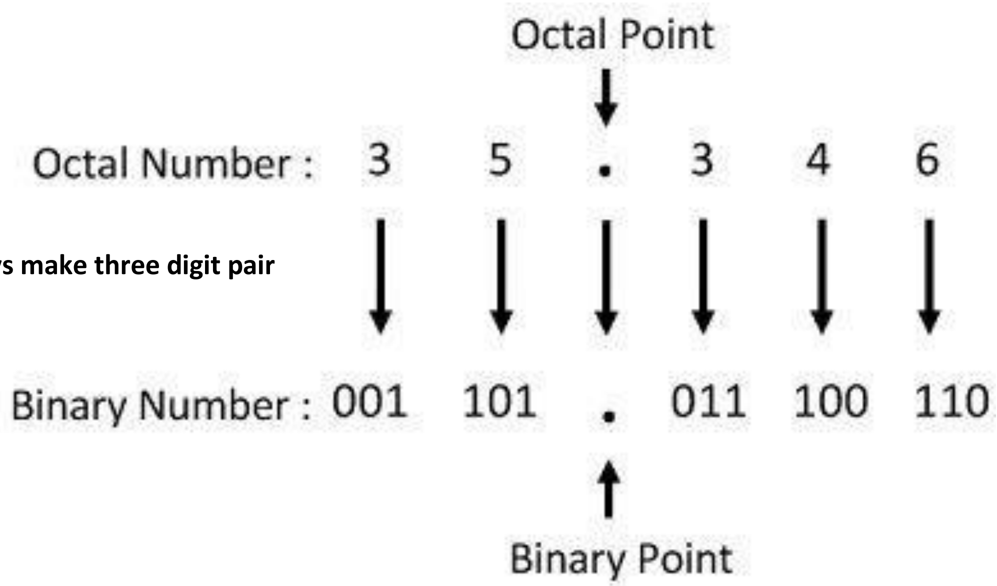
Computer Fundamental

DATA REPRESENTATION

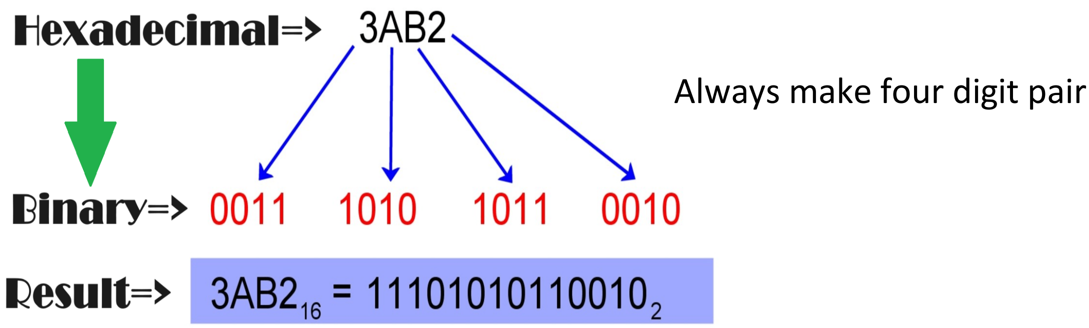
Q. Convert Octal to Binary ($)_8$ = ($)_2$



Always make three digit pair

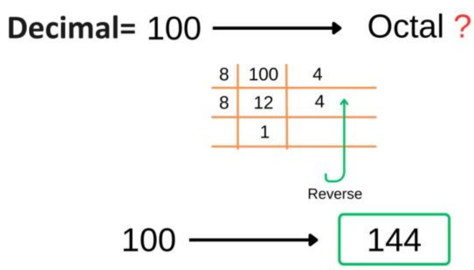
Octal	Binary
i. 27	10111
ii. 77	111111
iii. 58	Invalid
iv. 777	111111111
v. 101	1000001
vi. 500	101000000
vii. 32.7	11010.111
viii. 85.5	Invalid
ix. 33.3	11011.011
x. 55.50	101101.101000

