

**IAX0583**

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# **Function representation in python**

Homework 1

Programming I , IAX0583  
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# **Summary**

## **I-Program description**

## **II-UML sketch**

## **III-Code review**

# **I-Program description:**

The program can be divided in three majors steps:

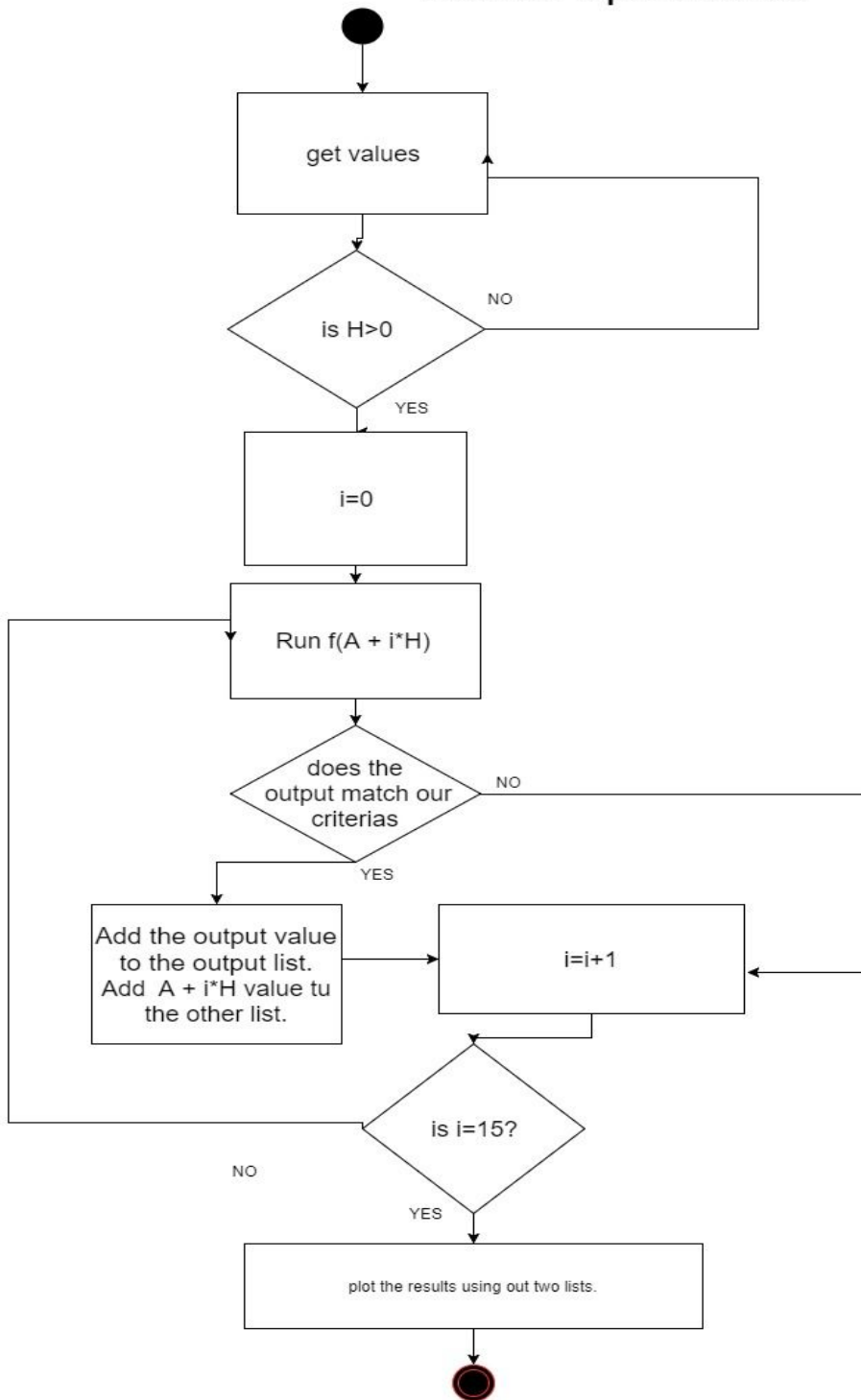
First ,it asks for the values necessities to run the algorithm properly .Namely “A”,the value that is going to be the base we feed the algorithm. M , the max value any number going out of the algorithm is allowed to get .And finally H ,the value we’re going to add in an incremental way inside the algorithm.

