A lottery algorithm for the Armada competition

Overview

Input

An excel with one column with a unique identifier, one with names and one column with a number of lottery tickets.

Algorithm

A lottery algorithm that gives each ticket an equal chance of winning. There will be drawn several winners, but once one person has won his or her remaining tickets should not be part of the next draw.

Output

A list with name and a unique identifier for the winners, in the same order they were drawn by the algorithm

The input will be provided to you on 19/11 and I want the output asap after that. The code needs to be done and tested before the final input is given to you so we can run the lottery one time only. I also want to know which randomizer or lottery function will be used for full disclosure to the student, and preferably the whole code should be disclosed before the fair.

Details

Chance of winning

$$\frac{number\ of\ personal\ tickets}{total\ sum\ of\ tickets}$$

Reliability

The numpy.random uses the Mersenne Twister Pseudorandom number generator. The sequence is predetermined by the PRNG´s seed, which could include truly random values.

The algorithm will only be run once, and should thus be deemed reliable enough.

Pseudocode in text

The algorithm will generate a shuffled file/list by first creating a row for each ticket that a person holds and then shuffling that file/list. After the file/list has been shuffled then i - the amount of winners will be picked randomly. This is done by selecting a row using the numpy.random.randint(0, sum of tickets). If the row or the unique ID is already in the WinnerList then a new winner is selected instead of that one. Starting from row 0 to row i is the order that the winners were picked.

Pseudocode

$function\ ArmadaLottery(file)$
$\quad\quad TicketFile/List \leftarrow GenerateTicket(file)$
$\quad\quad ShuffledFile/List \leftarrow ShuffleTickets(/file/list)$
$WinnerList[]$
$PickWinners(ShuffledFile/List,\ WinnerList)$
$print(WinnerList)$

$function\ GenerateTicket(file)$
$\quad\quad "Creates\ a\ row\ for\ each\ ticket\ that\ a\ person\ holds"$
$\quad\quad return\ file/list$

$function\ ShuffleTickets(file/list)$
$\quad\quad ShuffledFile/List \leftarrow numpy.random.shuffle(file/list)$
$\quad\quad "Or\ similar\ shuffle\ function"$
$\quad\quad return\ ShuffledFile/List$

$function\ PickWinners(ShuffledFile/List,\ WinnerList)$
$\quad\quad for(0 < i)\ (i = amount\ of\ winners)$
$\quad\quad\quad\quad x \leftarrow numpy.random.randint(0, NumberOfRows(ShuffledFile/List)$
$\quad\quad\quad\quad if\ (ShuffledFile/List(Row(x)\ \&\&\ uniqueID)\ not\ in\ WinnerList$
$\quad\quad\quad\quad "Might\ just\ need\ to\ check\ if\ the\ uniqueID\ is\ in\ WinnerList"$
$\quad\quad\quad\quad\quad\quad add(row(x)\ to\ WinnerList)\ to\ row(i)$
$\quad\quad\quad\quad else$
$\quad\quad\quad\quad\quad\quad i = i - 1$
$\quad\quad return\ WinnerList$