

Quiz 1

6 February 2013

You have up to 25 minutes. You may use a calculator, but no text book or notes.

- Using 7-bit signed (two's complement) binary numbers, what is the largest positive number? What is the smallest negative number?

- Convert the following 16-bit binary number into hexadecimal.

0 1 1 1 1 1 1 1 0 0 1 1 1 0 1 0

- Add and verify the following **unsigned** binary numbers.

$$\begin{array}{r} 1\ 0\ 1\ 1\ 1\ 1 \\ +\ 0\ 1\ 1\ 1\ 0\ 1 \\ \hline \end{array}$$

$$\begin{array}{r} 1\ 1\ 0\ 1\ 1\ 1 \\ +\ 1\ 0\ 0\ 1\ 0\ 0 \\ \hline \end{array}$$

- Suppose we need to send a text message uses just 15 distinct characters. How many bits per character are required if we're using a fixed encoding?
- Draw a binary tree that corresponds to the following variable-width encoding of four characters. The characters should appear in boxes at the leaves. Branch left on a zero, or right on a one.

T 00
R 010
N 011
O 1

- Use the character encoding from the previous question to decode the following word:

0 0 1 0 1 0 1 0 1 1 0 0 1