

# Number System Assignment I

1. Write a Binary values table for 0 to 10 decimal values?

Decimal	Binary
0	0000
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000
9	1001
10	1010

2. Convert the below numbers from decimal to Binary?

a) 12

$$\begin{array}{r} 2 \longdiv{12} \\ 2 \longdiv{6\ 0} \\ 2 \longdiv{3\ 0} \\ \hline 1\ 1 \end{array}$$

$$\begin{array}{r} 1\ 1\ 0\ 0 \\ 8\ 4\ 2\ 0 \end{array}$$

$$\begin{array}{r} 8 + 4 = 12 \\ \hline \end{array}$$

c) 45

$$\begin{array}{r} 2 \longdiv{45} \\ 2 \longdiv{22\ 1} \\ 2 \longdiv{11\ 0} \\ 2 \longdiv{5\ 1} \\ 2 \longdiv{2\ 1} \\ \hline 1\ 0 \end{array}$$

$$\begin{array}{r} (101101)_2 \\ 32\ 16\ 8\ 4\ 2\ 1 \end{array}$$

b) 20

$$\begin{array}{r} 2 \longdiv{20} \\ 2 \longdiv{10\ 0} \\ 2 \longdiv{5\ 0} \\ 2 \longdiv{2\ 1} \\ \hline 1\ 0 \end{array}$$

$$\begin{array}{r} 32 \\ 8 \\ 4 \\ \hline 45 \end{array}$$

$$38 + 8 + 4 = 45$$

d) 77

$$(10100)_2$$

$$10100 \\ 2^4 \times 1 + 2^2 \times 1 + 2^0 \times 0$$

$$2^4 \times 1 + 2^2 \times 1$$

$$= 16 + 4$$

$$= 20$$

$$\begin{array}{r} 2 \longdiv{77} \\ 2 \longdiv{38\ 1} \\ 2 \longdiv{19\ 0} \\ 2 \longdiv{9\ 1} \\ 2 \longdiv{4\ 1} \\ 2 \longdiv{2\ 0} \\ \hline 1\ 0 \end{array}$$

$$\begin{array}{r} 64\ 32\ 16\ 8\ 4\ 2\ 1 \\ 1\ 0\ 0\ 1\ 1\ 0\ 1 \end{array}$$

$$64 + 13$$

$$= 77$$

e) 103

$$\begin{array}{r} 2 \longdiv{103} \\ 2 \quad \boxed{51} \\ 2 \quad \boxed{25} \\ 2 \quad \boxed{12} \\ 2 \quad \boxed{6} \\ 2 \quad \boxed{3} \\ \hline & 1 & 1 \end{array}$$

$$(1100111)_2$$

$$\begin{array}{r} 1100111 \\ 64 32 16 8 4 \quad 2 \quad 1 \end{array}$$

$$64 + 32 + 4 + 2 + 1$$

$$= \underline{103}$$

3. Write a Binary

3. What is the Octal equivalent of  $(9910)_{10}$

Ans

$$(9910)_{10}$$

If we want to convert decimal to octal the decimal octal should be divided by no. 8

$$\begin{array}{r} 8 \longdiv{9910} \\ 8 \quad \boxed{1238} \\ 8 \quad \boxed{154} \\ 8 \quad \boxed{19} \\ \hline & 2 & 3 \end{array}$$

$$(23266)_8$$

$$\begin{aligned} & 2 \quad 3 \quad 2 \quad 6 \quad 6 \\ & 8^4 \times 2 + 8^3 \times 3 + 8^2 \times 2 + 8^1 \times 6 + 8^0 \times 6 \\ & 4096 \times 2 + 512 \times 3 + 64 \times 2 \\ & \quad + 48 + 6 \\ & = 8192 + 1536 \\ & \quad + 128 + 6 \\ & \underline{\underline{= 9910}} \end{aligned}$$

4. Convert the below numbers from binary to Decimal?

a.) 1101

$$\begin{array}{r} 1 \ 0 \ 1 \\ 2^3 \times 1 \ 2^2 \times 0 \ 2^1 \times 0 \ 2^0 \times 1 \end{array}$$

$$8 + 4 + 1$$

$$= \underline{\underline{13}}$$

$$\begin{array}{r} 1 \ 3 \\ 2 \ \overline{) 6 \ 1} \\ 2 \ \overline{) 3 \ 0} \\ \hline 1 \ 1 \end{array} \quad \begin{array}{r} 1101 \\ \hline - \end{array}$$

b.) 1110

$$\begin{array}{r} 1 \ 1 \ 1 \ 0 \\ 2^3 \times 1 \ 2^2 \times 1 \ 2^1 \times 1 \ 2^0 \times 0 \end{array}$$

$$8 + 4 + 2$$

$$\begin{array}{r} 1 \ 4 \\ 2 \ \overline{) 7 \ 0} \\ 2 \ \overline{) 3 \ 1} \\ \hline 1 \ 1 \end{array} \quad = \underline{\underline{1110}}$$

c.) 1110101

$$\begin{array}{r} 1 \ 1 \ 1 \ 0 \ 1 \ 0 \ 1 \\ 2^6 \times 1 \ 2^5 \times 1 \ 2^4 \times 1 \ 2^3 \times 1 \ 2^2 \times 0 \ 2^1 \times 1 \ 2^0 \times 1 \end{array}$$

~~+ 1~~

$$64 + 32 + 16 + 4 + 1$$

$$= \underline{\underline{117}}$$

$$\begin{array}{r} 117 \\ 2 \ \overline{) 581} \\ 2 \ \overline{) 290} \\ 2 \ \overline{) 141} \\ 2 \ \overline{) 70} \\ 2 \ \overline{) 31} \\ \hline 1 \ 1 \end{array}$$

$$\begin{array}{r} 110101 \\ \hline - \end{array} \quad 117$$

a) 01010101

$$\begin{array}{r} 0 \ 1 \ 0 \ 1 \ 0 \ 1 \ 0 \ 1 \\ 2^6 \times 1 \ 2^4 \times 1 \ 2^2 \times 1 \ 2^0 \times 1 \end{array}$$

$$\begin{aligned} 64 + 16 + 4 + 1 \\ = 85 \end{aligned}$$

$$\begin{array}{r} 2 \longdiv{85} \\ 2 \longdiv{42} \\ 2 \longdiv{21} \\ 2 \longdiv{10} \\ 2 \longdiv{5} \\ 2 \longdiv{2} \\ 1 \ 0 \end{array}$$

