Amrit Dahal
Homework 1-1
CSC142 Sp 2019

Binary and Hexadecimal numbering systems

In binary or base-2 numbering, there are only 2 digits, 0 and 1. Each binary digit is called a "bit". Using these properties of binary addition:

$$0 + 0 = 0$$

$$0 + 1 = 1$$

$$1 + 0 = 1$$

$$1 + 1 = 10$$

1.) Add the numbers 0110 and 0111.
➔   1101

2.) What is the largest positive number in **decimal**, that can be represented using 8 bits?
➔ $2^8 - 1 = 255$

Each groups of binary numbers can be represented more compactly in base-16 numbering, which is called hexadecimal. The hexadecimal digits are 0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F.

3.) What range of positive **decimal** numbers can one hexadecimal digit represent?
➔   0-15

Colors on a computer monitor are represented by 6 hexadecimal numbers, the first pair to the left specifies the amount of red to display, the middle pair of numbers specify the amount of green, and the right pair of numbers specify the amount of blue to display. (**RGB**)

4.) What is the value in the **decimal** (base-10) system, of the color green?
➔   65280

5.) What is the **decimal value** of the color blue?

➔ 255

6.) What is the largest (**decimal**) number that can be represented in 6 hexadecimal digits? What does that tell you about the number of different colors a computer monitor can display?

➔ $2^{24} - 1 = 16777215$

Almost 17 million colors are represented with these digits.

7.) Add the **hexadecimal** numbers 0A19 and 3A1B.

➔ 4434