



Assignment no 01:

Chapter 1: From Zero to One

Note: You can check the exercises after the Chapter of the Book. In our assignment, we are using 2nd Edition of “Digital Design and Computer Architecture” By David harris and Sarah harris.

Exercise 1.5: A classroom has an old clock on the wall whose minute hand broke off.

- (a) If you can read the hour hand to the nearest 15 minutes, how many bits of the information does the clock convey about the time?
- (b) If you know whether it is before or afternoon, how many additional bits of information do you know about the time?

Exercise 1.9 What is the largest 16-bit binary number that can be represented with

- (a) unsigned numbers?
- (b) two’s complement numbers?
- (c) sign/magnitude numbers?

Exercise 1.51 Draw a number line analogous to Figure 1.11 for 2-bit unsigned, two’s complement, and sign/magnitude numbers.

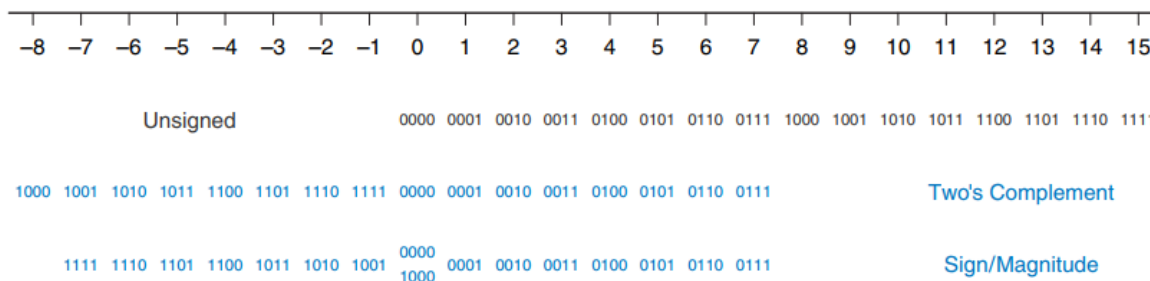


Figure 1.11 Number line and 4-bit binary encodings



Exercise 1.53 Perform the following additions of unsigned binary numbers. Indicate whether or not the sum overflows an 8-bit result.

(a) $100110012 + 010001002$

(b) $110100102 + 101101102$

Exercise 1.71 Draw the symbol, Boolean equation, and truth table for

(a) a three-input OR gate

(b) a three-input exclusive OR (XOR) gate

(c) a four-input XNOR gate

Exercise 1.85 Sketch a transistor-level circuit for the following CMOS gates. Use a minimum number of transistors.

(a) three-input NOR gate

(b) three-input AND gate

(c) two-input OR gate