1010101

e) 10001111

$$\begin{array}{r} 1 \ 0 \ 0 \ 0 \ 1 \ 1 \ 1 \ 1 \\ 2^7 \times 1 \ 2^6 \times 1 \ 2^5 \times 1 \ 2^4 \times 1 \ 2^3 \times 1 \end{array}$$

$$\begin{array}{r} 128 \\ 64 \\ 32 \\ 16 \\ 8 \\ 4 \\ 2 \\ 1 \\ \hline 143 \end{array}$$

$$128 + 64 + 32 + 16 + 8 + 4 + 2 + 1$$

$$\begin{array}{r} 143 \\ \hline - \end{array}$$

$$\begin{array}{r} 2 \longdiv{143} \\ 2 \longdiv{71} \\ 2 \longdiv{35} \\ 2 \longdiv{17} \\ 2 \longdiv{8} \\ 2 \longdiv{4} \\ 2 \longdiv{2} \\ 1 \ 0 \end{array}$$

10001111

5. Convert the following numbers  
to base indicated and vice versa.

a.  $(1101)_2 = (?)_8$

$$\begin{array}{r} 1 \ 1 \ 0 \ 1 \\ \times 2 \quad \quad \quad \\ \hline 4 \ 2 \ 1 \end{array}$$

$$(13)_{10}$$

$$8 \overline{)13} \\ \underline{-8} \\ 15$$

$$= \underline{(15)}_8$$

$$8 \overline{)15} \\ \underline{-8} \\ 7$$

$$= \underline{\underline{8+7}} \\ = \underline{\underline{15}}$$

$$2 \overline{)13} \\ \underline{-2} \\ 11 \\ 2 \overline{)6} \\ \underline{-4} \\ 2 \\ 2 \overline{)3} \\ \underline{-2} \\ 1$$

$$(1101)_2$$

$$\underline{\underline{(1101)_2 = (15)_8}}$$

3  
nullah  
nullah

$$b) (1111 \ 1111 \ 1110)_2 = (?)_{10}$$

2048 1024 512 256 128 64 32 16 8 4 2 1

$$= \underline{(4094)}_{10}$$

$$= (11111111110)_2$$

$$\begin{array}{r} 4094 \\ 2047 \\ 1023 \\ 511 \\ 255 \\ 127 \\ 63 \\ 31 \\ 15 \\ 7 \\ 3 \\ 1 \end{array}$$

$$(221201)_3 = (?)_{10}$$

~~2231201~~

~~61040~~

~~22422401~~

~~6136137~~  
~~8411~~

S.

$$\text{C. } (221201)_2 = (?)_{10}$$

221201

$$81 \times 2 + 27 \times 1 + 9 \times 21 + 3 \times 0 + 1$$

$$243 \times 2 +$$

$$\begin{array}{r} 42 \\ 186 \\ 162 \\ 27 \\ \hline 18 \\ \hline 694 \end{array}$$

$(694)_{10}$

  

$$\begin{array}{r} 3 \longdiv{694} \\ 3 \longdiv{234} \quad 1 \\ 3 \longdiv{77} \quad 0 \\ 3 \longdiv{25} \quad 2 \\ 3 \longdiv{8} \quad 1 \\ \hline 2 \quad 2 \end{array}$$

$$(221201)_3 = (694)_{10}$$

$$d) (76)_8 = (?)_{10}$$

$$= \begin{array}{r} 7 \ 6 \\ 8 \times 7 + 8 \times 6 \end{array}$$

$$= 56 + 6$$

$$= \underline{(62)}_{10}$$

$$8 \overline{)62}$$
  
$$\underline{76}$$

$$\cancel{8} \quad \cancel{(76)}$$
  

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$$e) (231)_8 = (?)_2$$

$$128 + 24 + 1 = (153)_{10}$$

$$\begin{array}{r} 1 \\ 128 \\ 24 \\ \hline 153 \end{array}$$

$$\begin{array}{r} 2 \overline{)153} \\ 2 \overline{)76} \\ 2 \overline{)38} \\ 2 \overline{)19} \\ 2 \overline{)9} \\ 2 \overline{)4} \\ 2 \overline{)2} \\ \hline \end{array}$$

$$\begin{array}{r} 128 \ 64 \ 32 \ 16 \ 8 \ 4 \ 2 \ 1 \\ 0 \ 0 \ 1 \ 1 \ 0 \ 0 \ 1 \end{array}$$
  
$$128 + 24 + 1$$

$$(231)_8$$

$$F) (F00)_{16} = (?)_8$$

$$(1500)_{16} = (?)_8$$

$$\begin{array}{r} 1500 \\ 8 \times 15 \quad 8 \times 0 \\ \hline 1280 \end{array}$$

$$= (3840)_{10}$$

$$= (7400)_8$$

$$7400 \\ 8 \times 8 \times 4 \\ \hline 4800$$

$$8^2 \times 7 + 8^2 \times 4$$

$$512 \times 7 + 64 \times 4$$

$$3584 + 256$$

$$= (3840)_{10}$$

$$(3840)_{10} = 1500 [F = 15]$$

$$= F00$$

$$\begin{array}{r} 23 \\ 256 \\ 15 \\ \hline 1280 \end{array}$$

$$\begin{array}{r} 256 \\ 256 \\ \hline 3840 \end{array}$$

$$\begin{array}{r} 3840 \\ 8 \quad 4800 \\ 8 \quad 600 \\ \hline 74 \end{array}$$

$$7400 \quad 8 \times 0$$

$$\begin{array}{r} 64 \\ 4 \\ \hline 256 \end{array}$$

$$\begin{array}{r} 64 \\ 8 \\ \hline 572 \end{array}$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline 49 \end{array}$$

$$\begin{array}{r} 3584 \\ 256 \\ \hline 3840 \end{array}$$

$$\begin{array}{r} 3840 \\ 16 \quad 240 \quad 0 \\ 150 \end{array}$$

$$g. (DACE)_{16} = C_{12}$$

13 10 12 14

$$4096 \times 13 + 256 \times 10 + 16 \times 12 + 14$$

$$53248 + 2560 + 192 + 14$$

$$= 56016$$

$$\begin{array}{r} 56016 \\ \hline 12 \overline{)56016} \\ \underline{12}) \quad 4668 \quad 0 \\ \underline{12}) \quad 389 \quad 0 \\ \underline{12}) \quad 32 \quad 5 \\ \underline{12}) \quad 24 \quad 8 \\ \underline{\quad 2 \quad 0} \end{array}$$

$$= (208500)_{12}$$

~~1284~~

$$\begin{array}{r} 12 \\ \underline{3} \\ \underline{9} \end{array}$$

$\frac{21}{4096}$	$\times 13$	$12288$
$4096x$		$53248$
		$1$
		$16$
		$12$
		$32$
		$16x$
		$192$
$53248$		$121$
$2560$		$2560$
$192$		$192$
$16$		$16$
		$56016$

