Weather Predictions

B. Snyder

Siena College, Loudonville, NY

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The percentage of rain in a given month was determined based on various given circumstances. Using the random function and for loops it was determined that the likely hood for all circumstances were less than one percent.

I. INTRODUCTION

The purpose of the project was to determine the percent chance of rain fall and amount of rain fall for specific days during the month.

II. QUESTION 1

In the first question we are asked to generate the percent chance that it would rain on one and only one day in a month. The condition for the weather was that there was a 20 percent chance that it could rain any day of the month. We were asked to work the problem out analytically first. To complete this problem you have to understand that question is saying that there is a chance that it can rain any day of the month, but it only does rain once. From here you have to understand that it may rain on the first Sunday of the month and not rain the next day. Or it could rain on the first Monday of the month and not rain on Sunday or Tuesday or any of the other days in the month.Using this formula;

$$Probabliltyof Rain = x * y^z$$

where **x** is equal to 0.2 which is the chance of rain for that one specific day, **y** is equal to the 0.8 which is the chance that it will not rain to the **z**, which is the remaining 29 days in an average month where it would not rain. As the problem is completed you find out that there is a 0.9 percent chance of rain that it will rain on one and only one day in a month. Next we were asked to complete the same question using a different approach, the Monte Carlo approach. I wrote a function that generated random numbers between 0 and 1 which represent different possible percents of rain per day. If the function generated a number greater then 0 but less than or equal to 0.2 the function would return the statement *True* any other number the function will return the statement *False*. Next I created a function that takes in the the random numbers generated and runs through the 30 times for the total amount of days in the month and adds the sum of the numbers. If the sum is 1 then the function will return *True* because that means it will only rain one day and if any other number is the sum it will return *False*. Using 990909 as a random number of months I wrote a function that loops through the previous function 30 times, represented by the number of days in the month. This found the sum of months that it rained one

and only one day in that month. From this, i divided the number of months that it rained by the total number of months tested and got the answer of 0.9 percent.

III. QUESTION 2

For question two we are asked to find the percent that it would rain at least any 8 days in a month. with everyday having a 10 percent chance of rain. I took a similar approach to this problem as I did the previous problem using the Monte Carlo approach. I wrote a function that generated random numbers between 0 and 1 which represent different possible percents of rain per day. If the function generated a number greater then 0 but less than or equal to 0.1 the function would return the statement *True* any other number the function will return the statement *False*. Next I created a function that takes in the the random numbers generated and runs through the 30 times for the total amount of days in the month and adds the sum of the numbers. If the sum is greater than or equal to 8 then the function will return *True* because that means it will only rain one day and if any other number is the sum it will return *False*.Using 1000000 as a random number of months I wrote a function that loops through the previous function 30 times, represented by the number of days in the month. This found the sum of months that it rained at least 8 days in that month. From this, i divided the number of months that it rained by the total number of months tested and got the answer of 0.9 percent.

IV. QUESTION 3A

In this question we were asked to find the odds that it rains 10cm of rain in a given month based on the following circumstances, 1 cm 20 percent, 2 cm 30 percent, 3 cm 30 percent, 4 cm 10 percent, and 5 cm 10 percent. If it is the first day of the month, there is a 10 percent chance of rain. If it rained 1 day before, but not 2 days before, there is a 20 percent chance of rain.If it rained both of the 2 days before, but not the 3rd day before, there is a 25 percent chance of rain.If it rained for the 3 days (or more) before, there is a 5 percent chance of rain. Otherwise, there is a 10 percent chance of rain.

V.   3B

I was unable to complete the rest of question 3 so I created a function that generated 100 random numbers from 0-1. I used these numbers as if they were percents of rain for given days in a month and created a graph based on these results.
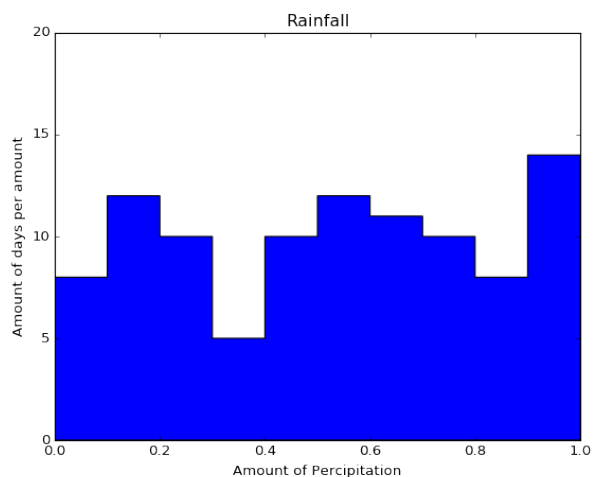
VI.   3C

For this section of question 3 we were asked to find the average rain fall in a month.

VII.   3D

For this section of question 3 we were asked to find the range for the uncertainty of our calculations from the previous parts to this question.