**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