$$h) (2B)_{16} = (?)_8$$

$$(2B)_{16} \quad [B = 11]$$

$$\begin{array}{r} 2 \ 1 \ 1 \\ 16 \times 2 + 16 \times 1 \end{array}$$

$$\begin{array}{r} 3 \ 2 \ + \ 1 \ 1 \\ = (43)_{10} \end{array}$$

$$= (53)_8$$

$$\begin{array}{r} 5 \ 3 \\ 8 \times 5 + 3 \\ 40 + 3 \\ = (43)_{10} \end{array}$$

$$= (211)_{16}$$

$$(2B)_{16}$$

$$8 \overline{)43} \\ 53$$

$$\begin{array}{r} 5 \ 3 \\ 8 \times 5 + 3 \\ 40 + 3 = 43 \end{array}$$

$$16 \overline{)43} \\ 2 + 1$$

b) Convert the following no. to the base 10.

$$(3312)_8$$

$$\begin{array}{r} 3 \ 3 \ 1 \ 2 \\ 512 \times 3 + 64 \times 3 + 8 + 2 \end{array}$$

$$= (1738)_{10}$$

$$\begin{array}{r} 512 \\ 3 \\ \hline 1536 \\ 192 \\ 8 \\ 2 \\ \hline 1738 \end{array}$$

$$\begin{array}{r} 1738 \\ 8 \overline{)1738} \\ 8 \overline{)257} \quad 2 \\ 8 \overline{)27} \quad 1 \\ 3 \quad 3 \end{array}$$

$$b.) (167)_8$$

$$\begin{array}{r} 167 \\ 64 \cancel{+} 2 - 8 \times 6 = 2^0 \times 7 \\ \hline 119 \end{array}$$

$$= (119)_{10}$$

$$= (167)_8 \quad \not=$$

$$\begin{array}{r} 64 \\ 48 \cancel{+} 7 \\ \hline 119 \end{array}$$

$$\begin{array}{r} 119 \\ 8 \underline{\quad} \\ 14 \quad 7 \\ 8 \underline{\quad} \\ 16 \end{array}$$

$$c.) (202103)_9$$

$$202103 \\ 9^5 \cancel{x} 2 + 9^4 \cancel{x} 0 + 9^3 + 2 \cancel{1} 9^2 \cancel{x} 1 + 9 \cancel{x} 0 + 3$$

$$(119640)_{10}$$

$$\begin{array}{r} 729 \\ 31 \\ 1429 \\ 1232 \cancel{x} \\ 563 \\ 5909 \\ 59 \cancel{+} 2 \\ 118843 \\ 1458 \\ 81 \\ 3 \\ \hline 119640 \end{array}$$

$$\begin{array}{r} 119640 \\ 9 \underline{\quad} \\ 1326963 \quad 3 \\ 9 \underline{\quad} \\ 145737 \quad 0 \\ 9 \underline{\quad} \\ 164 \quad 1 \\ 9 \underline{\quad} \\ 18 \quad 2 \\ 2 \quad 0 \end{array}$$

$$(202103)_9 \quad (119640)_{10}$$

$$d. (3132334)_{16}$$

$$16^8 \times 316^5 + 16^4 \times 316^3 \times 216^2 \times 316^1 \times 3 + 16^0 \times 4$$

$$16777216 \times 3 + 1048576 \times 1$$

$$+ 65536 \times 3 + 4096 \times 2$$

$$+ 256 \times 3 + 4$$

$$\begin{array}{r} 50^1 3^2 3^2 2^2 \\ 31^1 6^3 4^3 \\ 1048576 \end{array}$$

$$\begin{array}{r} 196608 \\ 8192 \\ 768 \\ \hline 51585796 \end{array}$$

$$(51585796)_{10}$$

$$\begin{array}{r} 16 \left( \begin{array}{r} 5^3 3^3 6^6 1^1 7^1 3^6 \\ 32248112 \end{array} \right) \\ 16 \left( \begin{array}{r} 215 \end{array} \right) \end{array}$$

$$\begin{array}{r} 51585796 \\ 48 \\ \hline 51585844 \end{array}$$

$$(51585844)_{10}$$

$$\begin{array}{r} 16 \\ 16 \\ \hline 96 \end{array}$$

$$\begin{array}{r} 16 \\ 256 \\ \hline 16 \end{array} \rightarrow 16^2$$

$$\begin{array}{r} 1536 \\ 16 \\ \hline 1536 \end{array}$$

$$\begin{array}{r} 4096 \\ 16 \\ \hline 4096 \end{array} \rightarrow 16^3$$

$$\begin{array}{r} 24576 \\ 4096 \\ \hline 24576 \end{array}$$

$$\begin{array}{r} 365536 \\ 16 \\ \hline 365536 \end{array} \rightarrow 16^4$$

16

$$\begin{array}{r} 393216 \\ 65536 \\ \hline 25343 \end{array}$$

$$\begin{array}{r} 1048576 \\ 16 \\ \hline 1048576 \end{array} \rightarrow 16^5$$

16

$$\begin{array}{r} 6291456 \\ 1098576 \\ \hline 1577716 \end{array}$$

$$\begin{array}{r} 1577716 \\ 16 \\ \hline 1577716 \end{array}$$

16

$$\begin{array}{r} 222216 \\ 16777216 \\ 3 \\ \hline 50331648 \end{array}$$

$$\begin{array}{r} 1048576 \\ 65536 \\ 3 \\ \hline 1048576 \end{array}$$

$$\begin{array}{r} 196608 \\ \hline 196608 \end{array}$$

$$\begin{array}{r} 4096 \\ 4096 \\ \hline 8192 \end{array}$$

$$\begin{array}{r} 11256 \\ 3 \\ \hline 768 \end{array}$$

$$\begin{array}{r}
 16 \overline{)51585844} \\
 16 \overline{)32248115} \quad 4 \\
 16 \overline{)20495067} \quad 3 \\
 16 \overline{)125914} \quad 3 \\
 16 \overline{)787} \quad 2 \\
 16 \overline{)49} \quad 3 \\
 3 \quad 1
 \end{array}$$

$$(51585844)_{10} = (3132334)_{16}$$

← →

$$e - (F2)_{16} = ( )_{10}$$

$$(F2)_{16} \quad (F = 15)$$

$$(152)_{16}$$

$$\begin{array}{r}
 15 \quad 2 \\
 16 \times 15 + 2
 \end{array}$$

$$\begin{array}{r}
 240 + 2 \\
 = (242)_{10}
 \end{array}$$

$$\begin{array}{r}
 16 \overline{)242} \\
 16 \overline{)15} \quad 2
 \end{array}$$

