Exercises in R - part 2

November 22, 2017

1 Write your own R functions

1.1 A typical statistics application

- Write a function that takes in a variable n, and will print out a result table of n simulated fair coin tosses
- Modify your function above so that it takes in two arguments: n and p. This function will print out a result table of fn simulated coin tosses, where the probability of head is p
- Modify your function above so that it will print a table AND make a bar plot of the result.
- Modify your function above so that it takes in an argument, `plot`. If plot == TRUE, then it will plot the results. If plot == FALSE, then it will print out a table.

1.2 Vectors and arrays

- Write a function that takes in two integers n, m, and returns a random $m \times n$ integer matrix (m rows, n columns), with entries between 0 and 100.

1.3 More advanced programming

Use R to solve the following problems from Project Euler.

1. If we list all the natural numbers below 10 that are multiples of 3 or 5, we get 3, 5, 6 and 9. The sum of these multiples is 23.
   Find the sum of all the multiples of 3 or 5 below 1000.

2. Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be:

   1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...

   By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.