

# Assignment 01

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## 1. Flowchart

When  $a=10$ ,  $b=5$ ,  $c=1$ , the output of the function Print\_values is: **5**

## 2. Continuous ceiling function

When the list [1, 2, 3, 4, 5, 6, 7, 8, 9] is provided, the output of the program is:

$$F(1) = 1$$

$$F(2) = 5$$

$$F(3) = 7$$

$$F(4) = 13$$

$$F(5) = 15$$

$$F(6) = 17$$

$$F(7) = 21$$

$$F(8) = 23$$

$$F(9) = 25$$

When a list of 10 random positive integers is generated, the output of the program is:

$$F(16) = 49$$

$$F(95) = 289$$

$$F(94) = 287$$

$$F(73) = 221$$

$$F(6) = 17$$

$$F(41) = 125$$

$$F(64) = 195$$

$$F(30) = 93$$

$$F(73) = 221$$

$$F(8) = 23$$

## 3. Dice rolling

In analyzing the number of ways for ( x ) values from 10 to 60 with Number\_of\_ways function, I found that the maximum value in this list is 4395456, which occurs at  $x = 35$ .

## 4. Dynamic programming

I invoked the `Sum_averages` function with the parameter  $N$  incrementing from 1 to 100, storing the results in a list. The data was then visualized in Figure 1. From Figure 1, it is evident that the `Total_sum_averages` increases exponentially with the growth of  $N$ .

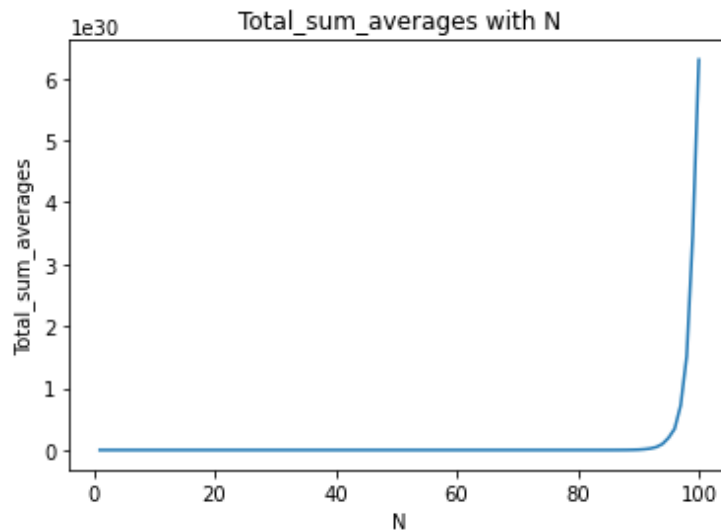


Figure 1 Total\_sum\_averages with N

## 5. Path counting

Let  $N=10$  and  $M=8$ . After running `Count_path` 1,000 times, the mean of the total number of paths from these runs could be approximately 0.28, 0.296, 0.659, 0.256, and so on.