CS 504 – Programming Languages for Data Analysis

Assignment 1

I. Task

The aim of this assignment is to implement the equation of the probability of finding a pair of people that share the same birthday described in the slide 15 of topic Basic Probability. For that purpose, your first task is to perform four implementations of the following equation

$$P(A) = 1 - P(A^c) = 1 - \frac{|A^c|}{|\Omega|}$$

$$= 1 - \frac{365 \times 364 \times \ldots \times (365 - n + 1)}{365^n}$$

in Julia, Python, R, and Octave. The second task will be to illustrate how does the number n of guests influence the probability of having guests with identical birthday. For that aim, you have to draw a curve to illustrate it using with each previous programming languages.

II. Hint

You need to use a loop for each programming language to compute $P(A)$. In addition, since you will use different values of n to see its influence for $P(A)$, you have to create a method that takes into parameter the number guests and returns the probability $P(A)$.

III. Useful links

1. For loop with Julia
2. Python For Loops
3. R for loop
4. For loop with Octave
5. Plotting with Julia
6. Line Plots - R Base Graphs
7. Python Matplotlib
8. 2D & 3D Plots with Octave

IV. Submission

You have to submit a pdf file that contains four outputs that are related to Julia, Python, R, and Octave. In addition, you have to submit the sources files in Julia, Python, R, and Octave. ***Please, do not use .zip nor .rar file in your submission***.

Good luck :)