
MATH 20 FALL 14 ASSIGNMENT 5, DUE FRIDAY 10/17

You're encouraged to discuss these problems with other students in the class. Hand in the solutions to the book problems and your guess for what the general formula is for the expected position of the smallest of n points drawn uniformly at random from $(0,1)$ on paper at the beginning of class on Friday, 10/17. Send the code for part 2 by email to ewa.j.infeld.gr@dartmouth.edu by the same time.

1 Book problems

Section 6.1: Problems 1, 2, 17, 36

Section 6.2: Problems 1, 2, 4

Section 6.3: Problems 1, 10

2 Expected position (coordinate) of the lowest point

Write code that:

- uses a function `LowestNumber(n)` that returns the position of the smallest of n points, each drawn from interval $(0,1)$ uniformly at random
- prints a list of estimates of the expected value of `LowestNumber(n)` for n from 1 to 10.

Do you have a guess what the general formula is for the expected coordinate of the smallest of n points drawn uniformly at random from $(0,1)$?

You can use this outline if you wish:

```
import random
def LowestNumber(n)
    instructions
    return ...

A=[]
for i in range(1,11):
    Exp=0
    for j in range(10000):
        do something with Exp and LowestNumber(i)
    A.append(Exp)
print A
```

For an introduction to Python functions, look at the next page.

2.1 Tutorial: Writing Python Functions

A function in Python is a set of commands that you can execute at any time for an input. **def** and **return** are part of the syntax. For example, the following function executes the exact division you remember from assignment 1 for integers n, m :

```
def ExactDivide(n,m):  
    a=n*1.0/m  
    return a
```

You can call on this function any time in the code, as many times as you want. It will run the function each time, and execute the further instructions for whatever you asked it to "return." For example:

```
def ExactDivide(n,m):  
    a=n*1.0/m  
    return a  
  
for i in range(1,6):  
    print ExactDivide(10,i)
```

Will print whatever you asked to return, in this case the output will be:

```
10.0  
5.0  
3.333333333333333  
2.5  
2.0
```