7. Convert the following base 10 numbers to the base indicated :-

a.  $(5610)_{10} = (?)_2$  Prove

$$\begin{array}{r}
 2 | 5610 \\
 2 | 2805 \quad 0 \\
 2 | 1402 \quad 1 \\
 2 | 701 \quad 0 \\
 2 | 350 \quad 1 \\
 2 | 175 \quad 0 \\
 2 | 87 \quad 1 \\
 2 | 43 \quad 1 \\
 2 | 21 \quad 1 \\
 2 | 10 \quad 1 \\
 2 | 5 \quad 0 \\
 2 | 2 \quad 1 \\
 1 \quad 0
 \end{array}$$

$$\begin{array}{r}
 3^4 \\
 4096 \\
 1024 \\
 256 \\
 128 \\
 64 \\
 32 \\
 16 \\
 8 \\
 4 \\
 2 \\
 \hline
 5610
 \end{array}$$

$$\left( \begin{matrix} 1 & 0 & 1 & 0 & 1 & 1 & 1 & 0 & 1 & 0 & 1 & 0 \\ 4096 & 1024 & 256 & 128 & 64 & 32 & 16 & 8 & 4 & 2 & 1 & 0 \end{matrix} \right)_2$$

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$$b. (5610)_{10} = (?)_3$$

$$(5610)_{10} = (?)_3$$

$$\begin{array}{r} 3 \mid 5610 \\ 3 \overline{)1870} \\ 3 \overline{)623} \\ 3 \overline{)207} \\ 3 \overline{)69} \\ 3 \overline{)23} \\ 3 \overline{)7} \\ 2 \end{array}$$

$$(21200210)_3$$

$$\cancel{21200210}$$

$$c. (5610)_{10} = (?)_8$$

$$\begin{array}{r} 8 \not\mid 5610 \\ 8 \not\mid 7015 \\ 8 \not\mid 877 \\ 10 \end{array}$$

$$\begin{array}{r} 8 \mid 5610 \\ 8 \overline{)701} \\ 8 \overline{)87} \\ 10 \end{array}$$

$$(12752)_8$$

$$12752$$

$$8^4 + 8^3 + 8^2 + 8^1 + 8^0$$

$$4096 + 1024 + 448 + 40 + 2$$

$$\underline{\underline{= 5610}}$$

$$d. (5610)_{10} = (?)_{12}$$

$$\begin{array}{r} 12 \longdiv{5610} \\ 48 \quad \quad \quad 6 \\ \hline 81 \\ 72 \quad \quad \quad 9 \\ \hline 90 \\ 72 \quad \quad \quad 18 \\ \hline 18 \\ 12 \quad \quad \quad 6 \\ \hline 6 \\ 6 \end{array}$$

$$\begin{array}{r} 32 \quad 11 \quad 6 \\ 12^3 \times 3 + 12^2 \times 11 + 12 \times 6 \\ + 11 \times 12 \\ \hline = 5610 \end{array}$$

~~(32 B 6)<sub>12</sub>~~

$$e. (5610)_{10} = (?)_{16}$$

$$\begin{array}{r} 16 \longdiv{5610} \\ 16 \quad \quad \quad 10 \\ 16 \quad \quad \quad 10 \\ \hline 16 \\ 16 \quad \quad \quad 14 \\ \hline 14 \\ 16 \quad \quad \quad 14 \\ \hline 14 \\ 16 \quad \quad \quad 10 \\ \hline 10 \end{array}$$

15E A

$$4096 \times 256 \times 10 + 14 \times 16 + 10$$

$$15 \quad 14 \quad 10 \quad 4096 \times 1180 + 224 + 10$$

$$(15E A)_{16} = (5610)_{10}$$

$$f) (22110)_10 \approx (?)_2$$

$$\begin{array}{r}
 2 \longdiv{22110} \\
 2 \quad \boxed{11055} \quad 0 \\
 2 \quad \boxed{5527} \quad 1 \\
 2 \quad \boxed{2763} \quad 1 \\
 2 \quad \boxed{1381} \quad 1 \\
 2 \quad \boxed{690} \quad 1 \\
 2 \quad \boxed{345} \quad 0 \\
 2 \quad \boxed{172} \quad 1 \\
 2 \quad \boxed{86} \quad 0 \\
 2 \quad \boxed{43} \quad 0 \\
 2 \quad \boxed{21} \quad 1 \\
 2 \quad \boxed{10} \quad 1 \\
 2 \quad \boxed{5} \quad 0 \\
 2 \quad \boxed{1} \quad 1 \\
 \end{array}$$

$$\left( \begin{smallmatrix} 1 & 0 & 1 & 0 & 1 & 1 & 0 & 0 & 1 & 0 & 1 & 1 & 1 & 0 \\ 16384 & 8192 & 4096 & 1024 & 512 & 256 & 128 & 64 & 32 & 16 & 8 & 4 & 2 & 1 \end{smallmatrix} \right)_2$$

$$16384 + 4096 + 1024 + 512 + 64 + 16$$

$$+ 8 + 4 + 2$$

$$= (22110)_10$$

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$$9. \quad (22110)_{10} = (?)_3$$

$$\begin{array}{r} 22110 \\ 3 \overline{)73720} \\ 3 \overline{)24526} \quad 2 \\ 3 \overline{)848} \quad 2 \\ 3 \overline{)272} \quad 2 \\ 3 \overline{)90} \quad 2 \\ 3 \overline{)30} \quad 0 \\ 3 \overline{)10} \quad 0 \\ 3 \overline{)3} \quad 1 \\ 1 \quad 0 \end{array}$$

$$(1010022220)_3$$

$$\begin{array}{r} 1222 \\ 3456 \\ 328 \\ 3636 \\ 1006 \\ 22110 \\ \hline \end{array} \rightarrow$$

$$h. (22110)_{10} \approx (?)_8$$

$$\begin{array}{r}
 8 \overline{)2261530} \\
 8 \overline{)27543} \quad 6 \\
 8 \overline{)345} \quad 3 \\
 8 \overline{)43} \quad 1 \\
 5 \quad 3
 \end{array}
 \quad (53136)_2$$

