Summer II Answers

Question 1) The following addition operations are to be carried out with 4-bit unsigned binary numbers. For each operation, convert the decimals to unsigned binary, calculate the result, and finally label the addition as OVERFLOW or CORRECT

A) 6 + 11

6 is 0110
11 is 1011

Result is 0001 (OVERFLOW)

B) 2 + 7

2 is 0010
7 is 0111

Result is 1001 (CORRECT)

Question 2) What's the range (min/max) numbers that can be represented using a 5-bit sign-magnitude binary sequence?

-15 ... 0 ... 15

Question 3) Assume we are dealing with 4-bit numbers for this problem. Complete the following tables. The first table is for unsigned binary representation, and the second table is for sign-magnitude representation. The first row of each table has been filled out for you.

Unsigned binary representation:

Decimal	Binary	Hexadecimal
10	0b1010	0xA
6	0b0110	0x6
13	0b1101	0xD
11	0b1011	0xB

Sign-magnitude representation:

Decimal	Binary
-3	0b1011
-4	0b1100
-5	0b1101
4	0b0100

Question 4) The following addition and subtraction operations are to be carried out with 4-bit 2's complement numbers. For each operation, calculate the result and label as OVERFLOW or CORRECT

1 + 7

1 is 0001
7 is 0111

Answer is 1000 (OVERFLOW)

- 4 - 4 (essentially -4 + -4)

-4 is 1100
-4 is 1100

Answer is 1000 (CORRECT)

Question 5) Assume we are dealing with 4-bit two's complement numbers for this problem. Complete the following table. The first row has been filled out for you. If value can't be represented, write 'NA'

Decimal	Binary
-5	1011
-1	1111
-2	1110
8	NA
1	0001
-8	1000