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***Homework 1***

**Determine the decimal equivalent of the following numbers:**

* **11012**

3 2 1 0

1 1 0 1

= 1 \* 23 + 1 \* 22 + 0 \* 21 + 1 \* 20

= 13

* **EE16**

1 0

E E

= E \* 161 + E \* 160

= 14 \* 161 + 14 \* 160

= 238

* **568**

1 0

5 6

= 5 \* 81 + 6 \* 80

= 46

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

1. **14 / 2 = 5**

14 = 1 \* r1 + 4 \* r0 = r + 4

2 = 2 \* r0 = 2

5 = 5 \* r0 = 5

(4 + r) / 2 = 5

r = 6, base 6

1. **54 / 4 = 13**

54 = 5 \* r1 + 4 \* r0 = 5r + 4

4 = 4 \* r0 = 4

13 = 1 \* r1 + 3 \* r0 = r + 3

(5r + 4) / 4 = r + 3

r = 8, base 8

1. **24 + 17 = 40**

24 = 2 \* r1 + 4 \* r0 = 2r + 4

17 = 1 \* r1 + 7 \* r0 = r + 7

40 = 4 \* r1 + 0 \* r0 = 4r

(2r + 4) / (r + 7) = 4r

r = 11, base 11

**Obtain the 1’s and 2’s complement of the following binary numbers:**

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.

1. **11101010**

1’s complement: 00010101

2’s complement: 00010110

1. **01111110**

1’s complement: 10000001

2’s complement: 10000010

1. **00000001**

1’s complement: 11111110

2’s complement: 11111111

1. **10000000**

1’s complement: 01111111

2’s complement: 10000000

1. **00000000**

1’s complement: 11111111

2’s complement: 100000000