MTH 2401 Probability/Statistics

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PROJECT 1

1. Explain in Example 5.8 (Chapter I, pages 37-38) of the Lecture Notes (a) how was λ obtained and (b) what went wrong with the Poisson approximation.

   The other problem is computational and it should be rendered using the R-programming (no any other language or tool). Here not only do you provide us with an answer, but also with the source code of the program. You must copy and paste your code from the R console to your paper (or give us snapshots of your screens) as an evidence that you really ran the program and no one else. Otherwise, the problem won't be graded. Also, your work must be rendered independently, without any collaboration with others. A joint or similar work will be cancelled.

   Answer 1:

   As per the given value of *n* refers to the number (of people randomly selected from the population i.e the sample); where
   ***n* = 1500**
   And, ***p* = 0.6378**
   (Where, *p* refers to the proportion of high speed internet users in the population.)

   λ was obtained by computing the product of *n* and *p*.

   That is, **n** x **p** = λ

   Hence, **λ = 956.7**

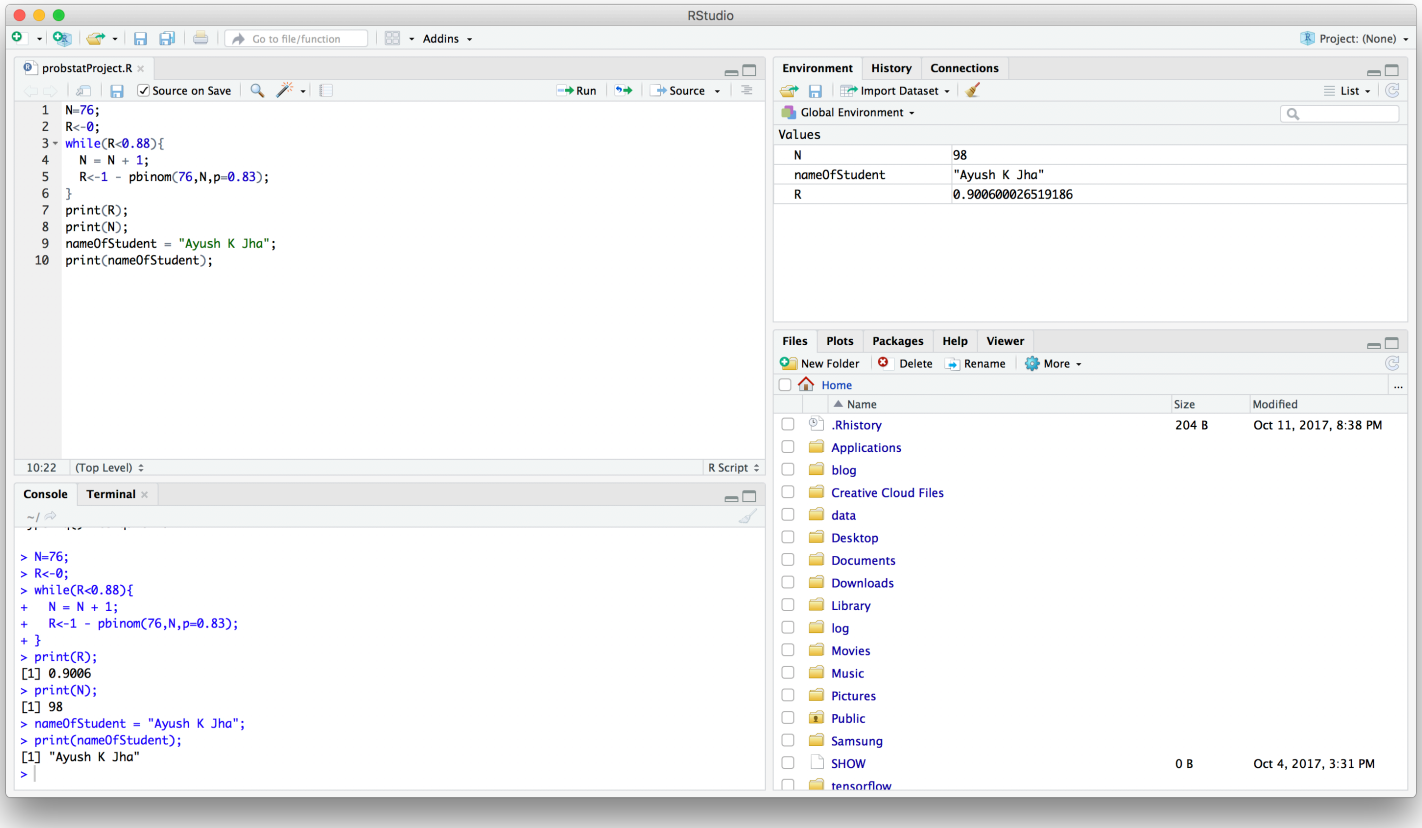
   Since the value of *n* was significantly bigger than the value of *p*; thus, the distribution (binomial distribution) tends to become a Poisson distribution wherein its parameter is λ, and due to the values of *n* and *p,* this occurs.

2. Suppose a parallel reliability system consists of a cable of wires for a bridge and that this cable must have at least 77 wires. If the reliability of a single wire is 17 what is a **minimal number of wires** counted from 77 (or more) should the cable have to provide the reliability of the system of at least 0.88?

Answer 2.:

n = N - 1; i.e n = 76; and, Q = 0.17; p = 1 - q; So, p = 0.83

Screenshot 1(R Studio, Console):



Screenshot 2:

probstatProject.R

Source on Save | Run | Source

```
1  N=76;
2  R<-0;
3  while(R<0.88){
4    N = N + 1;
5    R<-1 - pbinom(76,N,p=0.83);
6  }
7  print(R);
8  print(N);
9  nameOfStudent = "Ayush K Jha";
10 print(nameOfStudent);
```

10:22 (Top Level) R Script

Console Terminal

```
> N=76;
> R<-0;
> while(R<0.88){
+   N = N + 1;
+   R<-1 - pbinom(76,N,p=0.83);
+ }
> print(R);
[1] 0.9006
> print(N);
[1] 98
> nameOfStudent = "Ayush K Jha";
> print(nameOfStudent);
[1] "Ayush K Jha"
>
```