CMPSC 623 Problem Set 4.
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Out: Oct. 18, 2007
Due: Oct. 25, 2007, before class.

Problem 1. Page 228, Exercise 11.2-1.

Problem 2. Page 236, Exercise 11.3-3. You are not required to give an example of an application (as required in the original problem).

Problem 3. Page 244, Exercise 11.4-1. Only do double hashing (Page 240).

Problem 4. Page 250, Problem 11-2 (a) (b).

Problem 5. Suppose that a hash table has m slots, and we resolve collisions by chaining. There are n keys. Assume that our hashing is simple uniform hashing. If you randomly pick up a slot from the table, what is the probability that you find that slot is not empty? What is the probability that you find at least two keys in that slot? If you pick up a key and identify the slot where this key is in, then what is the probability that some other keys will be in this slot?

Problem 6. Show that if we restrict each component a_i of a in the universal hash function $h_a(k)$ discussed in class to be nozero, then the set $H = \{h_a\}$ is not universal. (Hint: consider the keys $x = 0$ and $y = 1$.)