Homework 1 solution

Determine the decimal equivalent of the following numbers

- $(1101)_2$
- $(EE)_{16}$
- $(56)_8$

Sol

$1101=1X2^0+0X2^1+1X2^2+1X2^3=13$

$EE=14X16^0+14X16^1=14+224=238$

$56=6X8^0+5X8^1=46$

Determine the base of the numbers in each case for the following operations to be correct:

(a) 14/2 = 5 (b) 54/4 = 13 (c) 24+17=40

Solution:

The base of the numbers in each case for the following operations to be correct:

(a) 14/2 = 5;
Find decimal equivalent
$14=1 \times r^1 + 4 \times r^0 = r + 4$
$2=2 \times r^0=2$
$5=5 \times r^0=5$
$(4+r)/2=5$
Solving this equation, we get r=6, base 6

(b) 54/4 = 13;
Find decimal equivalent
$54=5 \times r^1 + 4 \times r^0 = 5r + 4$
$4=4 \times r^0=4$
$13=1 \times r^1 + 3 \times r^0 = r + 3$
$(5r+4)/4= r + 3$
Solving this equation, we get r=8, base 8

(c) 24+17=40;
Find decimal equivalent
$24=2 \times r^1 + 4 \times r^0 = 2r + 4$
$17=1 \times r^1 + 7 \times r^0 = r + 7$
$40=4 \times r^1 + 0 \times r^0 = 4r + 0$
$(2r + 4) + (r + 7) = 4r$
Solving this equation, we get r=11, base 11

Obtain the 1's and 2's complement of the following binary numbers:
a) 11101010 b) 01111110 c) 00000001 d) 10000000 e) 00000000

Sol

Solution:

1's complement : change every 1 to 0 and vice versa.
2's complement : change every 1 to 0 and vice versa ,then add (1) to the least significant bit.

a) 11101010
1's complement : 00010101
2's complement : 00010110

b) 01111110
1's complement : 10000001
2's complement : 10000010

c) 00000001
1's complement : 01111110
2's complement : 11111111

d) 10000000
1's complement : 01111111
2's complement : 10000000

e) 00000000
1's complement : 11111111
2's complement : 100000000