Homework 1 – Due Thursday, January 25, 2018 at 5:00pm

Submit solutions to problems 1 and 2 on separate sheets. They will be graded by different people.

Page limit You can submit at most 1 sheet of paper per problem, even if the problem has multiple parts. If you submit a longer solution for some problem, only the first sheet of paper will be graded.

Exercises Please practice on exercises in Chapter 1 of Mitzenmacher-Upfal.

Problems

0. (0 points) The following steps are required to get you started in the course.

(a) Sign up on piazza at piazza.com/bu/spring2018/cs537.

(b) Read and sign the Collaboration and Honesty Policy and submit it to a grader in class or with your homework. We will be able to grade your homework only after you hand this in.

(c) Check out the following links and resources:
   i. course webpage: https://cs-people.bu.edu/sofya/cs537/
   ii. supplementary textbook to review proof techniques:

1. (Probability review, 10 points) Exercise 1.3 from the textbook. Justify your answers.

2. (Homework assignments, 10 points)

(a) You start working on the first homework as soon as it is assigned to you. Every time a new homework is assigned, you switch to working on it with a certain probability and keep working on your current homework with the remaining probability. Specifically, when homework $k$ is assigned, you switch to working on this homework with probability $1/k$. Prove that you are equally likely to work on any homework assigned so far. (In other words, the homework you are working on is uniformly distributed over all homework assignments so far.)

(b) Suppose that your friend has a similar strategy, except that when the $k$th homework is assigned, she switches to working on it with probability $1/2$. Describe the distribution of the homework assignment she is working on.