The second part is about running the algorithm.We check if H’s value is superior to 0 as stated in the exercise ,then we start feeding the algorithm with our values until we get 15 potential different values,which we add to a list at every iteration. When a value doesn’t fit the real number criteria ,it is simply ignored. We also create a list in which we add the values fed in the algorithm.

Third and last part is a plot using an imported library,with our returned values as y and our fed values as x.

## II-UML sketch:

### Function representation



# III-Code review:

```
import matplotlib.pyplot as plt
```

```
class homework(object):
```

```
    print("enter A value")
```

```
    A = float(input())
```

```
    print("enter M value")
```

```
    M = float(input())
```

```
    print("enter H value")
```

```
    H = float(input())
```

```
    values = []
```

```
    returnvalues = []
```

```
    i=0
```

```
    def f(x) : return (2+x)*(x+(1/x))/(x*x*(1/(1+x*x)))
```

```
    if H <= 0:
```

```
        print("wrong H value")
```

```
    else:
```

```
        while f(A + i*H) < M and i < 14:
```

```
            V = f(A + i*H)
```

```
            if V != float("inf") or V != float("-inf") or not isinstance(V,float) :
```

```
                returnvalues.append(V)
```

```
                values.append(A + i*H)
```

```
                i = i+1
```

```
            else:
```

```
                print("not available")
```

```
                i = i+1
```

```
    print(returnvalues)
```

```
    plt.plot(values,returnvalues)
```

```
    plt.show()
```

# Annex:

FichierEditionRechercheSourceExécutionDéboguerConsolesProjetsOutilsAffichageAide

Éditeur - D:\WinPython-64bit-3.6.2.0QT5\settings\spyder-py3\temp.py

temp.py

```
1 import matplotlib.pyplot as plt
2
3 class homework(object):
4
5     print("enter A value")
6     A = float(input())
7     print("enter M value")
8     M = float(input())
9     print("enter H value")
10    H = float(input())
11
12
13
14    values = []
15    returnvalues = []
16    i=0
17    def f(x) : return (2+x)*(x+(1/x))/(x*x*(1/(1+x*x)))
18
19    if H <= 0:
20        print("wrong H value")
21    else:
22        while f(A + i*H) < M and i < 14:
23            V = f(A + i*H)
24            if V != float("inf") or V != float("-inf") o
25                returnvalues.append(V)
26                values.append(A + i*H)
27                i = i+1
28            else:
29                print("not available")
30                i = i+1
31        print(returnvalues)
32        plt.plot(values,returnvalues)
33        plt.show()
```

Aide

Utilisation

Pour obtenir de l'aide ici, sélectionner (ou placer le curseur sur) un objet dans l'éditeur ou la console, puis appuyer sur **Ctrl+I**.

L'aide apparaît automatiquement après la saisie d'une parenthèse gauche après un objet si l'option correspondante est activée dans *Préférences > Aide*.

Console IPython

Console 6/A

enter A value

1

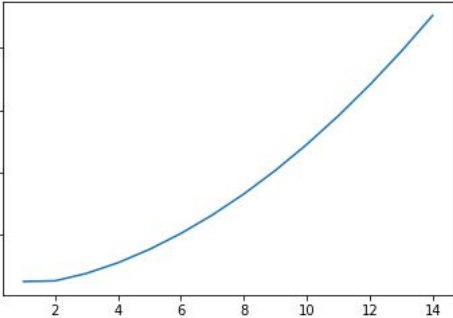
enter M value

2548418

enter H value

1

[12.0, 12.5, 18.51851851851852, 27.09375, 37.855999999999995, 50.7037037037037, 65.59766763848397, 82.51953125, 101.45953360768175, 122.41199999999999, 145.37340345604807, 170.34143518518522, 197.3145197997269, 226.2915451895044]



In [17]:

The method of finding the argument and function itself, is given according to your student code:

## Method

6. User inputs a starting value A, step H and upper limit of the function value YM.

The following conditions have to be true:  $H > 0$ .

The function value y will be calculated in the following points:

A

A + H

A + 2H

A + 3H

while the condition  $y < YM$  holds true, however not more than 15 times.

## Function

$$7. \quad y = (2 + x) \frac{x + \frac{1}{x}}{x^2 + \frac{1}{1 + x^2}}$$