Homework #2.

This homework is not due in written form. However, the in-class quiz on Thu, February 4, will be based primarily on this assignment.

Suggested reading:

1. For this assignment: BT, §1.2,1.3; P, §1.4;
2. For next week's classes: BT, §1.4,1.5; P, §1.4,1.5; B, §1.3, 3.1-3.3

Note: Required reading assignments from BT (consisting of parts of the above sections) will be announced later.

Problems:

Problem 1: BT, Problem 1.10.

Problem 2: Let A and B be events with $P(B) < 1$ (so that $P(B^c) > 0$). Express the conditional probability $P(A|B^c)$ in terms of $P(A)$, $P(B)$ and $P(A \cap B)$.

Problem 3: BT, Problem 1.14.

Problem 4: BT, Problem 1.15.

Problem 5: BT, Problem 1.16.

Problem 6: BT, Problem 1.17.

Problem 7: Alice sent an e-mail to Bob requesting a reply and did not hear back. Assume that each e-mail is lost with probability $\frac{1}{n}$ (for some fixed $n \in \mathbb{N}$), independently of other e-mails. What is the probability that Bob received the e-mail? (We assume that Bob would have responded if he had received the e-mail).

Problem 8: Solve Problem 5(b) from Homework#1 using conditional probability. **Hint:** Given $n \in \mathbb{N}$, let B_n denote the event that the number of rolls is larger than n (so that the probability we are trying to find is $1 - P(B_n)$). Represent B_n as the intersection of events $A_1 \cap A_2 \cap \ldots \cap A_{n-1}$ and use the multiplication rule to compute $P(B_n)$. Of course, B_n can be represented in the form $A_1 \cap A_2 \cap \ldots \cap A_{n-1}$ in many different ways. The point is to define A_k in such a way that probabilities $P(A_k|A_1 \cap \ldots A_{k-1})$ are easy to compute.