

Rubric for Project-2, Total- 10 marks.

1 Monte Carlo Method Basics

See below for marks breakup.

- (a) Insurance problem (**1 mark**, see here): Theoretical calculation of expectation for a compound Poisson random variable. Showing that $E[Y] = E[X]E[N]$ in class.
- (b) Magician and Beer Problem (**1 mark**, see here): Finding the probability that Magician is able to get Beer at the end of day if he/she works for 3 hours using Monte Carlo Simulation. Plot the probability for getting beer against time of hours the magician performs. Explain this graph and correlate this to the theoretical formula of expectation of Compound Poisson random variable.

2 Insurance Problem- 6 marks (Refer to Lab/mini-project 2, see here)

See below for marks breakup.

1. Section-1.2, The Nuts and Bolts.

(a) Question 1- **1 mark**.

(b) Question 2- **1 mark**.

Hint: Calculating $E(Z)$.

(i) Do you think Y_j 's are independent?

(ii) Recall that the main idea for calculating $E(Y_j)$ is to somehow fix the index N_j when we are calculating $E(X_1 + \dots + X_{N_j})$.

(iii) Similar ideas would also work for $Var(Z)$.

(c) Question 3- **1 mark**.

Hint: There are 2 ways of approaching this question.

(i) One approach is to arrive at a closed form expression for the probability as described in the class. If you are able to arrive at this expression, you would have the opportunity to easily calculate the probability for any number k , i.e., $P(Y_j = k)$!

(ii) The other way is to count each case by hand. This is indeed tedious but still doable since we have asked for a small number 5. See example on Pg-61, here.

2. Section-1.3, Crank up the Monte Carlo Engine.

(a) Question 1- **1 mark**.

(b) Question 2- **2 marks**.

3 Self Assessment- 2 marks

The TA's during the interviews would try to point out to you shortcomings in your thinking/answers. This would help you get a clearer idea of where you are going wrong.

In case a TA feels that you have not given yourself a fair self assessment score, you would have to go through several more comprehensive rounds of interviews and testing with the Professors.

Important Note:

- (a) You will only be allotted the complete score for any part above subject to satisfactorily answering the questions asked during your interview by TA's.
- (b) It is not possible to entertain individual requests from students to be assessed by a specific TA. The grader for each student would be randomly allotted and any change would not be entertained.