5 3 1 3 6

$$4096 \times 5 + 512 \times 3 + 64 \times 1 + 8 \times 3 + 6$$

$$20480 + 1536 + 64 + 24 + 6$$

$$= (22110)_{10}$$

$$(i) (22110)_{10} \approx (?)_{12}$$

$$\begin{array}{r}
 12 \overline{)2210530} \\
 12 \overline{)18442} \quad 6 \\
 12 \overline{)1532} \quad 6 \\
 12 \overline{)12} \quad 9 \\
 1 \quad 0
 \end{array}
 \quad \begin{array}{l}
 1 \ 0 \ 9 \ 6 \ 6 \\
 20736 \quad 144 \times 12 \times 6 + 6 \\
 = 20736 + 1296 \\
 + 72 + 6 \\
 = 22110
 \end{array}$$

1 0 9 6 6

$$j. (22110)_{10} = (?)_{16}$$

$$\begin{array}{r} 16 \overline{)22110} \\ 16 \overline{)1381} \quad 14 \\ 16 \overline{)86} \quad \quad 5 \\ \quad \quad 5 \end{array}$$

5 6 5 14

$$(565E)_{16}$$

5 6 5 14

$$\begin{array}{r} 20480 \\ 1536 \\ 80 \\ 14 \\ \hline 22110 \end{array}$$

$$4096 \times 5 + 256 \times 6 + 80 + 14$$

$$20480 + 1536 + 80 + 14$$

$$= (22110)_{10}$$

8. Perform Binary Addition on the below numbers.—

$$a. 9 + 12$$

$$\begin{array}{r} 2 \overline{)9} & 9 = 1001 \\ 2 \overline{)4} \quad 1 & \\ 2 \overline{)2} \quad 0 & \\ 1 \quad 0 & \end{array} \quad \begin{array}{r} 12 = 1100 \\ \hline 21 = 10101 \end{array}$$

$$\begin{array}{r} 2 \overline{)12} & 10101 \\ 2 \overline{)6} \quad 0 & 16 + 4 + 1 \\ 2 \overline{)3} \quad 0 & \\ 1 \quad 1 & \end{array} \quad \begin{array}{r} 10101 \\ 16 + 4 + 1 \\ \hline = 21 \end{array}$$

$$b. \quad 40 + 31$$

$$\begin{array}{r} 2 \overline{)40} \\ 2 \overline{)200} \\ 2 \overline{)100} \\ 2 \overline{)50} \\ 2 \overline{)21} \\ \quad \quad \quad 10 \end{array} \qquad \begin{array}{l} 40 = 101000 \\ 31 = 11111 \\ \quad \quad \quad 111000 \\ \quad \quad \quad 11111 \\ \hline 71 = 1000111 \end{array}$$
$$\begin{array}{r} 2 \overline{)31} \\ 2 \overline{)15} \\ 2 \overline{)71} \\ 2 \overline{)31} \\ \quad \quad \quad 11 \end{array} \qquad \begin{array}{l} 1000111 \\ 6432168421 \\ 64+4+2+1 \\ = 71 \end{array}$$

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$$c. \quad 1110 + 0101$$

$$\begin{array}{r} 1110 = 14 \\ 0101 = 5 \\ \hline 10011 = 19 \end{array}$$

$$\begin{array}{r} 10011 \\ 16+4+2+1 \\ 16+2+1 \\ = 19 \end{array}$$

$$d. \quad 11110101 + 01111100$$

$$\begin{array}{r}
 11110101 \\
 -01111100 \\
 \hline
 101110001
 \end{array} = 369$$

128
64
32
16
8
4
2
1
<hr/>
245

$$101110001$$

256    84 32 16

$$\begin{array}{r}
 256 + 84 + 32 + 16 + 1 \\
 = 369
 \end{array}$$

$$\begin{array}{r}
 11 \\
 256 \\
 -64 \\
 32 \\
 16 \\
 \hline
 368 \\
 1 \\
 \hline
 369
 \end{array} = 129$$

$$e. \quad 11000011 + 01011110$$

$$\begin{array}{r}
 11000011 \\
 -01011110 \\
 \hline
 100100001
 \end{array} = 289$$

$$\begin{array}{r}
 128 \\
 64 \\
 3 \\
 \hline
 195 \\
 64 \\
 16 \\
 8 \\
 4 \\
 2 \\
 \hline
 89
 \end{array}$$

$$100100001$$

256    128 64 32 16 8 4 2

$$256 + 32 + 1$$

$$= 289$$

$$\begin{array}{r}
 256 \\
 33 \\
 \hline
 289
 \end{array}$$

9. Perform binary subtraction  
on the below numbers.

a.  $8 - 3$

$$\begin{array}{r} 2 \longdiv{8} \\ 2 \longdiv{4} \\ 2 \longdiv{2} \\ 1 \end{array}$$
$$8 = 1000_2$$
$$- 3 = 0011_2$$
$$\underline{-} \qquad \qquad \qquad \underline{\underline{0101}}$$
$$5 = 101_2$$

$$\begin{array}{r} 2 \longdiv{3} \\ 1 \end{array}$$
$$\underline{-} \qquad \qquad \qquad \underline{\underline{1}}$$

b.  $17 - 11$

$$\begin{array}{r} 2 \longdiv{17} \\ 2 \longdiv{8} \\ 2 \longdiv{4} \\ 2 \longdiv{2} \\ 1 \end{array}$$
$$17 = 10001_2$$
$$- 11 = 01011_2$$
$$\underline{-} \qquad \qquad \qquad \underline{\underline{00110}}$$
$$6 = 110_2$$
$$\underline{\underline{4+2=6}}$$

$$\begin{array}{r} 2 \longdiv{11} \\ 2 \longdiv{5} \\ 2 \longdiv{2} \\ 1 \end{array}$$
$$\underline{-} \qquad \qquad \qquad \underline{\underline{1}}$$

c. 25-7

$$\begin{array}{r} 2 \longdiv{25} \\ 2 \longdiv{12} \\ 2 \longdiv{6} \\ 2 \longdiv{3} \\ \hline 1 \end{array}$$
$$25 = 1 + \overset{1}{0} \overset{1}{0} \overset{1}{1}$$
$$7 = 00111$$
$$\hline 18 = 160010$$
$$16+2$$

$$\begin{array}{r} 2 \longdiv{7} \\ 2 \longdiv{3} \\ \hline 1 \end{array}$$
$$= 13$$

d. 86-31

$$\begin{array}{r} 2 \longdiv{86} \\ 2 \longdiv{43} \\ 2 \longdiv{21} \\ 2 \longdiv{10} \\ 2 \longdiv{5} \\ 2 \longdiv{2} \\ \hline 1 \end{array}$$
$$86 = 1 + \overset{1}{0} + \overset{1}{0} \overset{1}{1} \overset{1}{0} \overset{1}{1}$$
$$31 = \underline{001111}$$
$$55 = \underline{\frac{1}{32} \frac{1}{16} \frac{0}{4} \frac{1}{2} \frac{1}{1}}$$
$$32 + 16 + 4 + 2 + 1$$
$$= 55$$

