

BCB BCB/GDCB/STAT/COM S 568 Spring 2010

Homework 3

February 2, 2010

Due one week later. Answers to selected problems will be posted.

1) Suppose we have two coins (A and B). Coin A has probability 0.7 for coming up heads. Coin B has probability 0.4 for coming up heads. If we use coin A for a given toss, we will retain it for the next toss with probability 0.4. If we use coin B for a given toss, the probability to retain coin B for the next toss is 0.8. The coin initially flipped is equally likely to be coin A or coin B.

a) Formulate the experiment as a Hidden Markov Model. State all parameters of the model.

b) What is the probability to get "HT" on two successive tosses (H: Head; T: Tail)? Calculate the probability by complete enumeration of possibilities and also by the HMM "forward" algorithm. Compare your answers.

c) If we get "HT", what's the most likely sequence of coins (AA, AB, BA, or BB)? Calculate the probability by complete enumeration of possibilities and also by the HMM "Viterbi" algorithm. Compare your answers.

2) Solve the problems posted in (1) for the word "TT" instead of "HT".