

Exercise on Bits, Data Types and Operations

1. How many distinct values can we represent with

a. 3 bits:

b. 4 bits:

c. 5 bits:

2. Convert the following from 2's complement to Decimal

a. 1010

b. 01011010

c. 11111110

decimal

3. Convert the following ^{decimal} to 8-bit 2's complement binary numbers.

a. 102

b. -128

4. What is the largest positive number one can represent in 8-bit 2's complement code?
Write down your result in binary and decimal

5. Add the following unsigned binary numbers and also express the answer in decimal.

a. 01 + 1011

b. 01 + 10

c. 0101 + 110

6. Add the following 2's complement binary numbers and also express the answer in decimal.

a. 01 + 10011

b. 01 + 10

c. 0101 + 110

7. The following numbers are 4-bit 2's complement binary numbers. Which of the following operations generate an overflow? Justify your answer.

a. 1100 + 0011

b. 0111 + 0001

c. 0111 + 1001

8. Compute the following

a. NOT(1011) OR NOT (1100)

b. (0110 OR 0000) AND 1111

8. Write the decimal equivalents for these IEEE floating point numbers

a. 0 10000011 000000000000000000000000

b. 1 11111111 100100000000000000000000
0 0

9. Convert unsigned binary numbers to hex notation

a. 0001 1111

b. 1110 1101 1011 0010

10. Convert from hex to unsigned binary and then to decimal

a. 10

b. 1B

c. F731

11. Convert unsigned binary numbers to octal notation

a. 00011111

b. 1110110110110010