Dr. A. Betten Spring 2006

M460 Information and Coding Theory

exercise sheet # 3

Exercise # 1 (5 points)

Let $\mathcal{S}$ and $\mathcal{T}$ be sources with symbols s_i and t_j and probabilities p_i and q_j, respectively. The product source $\mathcal{S} \times \mathcal{T}$ is defined to be the source which emits pairs of symbols of the form (s_i, t_j), each such with probability $p_i q_j$. Show that

$$H(\mathcal{S} \times \mathcal{T}) = H(\mathcal{S}) + H(\mathcal{T}).$$

Exercise # 2 (5 points)

Use a *ternary* (!) Huffman code to encode the following text (attention, the text has changed from the last time). What is the expected word length of your code, how efficient is it?

giraffe zebra rhino dog cat rhino zebra rhino giraffe rhino snake lion rhino dog lion elephant rhino elephant cat giraffe elephant giraffe dog elephant dog rhino giraffe dog snake lion elephant zebra rhino dog cat dog rhino elephant dog cat elephant lion giraffe zebra rhino giraffe dog rhino cat dog zebra cat giraffe

due Friday, 10/2/06.