

# STAT 280: Statistical Programming

**Assignment 5 [Posted: Thursday March 7, 2024]**

**Due: 8:00pm Thursday March 14, 2024**

Suggested exercises from textbook: A first course in statistical programming with R, Third Edition. Braun, W. J., & Murdoch, D. J. (2021). Cambridge University Press.

## Instructions

- Students should upload their solutions on Moodle before due date. Late submissions will not be accepted.
- Solutions should be uploaded as a single PDF.
- Make sure to clearly state the problem number in your solutions. Always show the code used to solve an exercise (not the output only, unless explicitly stated) and comment on your code by using `#` where appropriate.
- Readability of code and clarity of presentation will be taken into account when marking.

## Textbook problems

- Section 4.1.1; Problems **4**, **5** and **6(a)** on pages 98, 99:  
(**Problem 4** "Refer to the car dealer ... (up to 5 digits accuracy)?")  
(**Problem 5** "Use a fixed-point iteration.....starting value to 0.7?...to 0.0?").  
(**Problem 6(a)** "Repeat the previous question .....iteration converge now?").

**Note:** There can be different definitions of "an approximation accurate up to k digits". Here, we say that an approximation **x.approx** of **x** is accurate up to k digits if the first k consecutive significant digits of **x.approx** and **x** coincide. For example, **x.approx** = 0.005678 is an approximation of **x** = 0.0056987 accurate up to 2 digits since only the first two consecutive significant digits (5 and 6) coincide.

- Section 4.1.2; Problems **3** and **4** on page 102:  
(**Problem 3** "A twin prime .....less than 1000").

The result should be stored in a list of numeric vectors called **twin\_primes**, whose elements are the twin primes pairs. Print the length of the list twin primes and print the 10th and the 15th elements of the list, i.e. **twin\_primes[[10]]** and **twin\_primes[[15]]**.

(**Problem 4** "A bank offers.....where  $I = P((1 + i)^n - 1)$ .").

Call the desired function `GIC`. It should be of the form `GIC(P,n)`, where `P` is the initial investment amount and `n` is the number of years. Print the output of `GIC(1000,2)` and `GIC(1000,20)` to show the corresponding amount of interest earned. The function `GIC` should return an error (using the `stop()` command) in the following cases:

- `P` is negative
- `n` is negative or is not an integer.