

Homework 2

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Arithmetic Operations with Signed Numbers

1. Convert each pair of decimal numbers to binary and add using the 2's complement form:
 - a. 33 and 15 = **00110000**
 - b. -46 and 25 = **11101011**
2. Perform each subtraction in the 2's complement form:
 - a. 00110011 - 00010000 = **00100011**
 - b. 01100101 - 11101000 = **01111101**

Hexadecimal Numbers

3. Convert each hexadecimal number to binary:
 - a. A14(16): A(16)=10(10)=1010(2), 1(16)=1(10)=0001(2), 4(16)=4(10)=0100(2), A14(16)= **101000010100(2)**
 - b. 5C8(16): 5(16)=5(10)=0101(2), C(16)=12(10)=1100(2), 8(16)=8(10)=1000, 5C8(16)= **10111001000(2)**
4. Convert each hexadecimal number to decimal:
 - a. 92(16): 9(16)=9(10)=1001(2), 2(16)=2(10)=0010(2), 10010010= **146(10)**
 - b. 8D(16): 8(16)=8(10)=1000(2), D(16)=13(10)=1101(2), 10001101= **141(10)**
5. Convert each decimal number to hexadecimal:
 - a. 33(10): 33/16=2.0625, 2/16=0.125, 0625*16= 1, .125*16=2, 33(10)= **21(16)**
 - b. 52(10): 52/16=3.25, 3/16=0.1875, .25*16=4, .1875*16=3, 52(10)= **34(16)**
6. Perform the following additions:
 - a. 43(16)+62(16): 3+2=5, 4+6=10=A, 43(16)+62(16)= **A5(16)**
 - b. FC(16)+AE(16): **1AA(16)**

Octal Numbers

7. Convert each Octal number to decimal:
 - a. 27(8) = **23(8)**
 - b. 64(8) = **52(8)**
8. Convert each decimal number to octal by repeated division by 8:

- a. $27(10) = \mathbf{33(8)}$
- b. $70(10) = \mathbf{106(8)}$
- 9. Convert each octal number to binary:
 - a. $57(8) = \mathbf{101111(2)}$
 - b. $321(8) = \mathbf{11010001(2)}$
- 10. Convert each binary number to octal:
 - a. $101100011001 = \mathbf{5431(8)}$
 - b. $10110000011 = \mathbf{2603(8)}$

Binary Coded Decimal (BCD)

- 11. Convert the following decimal numbers to BCD:
 - a. $128 = \mathbf{0001\ 0010\ 1000}$
 - b. $150 = \mathbf{0001\ 0101\ 0000}$
- 12. Convert each of the BCD numbers to decimal:
 - a. $1001 = \mathbf{9}$
 - b. $00011000 = \mathbf{18}$