----------

101

101

------

0

---------------------------------------------------------------------------

11110 by 110

1's Complement

100

1's complement of 100 == > 011

2's Complement == > 1's complement + 1

1's ===== 011

+ 1

--------------------

2's ====== 100

================================================================

Subtraction by 1's complement

110101 = Minuend

100101 = Subtrahend

100101

1's = 011010

110101

011010  
----------

1 001111

001111

1

-----------------

difference = 10000

Subtraction by 2's complement

110110 = Minuend

010110 => 101001 (1's) +1 => 101010 (2's)

110110

101010

----------

1 **100000**

===============================================================

1110 1011(Nilesh,A) 1010(Nimesh,Saloni), 1101(J)

0011=>1100 +1 = 1101

1110

1101

------

1 1011

==============================================================

BCD (Binary Coded Decimal) ------> 4-bit code ( 8421 code)

15 = 1 1 1 1 (binary)

1 ====> 0001

5 ====> 0101

15 ===== > 00010101 (BCD)

234 (BCD)

001000110100

45 => 01000101

=========================================================================

ASCII (American Standard Code for Information Interchange)

A-Z (65-90)

a-z (97-122)

==========================================================================

10 + 20 ====> instruction ( 10 + 20 )

+ operator (symbol) ====== binary code (opcode )

10,20 operands

Instruction = Opcode+Operand

Instruction

Opcode Operand

111010 1010 10100

================================================================================

================================================================================

Assembly Language :

(Low level language) 0,1

Assembler -- Translator which translates the assembly language instructions into machine language instruction.

Platform Dependent /Configuration dependent

Example of Assembly language Instruction

8 GB = 8 \* 1024 MB = > = 8 \* 1024 \*1024 KB => 8 \* 1024 \*1024\*1024 Bytes => 8 \* 1024 \*1024\*1024\*8

8 \* 1024 \*1024 \*1024 \*8

65k ==> 0 to 65535

mnemonics

ADD AX , BX // AX =20, BX =30 ,, ,, AX address = 2fad34 , BX address = f1dda2

SUB AX , BX

MOV AX,BX

1111 1101 0101

1110 1101 0111

1100 1101 0111

=================================================================================

Binary Addition using 1's Complement

+1110 (14) Positive number can be represented by adding 0 before number =>>> 0 1110

-1101 (13) Negative number can be represented by adding 1 before number =>>> 1 1101

+14+(-13)

01110

10010

-------

00000

1

------

0 0001 +1