

EECS 122: Introduction to Communication Networks

Homework 11

(8 points)

Due: 1999-Dec-03-Fri (in class, or 467 Cory by 2pm)

Problem 1.

- a) (2 points) Consider a source that repeatedly emits one of five symbols (A, B, C, D, E), occurring with frequencies 0.6, 0.3, 0.05, 0.03, and 0.02, respectively. What is the entropy of the source? If we use an optimal binary encoding scheme, how many bits would you expect a typical 1000-symbol message to have?
- b) (2 points) Construct a Huffman code for the source.
- c) (2 points) What is the compression factor of your Huffman code? (That is, the average number of bits per symbol used by a simple fixed-length binary code, divided by the average number of bits per symbol used by your Huffman code. A higher compression factor means better compression.)

Parts (b) and (c) are taken from chapter 8 problem 7 of the textbook.

Problem 2. (2 points) The figure below shows router R receiving packets $P1$ and $P2$, both with source address S and destination address G , where G is a multicast group address. If R uses reverse path forwarding, on which link(s) will it forward $P1$? $P2$? Assume no prune messages have been sent.

