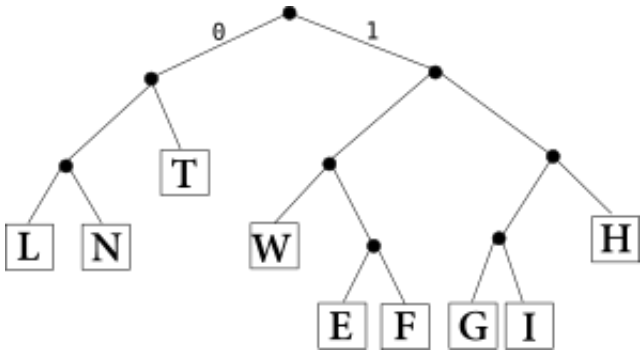

Figure 1:

Quiz 2a

Wed Feb 8

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 6-bit **signed two's complement** binary numbers into base ten.

   a. `110100` _____
   b. `001011` _____
   c. `110010` _____
   d. `101101` _____

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

- decode the bits `1011110111001110 1` into a word: _____
- encode the word `FELT` as bits: _____

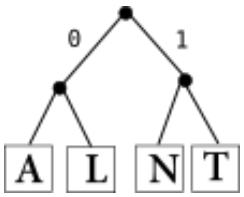

Figure 2: A **fixed-width** encoding of four letters.

3. (5 points) If an image uses 12 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`?