111A Introduction to Computer and Computer Science

Homework Assignment #3

Due: 10/17 12:00:00

In this homework assignment, you will practice the basic concepts of input, branching, conditional, and iterations. As you have learned all the related knowledge during the lectures (if, while, for, def, and so on…).

Problem #1: Exercise 3 of the Lecture4.ipynb

For a given positive number x and a given positive integer n, please write a function that returns you a real number y such that $y^n = x$. If there does not exist such number y, your function should also return the corresponding message. You can also add a parameter that allows user to choose either bisection search or Newton-Raphson method.

Sample code:

```
def findRoot(x, n, epsilon=1e-4, method='NR method'):
    """
    Using Newton-Raphson method or bisection search method to find root,
    do not directly calculate it with ** operator.
    Params:
        x:          float, x > 0, input number
        n:          int, n > 0, exponential power of x
        epsilon:    float, 1e-4, minimum acceptable difference
        method:     string, using Newton-Raphson method (NR method) or
                    bisection search method (BS method)
    Returns:
        answer:     float or string, if no such answer, return 'NA'
                    instead
    """

    # 自己想
    # 這就是 HW#3

    return answer
```

(Bonus) Problem #2:

Assuming n is an integer and x is a real number. Please write another function "**findRoot2**" to handle this.

Sample code:

```
def findRoot2(x, n, epsilon=1e-4, method='NR method'):
    """
    Using Newton-Raphson method or bisection search method to find root,
    do not directly calculate it with ** operator.

    Params:
        x:          float, input number
        n:          int, exponential power of x
        epsilon:    float, 1e-4, minimum acceptable difference
        method:     string, using Newton-Raphson method (NR method) or
                    bisection search method (BS method)

    Returns:
        answer:     float or string, if no such answer,
                    return 'NA' instead
    """
    # if you don't want to write this optional homework,
    # please keep the function and pass it.
    pass
```

Hand in procedure:

As we had mentioned in the lecture, you should list all your collaborators in your programs. Here is the template:

```
"""
Created on Sun Aug 7 01:23:45 2022

@author: Xi Winnie, student ID

@collaborators: Jane Doe, her student ID
                John Doe, his student ID
"""
```

Please save your code as a ".py" file, where the file name should follow this format:

111A_hw#3_ID.py

For example,

111A_hw#3_0123456789.py

Please be aware. **We are not going to accept any homework file with wrong file name or without signature**. Please double check the content of your file.

Once you have accomplished your works, you can upload your homework to the "E3@NYCU" system. There will be a section for uploading your homework.