**Lecture Two: System Conversions**

**(Binary , octal and Hexadecimal) to Decimal :**

**For binary number** :

***Ex*** : ( 11010 . 101) 2 = 1(2)4+1(2)3+ 0(2)2+ 1(2)1+ 0(2)0+1(2)-1+ 0(2)-2+1(2)-3

= 16 + 8 + 0 + 2 + 0 +0.5 + 0 +0.125 = ( 26.625)10

**For octal number :**

***Ex***: ( 613.24)8 = 6(8)2 +1(8)1+3(8)0+2(8)-1 + 4(8)-2

= 384 + 8 + 3 + 0.25 + 0.0625 = ( 395.3125)10

**For hexadecimal :**

***Ex***: ( 5A.E)16 =5( 16)1+ A(16)0+ E(16)-1

= 5(16)+10(1)+ 14(16)-1

= 80 + 10 +0.875 = (90.875)10

**Decimal to (Binary , octal and Hexadecimal) :**

**1- To Binary :**

***Ex***: (353)10 = (?)2

الباقي

353 2 1 **LSB**

176 2 0

88 2 0

44 2 0

22 2 0

11 2 1

5 2 1

2 2 0

1 2 1 **MSB**

0

(353)10 = (101100001)2

***H.W.:*** (49302)10 = (?)2

(10010)10 = (?)2

***EX***: (0.65625)10 = (?)2

0.65625

\_\_\_\_\_ 2 x

1 1.31250

**اول مرتبه بعد الفارزه**

0.31250

\_\_\_\_\_ 2 x

0 0.62500

\_\_\_\_\_ 2 x

1 1.250

2 x

0 0.50

2 x

1 1.0

(0.65625)10 = (0.10101)2

***H.W*.:** (0.8134)10 = (?)2

(741.528)10 = (?)2

**2- to Octal :**

***EX*** : (254.75)10 = (?)8

**الباقي**

254 8 6 **LSB**

31 8 7

3 8 3

0

0.75

8 x

6 6.00

(254.75)10 = (376.6)8

***H.W.* :** (3070.446)10 = (?)8

(7706.77)10  = (?)8

**3- to Hexadecimal :**

***EX***: (567.1875)10 = (?)16

567 16 7 **LSB**

35 16 3

2 16 2

0

0.1875

16 x

3 3.0000

(567.1875)10 = (237.3)16

***H.W.***(1005.36)10 = (?)16

(3987.055)10 = (?)16

**Binary , Octal and Hexadecimal conversion(fast method) :**

***EX***:

1 2 7 5 4 3 Octal

1 0 1 0 1 1 1 1 0 1 1 0 0 0 1 1 Binary

A  F  6  3  Hexadecimal

=(44899)decimal how !

***EX:***

2 1 4 4 3 5  Octal

1 0 0 0 1 1 0 0 1 0 0 0 1 1 1 0 1 Binary

1  1  9  1 D  Hexadecimal

***H.w:***

(1011100011)B =( ?)0 =(?)H

(AF31C)H= (?)O =(?)B

(37012)0= (?)B =(?)H