MSPA 400: Session 5 Python

Reading

Think Python 2nd Edition Chapter 6 (6.1-6.9)

Think Python 3rd Edition Chapter 6 (pages 61-71)

Module 1

(Session 1 Module 1.py)

Objectives:

1. Introduce recursive functions.
2. Demonstrate the use a recursive function by computing permutations and combinations.
3. Use keyboard input.

Output from Module 1.py:

Output:

> Enter a positive integer to obtain the factorial value.
> Enter a negative integer to stop.
> In either case, hit return or enter. 5
> Factorial of 5 is equal to 120
> Permutation of 10 elements taken 5 at a time = 30240
> Combination of 10 elements taken 5 at a time = 252

Exercises:

1. Using the functions as defined in the code, check the calculations in Lial Section 8.1 Examples 3 and 9, and Section 8.2 Example 3.

2. Using the concept of a "for" loop discussed in Section 10.3 of "Think Python", write a function that calculates factorials without using a recursive approach.

Module 2

(Session 2 Module 2.py)

Objectives:

1. Introduce binomial probabilities.
2. Demonstrate the calculation of binomial probabilities.
3. Display binomial distributions.
    (Functions used in Module #1 will be required.)

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Output from Module 2.py

In each instance, hit return or enter after submitting the number.
Enter a positive integer for the number of repeated trials. 10
Enter the number of successes. 5
Enter the probability of success. 0.5

Binomial probability with n= 10, k= 5, p= 0.5 is 0.24609375
Binomial distribution with 10 trials and p= 0.5 follows.

# of successes= 0 probability= 0.0010
# of successes= 1 probability= 0.0098
# of successes= 2 probability= 0.0439
# of successes= 3 probability= 0.1172
# of successes= 4 probability= 0.2051
# of successes= 5 probability= 0.2461
# of successes= 6 probability= 0.2051
# of successes= 7 probability= 0.1172
# of successes= 8 probability= 0.0439
# of successes= 9 probability= 0.0098
# of successes= 10 probability= 0.0010
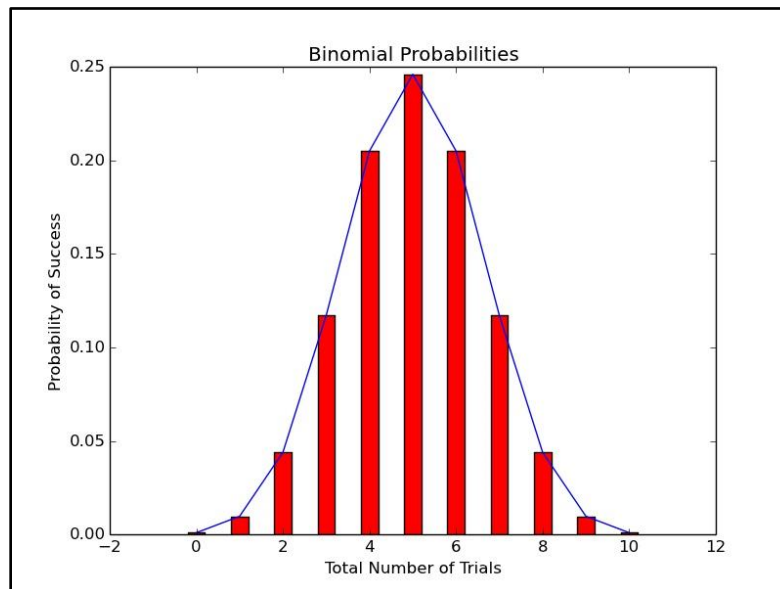
Exercises:

1. Using a variation of the code and functions defined, check the calculations in Lial Section 8.4 Examples 2 and 3. Note the distributions which are produced.

2. Using the function "binomial" as defined in the code, write the code to verify the calculations in Lial Section 8.5 Example 7.

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