

Quiz 2

Wed Feb 10

You have up to 20 minutes. You may use a standard calculator if necessary, but no text book or notes.

1. (5 points) Convert the following 5-bit **signed two's complement** binary numbers into base ten.

- a. 11100 _____
- b. 00111 _____
- c. 11010 _____
- d. 11001 _____

2. (5 points) Below is a tree representing a variable-width encoding of 9 letters. Use it to:

- decode the bits 10011111010011010 into a word: _____
- encode the word WITH as bits: _____

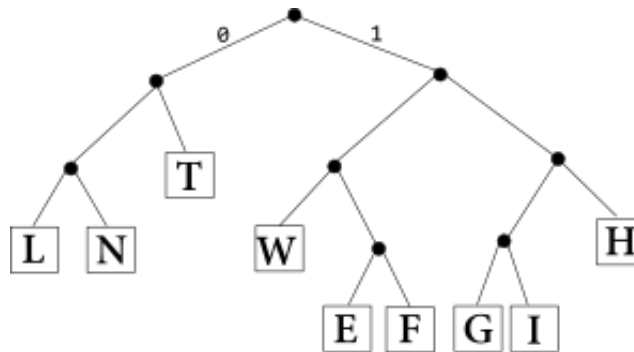


Figure 1:

3. (5 points) If an image uses 9 bits for each pixel, what is the maximum number of distinct colors it can contain?

4. (5 points) Draw a tree representing a **variable-width** encoding of the four letters **A**, **L**, **N**, and **T**. Use it to encode the word ATLANTA. The fixed-width tree (below) uses exactly 2 bits per character, so encoding ATLANTA requires 14 bits. How many bits does your tree need to encode ATLANTA?

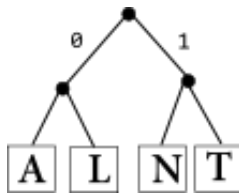


Figure 2: A **fixed-width** encoding of four letters.