Q. Convert Hexadeciaml to Binary$(\quad)_{16} = (\quad)_2$



Si no	Hexa	Binary
1	45	1000101
2	FA	11111010
3	5D	1011101
4	99	10011001
5	03	11
6	1C.2	11100.0010
7	33.98	110011.10011000
8	AAA.8	101010101010.1000
9	55	1010101
10	24E7	10010011100111

Q. Convert Decimal to Octal $(\quad)_{10} = (\quad)_8$



Si no	Decimal	Octal
1	56	70
2	89	131
3	2025	3751
4	180	264
5	8	10

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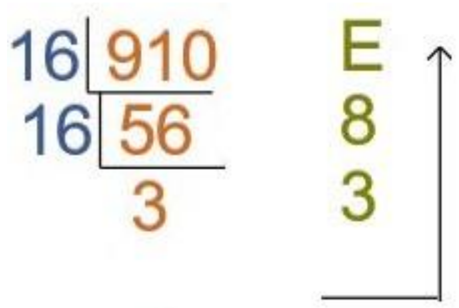
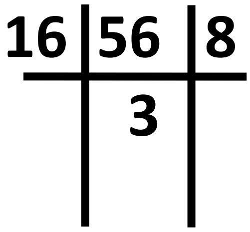
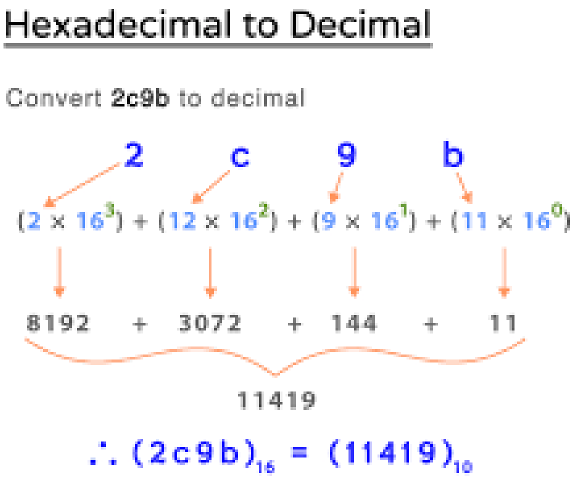
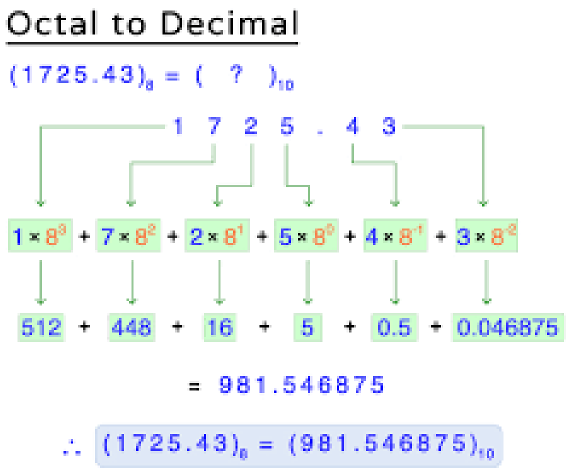
Q. Convert Decimal to Hexadecimal ($)_{10}$ = ($)_{16}$





Si no	Decimal	Hexa
1	56	38
2	160	A0
3	35	23
4	325	145
5	80	50





	Find Octal to Hexadecimal	Hexadecimal to Octal
Step 1	Octal to Binary	Hexadeciaml to Binary
Step 2	Binary to hexa	Binary to octal

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❖ Binary Arithmetic

- All the arithmetic operations are possible in binary numbering system like addition, subtraction, multiplication and division.

➢ Binary addition

The following rules of binary addition are to be considered.

