Date: 09-Mar-2021

[ASSIGNMENT - 1]

COMPUTER ARCHITECTURE & ASSEMBLY LANGUAGE

Course Code: CSC 3402, SEC: 02

LECTURER: Dr. HAFIZAH BINTI MANSOR

Name: Hasan Tanveer Mahmood

Matric No: 1725413

Hasan Tanveer Mahmood
1725413, Sec: 02

1. Binary Addition

a)
$$\begin{array}{r} {\scriptstyle 1\ 1\ 1} \\ 10110001 \\ +\ 00011100 \\ \hline 11001101 \end{array}$$

b)
$$\begin{array}{r} {\scriptstyle 1\ \ \ \ \ \ \ \ } \\ 01010011 \\ +\ 11001100 \\ \hline 100011111 \end{array}$$

2. Hexa Addition

a)
$$\begin{array}{r} {\scriptstyle 1\ 1\ 1\ 1\ 1\ \ } \\ 2ACDAA24 \\ 1234AABC \\ \hline 3D0254E0 \end{array}$$

4+C = 16
16 - 16 = 0
carry: 1

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

b)
$$\begin{array}{r} {\scriptstyle 1\ 1\ \ \ \ \ \ } \\ 9AAD1278 \\ 12AABB56 \\ \hline AD57CDCE \end{array}$$

3. "Single precision floating point Addition"
(Normalise)

a) $1.00110011001111100110001 \times 2^6$
$0.01110100010010100010011 \times 2^3$

Step: 1 ⇒ Difference between the two exponent = 6-3 = 3

Step: 2 ⇒ Shift Right 2nd number increase 3 so, that exponent will be equal.

$0.00001110100010010100010011 \times 2^6$

$1.00110011001111100110001 \times 2^6$
$0.00001110100010010100010011 \times 2^6$
$1.01000001110001111010011011 \times 2^6$

Step: 3 ⇒ The Ans is alread Normalised, so, Ans is

$1.01000001110001111010011011 \times 2^6$

4. Decimal FP multiplication

a) $2.31 \times 10^3 * 8.11 \times 10^4$

⇒ Exponent of product is $3+4=7$

⇒ Multiply the coefficients.

$2.31 \times 8.11 = 18.7341$

⇒ Result $= 18.7341 \times 10^7$

⇒ Normalize $= 1.87341 \times 10^8$

b) $4.5 \times 10^2 * 5.2 \times 10^3$

⇒ Exponent of product is $2+3=5$

⇒ Multiply the coefficients $4.5 * 5.2 = 23.4$

⇒ Result 23.4×10^5

⇒ Normalize : 2.34×10^6

5. Binary FP multiplication

a) ⇒ $111_2 * 1001$

```
      111
     1001
    ------
      111
     000
    000
   111
  --------
  111 111
```

Normalize $= 1.11111 \times 2^5$

b) ⇒ $1.11 \times 2^2 * 1.001 \times 2^3$

Exponent of product is $= 2+3 = 5$

Multiply the coefficients:

```
       1.11
      1.001
    -------
        111
       000
      000
     111
   ---------
   1.11 111
```

Result $= 1.11111 \times 2^5$ (Already Normalized)

6. FP division

a) $$\frac{4.5 \times 10^{2}}{2.5 \times 10^{3}}$$

Exponent product is $2+(-3) = -1$

Division the coefficients $4.5 / 2.5 = 1.8$

Normalise result is 1.8×10^{-1}