Due: 2011/09/28 before class

# Homework 2

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

**Problem 2.** *Let $A$ be the $6 \times 6$ 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 $x_1, x_2, \cdots, x_{2n}$ of $[2n]$ such that $x_i + x_{i+1} \neq 2n+1$ for all $1 \leq i \leq 2n-1$.*