$$\begin{array}{r} 86 \\ 31 \\ \hline 55 \end{array}$$

$$e. \quad 11010001 - 01000111$$

$$\begin{array}{r} 11010001 \\ 01000111 \\ \hline 10001010 \end{array} = \begin{array}{r} 209 \\ 71 \\ \hline 138 \end{array}$$

$$\begin{array}{r} 128 \\ 64 \\ 16 \\ \hline 209 \\ 64 \\ 7 \\ \hline 71 \\ \hline 138 \end{array}$$

$$\begin{array}{r} 10001010 \\ 128 \\ \hline 8 \end{array}$$

$$128 + 8 + 2$$

$$= 138$$

—

00111101010

10. Perform Binary Multiplication on the below numbers :-

$$a. 12 \times 3$$

$$\begin{array}{r} 12 \\ 2 \overline{) 60} \\ 2 \overline{) 30} \\ 11 \end{array}$$

$$\begin{array}{r} 1100 \rightarrow 12 \\ 0011 \rightarrow 3 \\ \hline 11100 \\ 1100x \\ \hline 100100 \end{array}$$

$$\begin{array}{r} 3 \\ 2 \overline{) 11} \end{array}$$

$$\begin{array}{r} 100100 \\ 32 \overline{) 84} \\ 32 \overline{) 42} \\ 42 \\ \hline 0 \end{array}$$

$$32 + 4 = 36$$

b.  $20 \times 5$

$$\begin{array}{r} 10100 \\ \cdot 101 \\ \hline 10100 \\ 00000x \\ 10100xx \\ \hline 1100100 \end{array}$$

$$\begin{array}{r} 2(20 \\ 2\overline{)10}0 \\ 2\overline{)15}0 \\ 2\overline{)2}1 \\ 10 \end{array}$$

$$\begin{array}{r} 2(15 \\ 2\overline{)2}1 \\ 10 \end{array}$$

$$\begin{array}{r} 1100100 \\ 64 32 16 4 2 \\ \hline ? \end{array}$$

$$64 + 32 + 4 = 100$$

c.  $0111 \times 0010$

$$\begin{array}{r} 0111 = 7 \\ \times 0010 = 2 \\ \hline 0000 \\ 0111x \\ \hline 1110 \end{array}$$

$$\begin{array}{r} 1110 \\ 842 \\ \hline ? \end{array}$$

$$8+4+2=14$$

d)  $\begin{array}{r} 11010100 \\ \times 101 \\ \hline \end{array}$

$$\begin{array}{r} 64 \\ 32 \\ \hline 103 \end{array}$$

$$\begin{array}{r} 01100111 = 103 \\ \times 101 = 5 \\ \hline \end{array}$$

$$\begin{array}{r} 101100111 \\ 000000000x \\ \hline 01100111xx \\ \hline 10000000011 \\ \hline 512 \ 256 \ 128 \ 64 \ 32 \ 16 \ 8 \ 4 \ 2 \ 1 \end{array}$$

$$512 + 2 + 1 = 515$$

$$\hline$$

e.  $10101010 \times 0101$

$$\begin{array}{r} 1010101010 = 170 \\ \times 0101 = 5 \\ \hline \end{array}$$

$$\begin{array}{r} 10101010 \\ 00000000x \\ \hline 0101010xx \\ \hline 1010100010 \\ \hline 512 \ 256 \ 128 \ 64 \ 32 \ 16 \ 8 \ 4 \ 2 \end{array}$$

$$\begin{array}{r} 128 \\ 32 \\ 8 \\ 2 \\ \hline 170 \\ 3 \\ 170 \\ 5 \\ \hline 850 \end{array}$$

$$512 + 256 + 64 + 16 + 2$$

$$= 850$$

$$\begin{array}{r} 12 \\ 512 \\ 256 \\ 64 \\ 16 \\ \hline 850 \end{array}$$

11. Perform binary division on the below numbers :-

a.  $15/2$

$$\begin{array}{r} 1111 \\ \times 10 \\ \hline 1110 \end{array} = 15$$

$$\begin{array}{r} 10 < 11 \times 1 \\ 10 < 11 \times 1 \\ 10 < 11 \times 1 \end{array}$$

$$\begin{array}{r} 10 ) 1111 \quad ( 111 \\ \hline 10 \downarrow \quad | \\ \hline 011 \quad | \\ \hline 10 \downarrow \\ \hline 11 \\ \hline 10 \\ \hline 01 \end{array}$$

$$\begin{array}{r} 2 \overline{) 15} \\ 2 \overline{) 7} \\ 2 \overline{) 3} \\ \hline 1 \end{array}$$

---

b.  $45/5$

$$\begin{array}{r} 2 \overline{) 45} \quad ( 101 ) \quad 101101 \quad ( 1001 \quad ( 101 = 101 \times 1 ) \\ 2 \overline{) 22} \\ 2 \overline{) 11} \\ 2 \overline{) 5} \\ 2 \overline{) 2} \\ \hline 10 \\ \hline 101 \\ \hline 101 \\ \hline 0 \end{array}$$
  
$$\begin{array}{r} 2 \overline{) 15} \\ 2 \overline{) 12} \\ \hline 10 \end{array}$$

$$d. \quad 11010100 / 101$$

~~100~~

~~101 < 110x1~~

$$101 ) 1\overset{1}{\cancel{0}}\overset{1}{\cancel{0}}10100 \text{ (}101010\text{)}$$

$$\begin{array}{r} 101 \downarrow \\ 001\cancel{0} \\ \hline 101 \end{array}$$

$$\begin{array}{r} 01\cancel{0} \\ \hline 101 \\ \hline 100 \end{array}$$

$$\begin{array}{r} 11010100 \\ 128 64 32 16 8 4 2 \\ \hline \end{array} = 212$$

$$\begin{array}{r} 12 \\ 128 \\ 64 \\ 16 \\ 4 \\ \hline 212 \\ \hline 101 \end{array}$$

$$5) 212(42$$

$$\begin{array}{r} 20 \downarrow \\ \hline 2 \\ \hline 10 \\ \hline 2 \end{array}$$

$$e. \quad 10101010 / 0111$$

$$\begin{array}{r} 10101010 = 170 \\ 0111 = 7 \end{array}$$

$$\begin{array}{r} 128 \\ 42 \\ \hline 170 \end{array}$$

$$0111 ) 1\overset{1}{\cancel{0}}\overset{1}{\cancel{0}}1010 \text{ (}11000\text{)}$$

