Sezgi Şensöz
10792020
COMP 249/LC
Lecturer: Doç Dr. Alpaslan Parlakçı

Assignment 1

1) Convert the following binary numbers to decimal: 10011101, 1011011.1011.

$10011101 = 2^7 + 2^4 + 2^3 + 2^2 + 1 = 128 + 16 + 8 + 4 + 1 = 157$

$10110101,1011 = 2^7 + 2^5 + 2^4 + 2^2 + 1 + 2^{-1} + 2^{-3} + 2^{-4} = 128 + 32 + 16 + 4 + 1 + (½) + (1/8)+(1/16) = 181+ (11/16)$

2) Convert the following decimal numbers to binary: 1854, 1904 .

1854=[(1854-1024 = 830 -512 = 318 – 256 = 62- 32 = 30- 16 = 14 -8 = 6-4 = 2-2 = 0]
    = 11100111110

1904= [1904-1024=880-512= 368-256 = 112- 64= 48-32 = 16- 16=0]
    =11101110000

3) Convert the following decimal numbers to the indicated bases: 4539.61 to octal, 8961.459 to hexadecimal

4539.61[4539=8*567+3 867=8*70+7 70=8*8+4 8=8*1], [0,61*8= 4,88 0,88*8= 7,04 0,04*8=0,32] = 10673_8 , 470_8

8961.459 [8961=16*560+1 560=16*35 35=16*2+3] , [0,459*16= 7,344 0,344*16=5,504 0,504*16= 8,064] = $2301,426_8$

4) Perform the following binary multiplication: 111001*1010111

```
        111001
       1010111
    *-------------
        111001
       111001
      111001
    111001
  111001
 +-------------------
   1001101011111
```
1001101011111_2

5) The following calculation was performed by a particular breed of unusually intelligent chicken. If the base r used by the chicken corresponds to its total number of toes, how many toes does the chicken have on each foot?

[$43_r + 61_r$] * 35_r = 5416_r

$$[3 + 4r + 1 + 6r] * [5 + 3r] = 6 + r + 4*r^2 + 5*r^3$$
$$[10r + 4] * [5 + 3r] = 6 + r + 4*r^2 + 5*r^3$$
$$30*r^2 + 62*r + 20 = 6 + r + 4*r^2 + 5*r^3$$
$$5*r^3 - 26*r^2 - 61*r - 14 = 0$$

r must be greater than 6...

6)Represent the decimal numbers 651 and 1904 in BCD, then show the steps necessary to form their sum.

$$651 = (110)(101)(001)_{BCD}$$
$$1904 = (0001)(1001)(0000)(0100)_{BCD}$$
+--
$$(0001)(1010)(1010)(1101)_{BCD}$$