Binary Addition Table

Addition		Result	Carry
0 + 0	=	0	0
0 + 1	=	1	0
1 + 0	=	1	0
1 + 1	=	0	1

```
                 11   1 ← Carry bits → 11
  1001101        1001101              1000111
+ 0010010      + 0011001            + 0010110
---------      ---------            ---------
  1011111        1100010              1011101
```

```
      1  1  1  1  ← carry            0111                  11   1
      1  1  1  0  1                  00111     7           1011.01
(+)   1  1  0  1  1                  10101    21        +    11.011
-----------------                    -----    --        -----------
   1  1  1  0  0  0                  11100  = 28           1110.101
```

i. 101 + 101 =

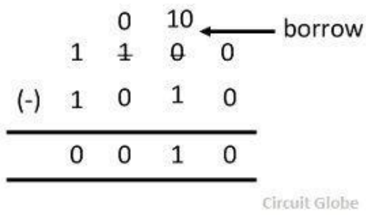
ii. 111011 + 001101 = (ppu 2024)

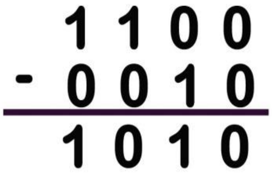
iii. 010111 + 101101 = (ppu 2024)

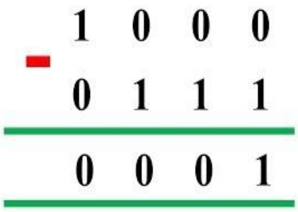
➢ Binary Substraction

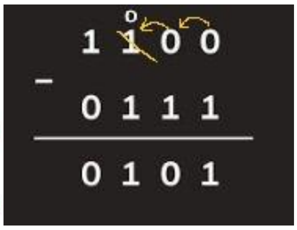
The following rules of binary substract are to be considered.

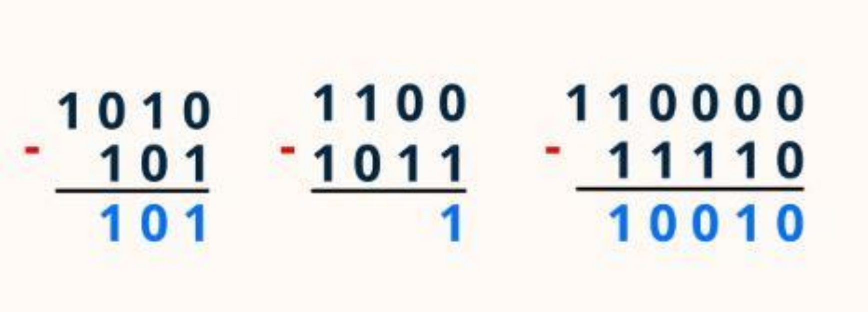
A - B	Subtract	Borrow
0 – 0	0	0
0 – 1	1	1
1 – 0	1	0
1 – 1	0	0
10 – 1	1	0