$$\begin{array}{r} 0111 \downarrow \\ 0111 \\ \hline 0110 \end{array}$$

$$\begin{array}{r} 0000010 \\ \hline \end{array}$$

$$\begin{array}{r} 24 \\ 7 \\ \hline 168 \\ 3 \end{array}$$

$$7) 170(24$$

$$\begin{array}{r} 168 \downarrow \\ 30 \\ 17 \\ \hline 2 \end{array}$$

~~✓~~

12. Convert the following floating point numbers.

a.  $(34.34)_{10}$

$$\begin{array}{r} 34 \\ 2 \overline{) 17.0 } \\ 2 \overline{) 8.1 } \\ 2 \overline{) 4.0 } \\ 2 \overline{) 2.0 } \\ 1.0 \end{array}$$

$$(100010.01010)_2$$

$$(10010.0)$$

$$\begin{aligned} 0.34 \times 2 &= 0.68 \\ 0.68 \times 2 &= 1.36 \\ 0.36 \times 2 &= 0.72 \\ 0.72 \times 2 &= 1.44 \\ 0.44 \times 2 &= 0.88 \end{aligned}$$

$$\begin{array}{r} 3 \overline{) 111 } \\ 3 \overline{) 32 } \\ 3 \overline{) 11 } \\ 3 \overline{) 3 } \\ 1.0 \end{array} \quad (1021.1000)_3$$

$$\begin{aligned} 0.34 \times 3 &= 1.02 \\ 0.02 \times 3 &= 0.06 \\ 0.06 \times 3 &= 0.18 \\ 0.18 \times 3 &= 0.54 \end{aligned}$$

$$\begin{array}{r} 3 \overline{) 34 } \\ 3 \overline{) 11 } \\ 3 \overline{) 3 } \\ 1.0 \end{array} \quad (42.2560)_8$$

$$(22.570A)_{16}$$

$$\begin{aligned} 0.34 \times 8 &= 2.72 \\ 0.72 \times 8 &= 5.76 \\ 0.60.76 \times 8 &= 6.08 \\ 0.08 \times 8 &= 0.64 \end{aligned}$$

$$\begin{array}{r} 34 \\ 42 \\ 34 64 \\ -24 0.76 \\ \hline 72 \\ 72 \\ 0.64 \\ -76 \end{array}$$

$$\begin{array}{r} 2.34 \\ .16 \\ \hline 2.04 \\ 3.4x \\ \hline 5.44 \end{array}$$

$$\begin{array}{r} 0.34 \\ .16 \\ \hline 0.24 \\ 0.4x \\ \hline 0.64 \\ 10.24 \end{array}$$

$$\begin{array}{r} 2.04 \\ .16 \\ \hline 2.04 \\ 4.1x \\ \hline 4.04 \\ 0.64 \end{array}$$

$$(125.125)_{10}$$

$$\begin{array}{r} 125 \\ 62 1 \\ 31 0 \\ 15 1 \\ 7 1 \\ 3 1 \\ 1 \end{array}$$

$$(1111101.001)$$

$$\begin{aligned} 0.125 \\ 0.250 \\ 0.500 \end{aligned}$$

$$\begin{array}{r} 125 \\ 41 2 \\ 13 2 \\ 3 1 \\ 1 \end{array}$$

$$(11122.01)_3$$

$$\begin{aligned} 0.125 \\ 0.375 \\ 0.125 \end{aligned}$$

$$\begin{array}{r} 125 \\ 15 5 \\ 17 \end{array}$$

$$(175.1)_8$$

$$0.125$$

$$\begin{array}{r} 125 \\ 7 13 \end{array}$$

$$(7D.2)_{16}$$

$$0.12$$

$$\begin{array}{r} 10 A \\ 11 B \\ 12 C \\ 13 D \\ 14 E \\ 15 F \\ 112 \\ 13 \end{array}$$

$$b. (125 \cdot 125)_{10}$$

$$\begin{array}{r} 125 \\ 2 \overline{)62} \quad 1 \\ 2 \overline{)31} \quad 0 \\ 2 \overline{)15} \quad 1 \\ 2 \overline{)7} \quad 1 \\ 2 \overline{)3} \quad 1 \\ \hline 1 \quad 1 \end{array}$$

$$(1111101.001)$$

$$0.125 \times 2 = 0.250$$

$$0.250 \times 2 = 0.500$$

$$0.500 \times 2 = 1.000$$

$$\begin{array}{r} 125 \\ 3 \overline{)41} \quad 2 \\ 3 \overline{)13} \quad 2 \\ 3 \overline{)4} \quad 1 \\ \hline 1 \quad 1 \end{array}$$

$$(11122.01)_3$$

$$0.125 \times 3 = 0.375$$

$$0.375 \times 3 = 1.125$$

$$0.125 \times 3 = 0.375$$

$$\begin{array}{r} 125 \\ 2 \overline{)15} \quad 5 \\ 8 \overline{)7} \quad 7 \\ \hline \end{array}$$

$$(175.1)_8$$

$$0.125 \times 8 = 1.000$$

$$\begin{array}{r} 125 \\ 16 \overline{)7} \quad 13 \\ 16 \overline{)1} \quad 3 \\ \hline 13 \end{array}$$

$$(7D.2)_{16}$$

$$0.125 \times 16 = 2.000$$

10 A  
 11 B  
 12 C  
 13 D  
 14 E  
 15 F

c.  $(10.16)_{10}$

$$\begin{array}{r} 2 \longdiv{110} \\ 2 \quad 5 \\ \hline 2 \quad 0 \\ \hline 1 \quad 0 \end{array}$$

$$(1010.0010)_2$$

$$0.16 \times 2 = 0.$$

$$0.32 \times 2 = 0.64$$

$$0.74 \times 2 = 1.48$$

$$0.48 \times 2 = 0.96$$

$$\begin{array}{r} 3 \longdiv{110} \\ 3 \quad 3 \\ \hline 1 \quad 0 \\ 1 \quad 2 \\ \hline 0.48 \\ 0.48 \\ \hline 0.44 \\ 0.44 \\ \hline 0.32 \\ 0.32 \\ \hline 0.96 \end{array}$$

