NAME : JAWAD AHMED

ROLL NO : 20P-0165

Section : 2A

ASSIGNMENT NO 1

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Decimal	Signed Magnitude Form	1's Complement	2's Complement
7	0111	0111	0111
6	0110	0110	0110
5	0101	0101	0101
4	0100	0100	0100
3	0011	0011	0011
2	0010	0010	0010
1	0001	0001	0001
0	0000	0000	0000
-0		1111	NA
-1	1001	1110	1111
-2	1010	1101	1110
-3	1011	1100	1101
-4	1100	1011	1100
-5	1101	1010	1011
-6	1110	1001	1010
-7	1111	1000	1001
-8	NA	NA	1000

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QUESTION NO 2

Convert Binary Number $(110111101.1011)_2$ into Decimal.

Solution.

Using Weight Method

$$\overset{2^8\ 2^7\ 2^6\ 2^5\ 2^4\ 2^3\ 2^2\ 2^1\ 2^0 \quad 2^{-1}\ 2^{-2}\ 2^{-3}\ 2^{-4}}{= 1\ 1\ 0\ 1\ 1\ 1\ 1\ 0\ 1\ .\ 1\ 0\ 1\ 1}$$

$$= (1\times2^8)+(1\times2^7)+(0\times2^6)+(1\times2^5)+(1\times2^4)$$
$$+(1\times2^3)+(1\times2^2)+(0\times2^1)+(1\times2^0)+(1\times2^{-1})$$
$$+(0\times2^{-2})+(1\times2^{-3})+(1\times2^{-4})$$

$$= 256+128+32+16+8+4+1+\frac{1}{2}+0\times\frac{1}{4}+\frac{1}{8}+\frac{1}{16}$$

$$= 256+128+32+16+4+1+\frac{1}{2}+\frac{1}{8}+\frac{1}{16}$$

$$= 445+0.5+0.125+0.0625$$

$$= 445+0.6875$$

$$= (445.6875)_{10}$$

R.W
0.0625
0.125
0.5
0.6875

$$(110111101.1011)_2 = (445.6875)_{10}$$

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QUESTION NO 3

- 86235.876

USING REPEATED DIVISON

First we solve 86235.

2	86235
2	43117 - 1
2	21558 - 1
2	10779 - 0
2	5389 - 1
2	2694 - 1
2	1347 - 0
2	673 - 1
2	336 - 1
2	168 - 0
2	84 - 0
2	42 - 0
2	21 - 0
2	10 - 1
2	5 - 0
2	2 - 1
	1 - 0

$$(86235)_{10} = (1\,0\,1\,0\,1\,0\,0\,0\,0\,1\,1\,0\,1\,1\,0\,1\,1)_2$$

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Now solving Decimal Part By Multiplication.

* 0.876

0.876 x 2 = 1.752 ⇒ 1

0.752 x 2 = 1.504 ⇒ 1

1.504 x 2 = 1.008 ⇒ 1

0.008 x 2 = 0.016 ⇒ 0

0.016 x 2 = 0.032 ⇒ 0

0.032 x 2 = 0.064 ⇒ 0

0.064 x 2 = 0.128 ⇒ 0

0.128 x 2 = 0.256 ⇒ 0

0.256 x 2 = 0.512 ⇒ 0

0.512 x 2 = 1.024 ⇒ 1

0.024 x 2 = 0.048 ⇒ 0

0.048 x 2 = 0.096 ⇒ 0

0.096 x 2 = 0.192 ⇒ 0

0.192 x 2 = 0.384 ⇒ 0

0.384 x 2 = 0.768 ⇒ 0

0.768 x 2 = 1.536 ⇒ 1

$(0.876)_{10} = (111000000\ 1000001)_2$

So,

$(8635.876) = (1010\ 1000\ 1101\ 1011.\ \overbrace{111000000\ 1000001})_2$

Convert 86235.876 using Weight Method. (5)

