WIA2005 Algorithm Design & Analysis
Semester 2, 2016/17
Tutorial 4

PART 1

The indicator random variable I {A} associated with event A is defined as

I{A} = 1 if A occurs ;
=0 if A does not occur :

For each of the problem below find the expected value associated with the problem using the known property of linearity of Expectation, E[X+Y] = E[X] + E[Y], provided that X and Y are indicator random variable for an event A occurring.

Problem 1

Given a dice with 6 faces, numbering from 1 to 6. Find the probability of getting the number 5 when the dice is thrown.

i) Declare an indicator random variable for the event associated to throwing the dice to get number 5 for n number of throws

Let X be the random variable to get number 5 in n number of throws

ii) What is the probability of getting the number 5 when dice is thrown?

iii) What is the expectation of getting the number 5 in one throw? Show your working.

iv) What is the expected value for getting number 5 in n number of throws

Problem 2

Suppose that you need to hire a new office assistant. Your previous attempts at hiring have been unsuccessful, and you decide to use an employment agency. The employment agency sends you one candidate each day. You interview that person and then decide either to hire that person or not. You must pay the employment agency a small fee to interview an applicant. To actually hire an applicant is more costly, however, since you must fire your current office assistant and pay a substantial hiring fee to the employment agency. You are committed to having, at all times, the best possible person for the job. Therefore, you decide that, after interviewing each applicant, if that applicant is better qualified than the current office assistant, you will fire the current office assistant and hire the new applicant. You are willing to pay the resulting price of this strategy, but you wish to estimate what that price will be.

i) Write a pseudocode for the above problem.

ii) Discuss step by step approach on how you would find the estimated cost of hiring a candidate. Show your workings using indicator random variable and expectation values.