111A Introduction to Computer and Computer Science

Homework Assignment #2

Due: 10/10 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, exhaustive search, and so on…).

Problem #1: Comparison

We have already illustrated how to find a **cube root** via exhaustive enumeration during the class, yet we never demonstrate how to **find a cube root via bisection search or Newton-Raphson method**. It is time for you to complete our unaccomplished duty. Please write a program that asks users to enter one arbitrary number and print out the corresponding cube root based on the concepts of bisection search and Newton-Raphson method. You should also print out how much iterations (guesses) your program takes for searching the solution based on these two methods as well.

(Bonus) Problem #2:

Solving the roots of an equation had been bothering us during our high-school time. Most of the high-school students in Taiwan has dedicated their passion for learning so many techniques to find those lovely roots. Fortunately, you had already started to learn some powerful tools for solving the roots of equations since you graduated from high school. This is a great chance for you to forget those dispensable techniques and start to utilize all these efficient tools around you.
Please write a program that can solve the equation as following:

$$\cos^2 x - x^3 = 0$$

You may wonder how to calculate the **cosine** function in Python. Well, try to figure it out by yourself. That's why this problem is a bonus.

You are ONLY allowed to import additional module
for calculating the cosine function.
However, we strongly encourage you a
to write an approximate cosine function by yourself.

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:

<div align="center">

111A_hw#2_ID.py

</div>

For example,

<div align="center">

111A_hw#2_0123456789.py

</div>

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.