(i) 86235.876

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First we solve 86235.876

$= 86235 - 65536 \Rightarrow 20699$

$= 20699 - 16384 \Rightarrow 4315$

$= 4315 - 4096 \Rightarrow 219$

$= 219 - 128 \Rightarrow 91$

$= 91 - 64 \Rightarrow 27$

$= 27 - 16 \Rightarrow 11$

$= 11 - 8 \Rightarrow 3$

$= 3 - 2 \Rightarrow 1$

$= 1 - 1 \Rightarrow 0$

$\Rightarrow 65536 + 16384 + 4096 + 128 + 64 + 16 + 8 + 2 + 1$

$= 2^{16} + 2^{14} + 2^{12} + 2^{7} + 2^{6} + 2^{4} + 2^{3} + 2^{1} + 2^{0}$

$= (1\,0\,1\,0\,1\,0\,0\,0\,0\,1\,1\,0\;1\,1\,0\,1\,1)_2$

$(86235)_{10} = (1\,0\,1\,0\,1\,0\,0\,0\;1\,1\,0\,1\,1\,0\,1\,1)_2$

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Now Solving 0.876

$\Rightarrow 0.876 - 0.5 = 0.376$

$\Rightarrow 0.376 - 0.25 = 0.126$

$\Rightarrow 0.126 - 0.125 = 0.001$

$\Rightarrow 0.001 - 0.000976562 = 0.001976562$

$\Rightarrow 2^{-1} + 2^{-2} + 2^{-3} + 2^{-10}$

Now we for (On) Bit we write 1 and for (OFF) we write (0).

$(0.876)_{10} = (111000000\,1)_2$

So The Final Answe is

$(86235.876)_{10} = (10101000011011011.111000000\,1)_2$

So We had converted 86235.876 into Binary using weight method.

QUESTION NO 4

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(i) -412.390625

Solution

First we will solve 412.

By Using Repeated Divison Method

2	412
2	206 - 0
2	10 3 - 0
2	5 1 - 1
2	25 - 1
2	12 - 1
2	6 - 0
2	3 - 0
	1 - 1

So

$$(412)_{10} = (1100\ 11100)_2$$

* Now Solving 0.390625 by Multiplication Method.

$0.390625 \times 2 \Rightarrow 0.781250 \Rightarrow 0$

$0.781250 \times 2 \Rightarrow 1.562500 \Rightarrow 1$

$0.562500 \times 2 \Rightarrow 1.125000 \Rightarrow 1$

$0.125000 \times 2 \Rightarrow 0.250000 \Rightarrow 0$

$0.250000 \times 2 \Rightarrow 0.500000 \Rightarrow 0$

$0.500000 \times 2 \Rightarrow 1.000000 \Rightarrow 1$

So,

$(0.390625)_{10} = (0110001)_2$

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So,

$+412.390625 = (110011100.0110001)_2$

Now we have to write it in significant form.

$= 1.10011100011000\,1 \times 2^8$

Mantessa = 10011100 11000 1

Exponent = 8

Now we add Exponent in Bias.

$127 + 8 = (135)_{10}$

$(135)_{10}$ => By Using Repeated Divison.

2	135
2	67 – 1
2	33 – 1
2	16 – 1
2	8 – 0
2	4 – 0
2	2 – 0
	1 – 0

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$(135)_{10} = (10000111)_2$.

So Final Answer In Singles Precision

form

signbit	Exponent	Mantessa
1	10000111	00111000110010000000000

QUESTION NO 5

(10)

Convert Binary into Decimal.

1101101011000 1011001 11010110111

Solution

$= (1\times2^{31}) + (1\times2^{30}) + (0\times2^{29}) (1\times2^{28}) + (1\times2^{27}) + (0\times2^{26})$
$+ (1\times2^{25}) + (1\times2^{24}) + (0\times2^{23}) + (1\times2^{22}) + (1\times2^{21})$
$+ (0\times2^{20}) + (0\times2^{19}) + (0\times2^{18}) + (1\times2^{17}) + (0\times2^{16})$
$+ (1\times2^{15}) + (1\times2^{14}) + (0\times2^{13}) + (0\times2^{12}) + (1\times2^{11}) + (1\times2^{10})$
$+ (1\times2^{9}) + (0\times2^{8}) + (1\times2^{7}) + (0\times2^{6}) + (1\times2^{5}) +$
$(1\times2^{4}) + (0\times2^{3}) + (1\times2^{2}) + (1\times2^{1}) + (1\times2^{0})$

$= 2147483648 + 1073741824 + 268435456 +$
$134217728 + 33554432 + 16777216 +$
$4194304 + 2097152 + 131072 + 32768 +$
$16384 + 2048 + 1024 + 512 + 128 + 32 + 16 + 4 + 2$
$+ 1$

$= (3680685751)_{10}$