$$(101.0110)_3$$

$$0.16 \times 3 = 0.48$$

$$0.48 \times 3 = 1.44$$

$$0.44 \times 3 = 1.32$$

$$0.32 \times 3 = 0.96$$

$$\begin{array}{r} 3 \longdiv{10} \\ 1 \quad 2 \end{array}$$

$$(10.28E5)_{16}$$

$$0.16 \times 16 = 2.56$$

$$0.56 \times 16 = 8.96$$

$$0.96 \times 16 = 15.36$$

$$0.36 \times 16 = 5.76$$

16 | 10

$$2.56$$

$$\begin{array}{r} 0.36 \\ 1.6 \\ \hline 0.96 \end{array}$$

$$\begin{array}{r} 1.6 \\ 2.56 \\ \hline 2.56 \end{array}$$

$$\begin{array}{r} 0.36 \\ 1.6 \\ \hline 0.36 \end{array}$$

$$\begin{array}{r} 0.6 \\ 5.6 \\ \hline 5.6 \end{array}$$

$$\begin{array}{r} 0.96 \\ 3.96 \\ \hline 3.96 \end{array}$$

$$\begin{array}{r} 2.36 \\ 1.6 \\ \hline 0.96 \end{array}$$

$$\begin{array}{r} 0.96 \\ 1.6 \\ \hline 5.76 \end{array}$$

$$\begin{array}{r} 2.16 \\ 3.6 \\ \hline 5.76 \end{array}$$

$$\begin{array}{r} 9.6 \\ 15.36 \\ \hline 15.36 \end{array}$$

15. What is the biggest binary no. you can write 5 bits?

Ans)

$$\begin{array}{r} 11111 \\ 16 \ 8 \ 4 \ 2 \end{array}$$

$$16 + 8 + 4 + 2 + 1$$

$$\underline{-} \quad = 31$$

16 In hex,  $2\text{BFC} + 54\text{A7}$  ?

$$2\text{BFC} + 54\text{A7}$$

$$\begin{array}{r} 2 \ 11 \ 15 \ 12 \\ 4096 \times 2 \times 256 \times 11 \times 16 \times 15 + 12 \\ + 54107 \\ 4096 \times 5 + 256 \times 4 + 16 \times 10 + 7 \end{array}$$

$$\begin{array}{r} 2 \ 3 \ 8 \\ + 5 \ 3 \ 2 \\ \hline 4096 \end{array}$$

$$\begin{array}{r} 256 \\ \times 1 \\ \hline 256 \\ 256 \times \\ \hline 2816 \end{array}$$

~~$$2816 + 2816 + 240 + 12$$~~

$$20480 + 1024 + 160 + 7$$

$$\begin{array}{r} 76 \\ \times 16 \\ \hline 128 \\ 16 \times \\ \hline 240 \end{array}$$

$$\begin{array}{r} 5 \ 11 \\ 8192 \\ 2816 \\ 240 \\ 12 \\ \hline 11260 \end{array}$$

$$11260 + 21671$$

$$\underline{-} \quad = 32931$$

$$\begin{array}{r} 4096 \\ \times 5 \\ \hline 20480 \end{array}$$

$$\begin{array}{r} 20480 \\ 1024 \\ 160 \\ \hline 21671 \end{array} = (80A3)_{16}$$

$$\begin{array}{r} 16 \ 32931 \\ 16 \ 20480 \ 3 \\ 16 \ 128 \ 10 \\ \hline 8 \ 0 \end{array}$$

$$\begin{array}{r} 11260 \\ 21671 \\ \hline 32931 \end{array}$$

12. Convert the hex number ABC7 to Binary?

Ans)

A B C 7

1 0 1 1 1 2 7

$$4096 \times 10 + 11 \times 256 + 16 \times 12 + 7$$

$$\begin{array}{r} 16 \\ 12 \\ \hline 32 \\ 32 \times \\ \hline 96 \\ 96 \\ \hline 92 \end{array} \quad 2 \quad 43975$$

$$\begin{array}{r} 43975 \\ \hline 21987 & 1 \\ 10993 & 1 \\ 5496 & 1 \\ 2748 & 0 \\ 1374 & 0 \\ 687 & 0 \\ 343 & 1 \\ 171 & 1 \\ 85 & 1 \\ 42 & 1 \\ 21 & 0 \\ 10 & 1 \\ 5 & 0 \\ 2 & 1 \\ 1 & 0 \end{array}$$

$$\begin{array}{r} 256 \\ 11 \\ \hline 256 \\ 256 \times \\ \hline 2816 \\ 192 \\ 7 \\ \hline 43975 \end{array}$$

$$2) \begin{array}{r} 21987 \\ \hline 2 \downarrow \downarrow \\ 19 \end{array}$$

$(101010111000111)_2$

18. In hex, AC74 - B3F

AC74

$$256 \times 11 + 16 + 4$$

$$4096 \times 10$$

$$\begin{array}{r} 1^3 4^6 1^2 1^8 \\ \times 1^3 4^6 1^2 1^8 \\ \hline 2879 \\ \hline 41269 \end{array}$$

AC74 - B3F

$$= A135$$

$$\begin{array}{r} 256 \\ 11 \\ \hline 256 \\ 256 \\ \hline 11 \\ 11 \\ \hline 3 \\ 3 \\ \hline 15 \\ 15 \\ \hline 48 \\ 48 \\ \hline 44148 \end{array}$$

$$\begin{array}{r} 16 \\ 16 \\ \hline 412649 \\ 16 \\ \hline 25795 \\ 16 \\ \hline 161 \\ 16 \\ \hline 10 \end{array}$$

19. Convert binary fraction into ordinary fractions.

a. 0.1001

$$0.1001$$

$$\begin{array}{r} 1 \times \frac{1}{2} \\ 0 \times \frac{1}{4} \\ 1 \times \frac{1}{16} \end{array}$$

$$0.5 + 0.0625$$

$$\begin{array}{r} 0.5 \\ 0.0625 \\ \hline 0.5625 \end{array}$$

$$0.1001 = 0.5625$$

b. 1.00011

C1.

$$\begin{array}{r} \cdot 0011 \\ 0 \times \frac{1}{2} 0 \times \frac{1}{4} 0 \times \frac{1}{8} \times 1 1 \times \frac{1}{16} \end{array}$$

$$\begin{array}{r} 0.125 \\ 0.0625 \\ \hline 0.1875 \end{array}$$

(1.1875)

C 1.1111

(1. )

$$\begin{array}{r} 0.1111 \\ 1 \times \frac{1}{2} 1 \times \frac{1}{4} * 1 \times \frac{1}{8} + 1 \times \frac{1}{16} \end{array}$$

$$0.5 + 0.25 + 0.125 + 0.0625$$

$$\begin{array}{r} 0.5 \\ 0.25 \\ 0.125 \\ 0.0625 \\ \hline 0.9375 \end{array}$$

(1. 9375)