
CENG 222

Statistical Methods for Computer Engineering

Spring '2017-2018

Take Home Exam 1

Deadline: May 25, 23:59

Submission: via COW

Student Information

Full Name : Adil Kaan Akan

Id Number : 2171155

Answer 1

Firstly, we found what number of experiments should be from the formula given in the book with the name size of the Monte Carlo study. Since we do not know preliminary estimator for p , we use the following formula,

$$N \geq 0.25 * \left(\frac{z_{\alpha/2}}{\epsilon} \right)^2$$

We should simulate the situation at least approximately 39000 times. Using the integral we can find the probability of a minion with the relationship which is $W \geq 2 * S$, and we found it approximately 0.26. Then, using the built-in poisson random variable function `poissrnd`, we get the number of minions we caught. (Since number of caught minions is poisson random variable). After that, we get n random variables where n is the number of minions we get. Then, we found how many of them has the relationship we want, and if it is greater than 6, we are successful.

Answer 2

Like first part, again we should simulate the experiment approximately 39000 times. We should use the rejection method algorithm. Rejection method says that choose three numbers a, b, c and i choose 0, 10, and $\frac{1}{e^1}$ respectively. Again, we using `poissrnd` we get the number of minions we

caught. By rejection method algorithm, we get 2 random variables and changing our parameters x value and y value according to them. We should do the algorithm for every minion we caught. After doing that we calculate the weights of the minions.

Answer 3

A big number of simulation goes us to expectation of the function. I did 1000 experiments and in each experiment, i get 2 random variables a and b , where a is exponential random variable and b is normal random variable. Put them into function get the total value and sum all of total values while the experiment goes on. Then, if we divide it by number of experiments, we will get the expectation of the function.