

Due: 2011/09/28 before class

Homework 2

Problem 1. We randomly generate numbers a_1, a_2, \dots, a_n such that each a_i is uniformly and independently sampled from $[100]$. What is the probability that $\prod_1^n a_i$ is a multiple of 10?

Problem 2. Let A be the 6×6 matrix where the i -th row and j -th column is 1 if $i|j$, otherwise 0. (Here the row and column indices start from 1.) Write down A explicitly, and compute A^{-1} .

Problem 3. Let n be a positive integer, determine $\sum_{1 \leq m \leq n} \mu(m) \lfloor n/m \rfloor$. Prove your answer.

Problem 4. Count the number of permutations x_1, x_2, \dots, x_{2n} of $[2n]$ such that $x_i + x_{i+1} \neq 2n + 1$ for all $1 \leq i \leq 2n - 1$.