Homework 1

Sept 28, 2022

In this homework assignment you are going to calculate the expected value of a function of a random variable and the variance of the random variable.

Task 1 - Expected value of a function of a random variable

The formula is

$$E(f(X)) = \sum_{i=1}^{n} p(x)f(x)$$

You are supposed to complete the function **expect** in the *expect.py* file.

There are two input parameters of the function **expect**. (1) A dictionary representing the distribution of the random variable. The keys of dictionary are the possible values of random variable X and the values of the dictionary are the corresponding probability $p(x)$. (2) A function. The function f accepts a number as input and returns a number.

The return value of the function **expect** is a number, representing the expected value of $f(X)$.

Task 2 - Variance of a random variable

The formula is

$$Var(X) = E(((X - E(X))^2)$$

You are supposed to complete the function **getVariance** in the *expect.py* file. You should call your own **expect** function.

The **getVariance** function accepts a dictionary as input. The dictionary represents the distribution of the random variable. The keys of dictionary are the possible values of random variable X and the values of the dictionary are the corresponding probability $p(x)$.

The return value of the function **getVariance** is a number, representing the variance of X.

Test Examples

Two examples are provided for you to test your completed functions.

For the **expect** function, the first example should return 5.4 and the second example should return 0.75.

For the **getVariance** function, the first example should return 0.56 and the second example should return approximately (by decimal points) 0.28046875.

Note: we will use more test examples in grading.

Submission

Please submit a completed *expect_YourLastName_YourFirstName.py* file on CCLE before due. **The due date and time of this homework assignment is Tuesday 10/04/2022 11:59pm**.