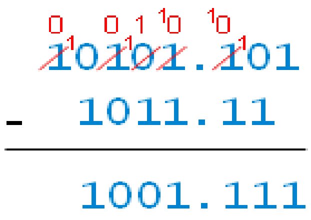












i. 1010101 – 1001100 =

ii. 111000 – 011010 = ppu 2020

iii. 0110 – 0010 = ppu 2020

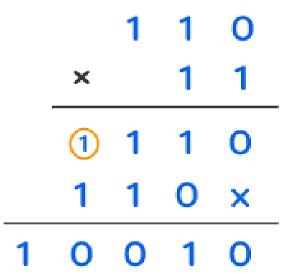
iv. 1111 – 1001 = ppu 2020

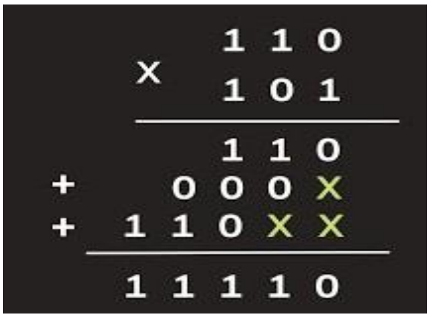
v. 1100 – 1010 = ppu 2020

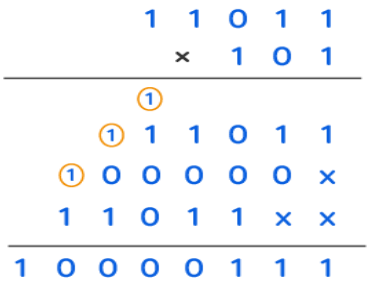
➢ Binary Multiplication

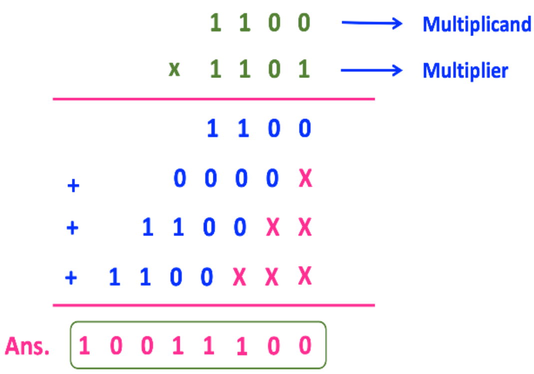
The following rules of binary multiplication are to be considered.

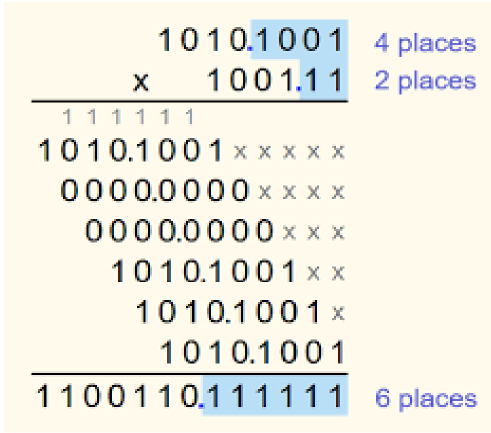
Input A	Input B	Multiply (M) AxB
0	0	0
0	1	0
1	0	0
1	1	1







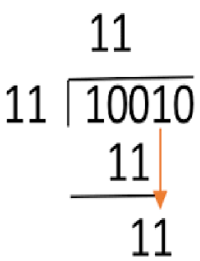


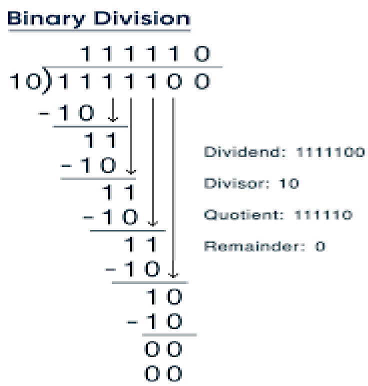


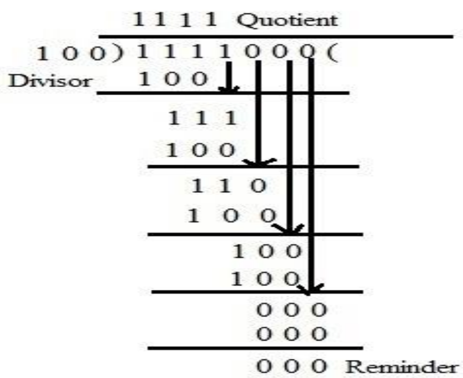
➢ Binary Division

The following rules of binary multiplication are to be considered.

Input A	Input B	Divide (D) A/B
0	0	Not defined
0	1	0
1	0	Not defined
1	1	1







1) 11000 / 100 = 110
2) 10110 / 10 = 1011
3) 101010 / 11 = 1110
4) 111100 / 10 = 11110
5) 100000 / 1000 = 100

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