Name-Surname: Chiho Li ID: 64011378

Introduction to Computers and Programming, SE Programme

Homework #5

6th September 2021

1. The Problem

You need to find the square root of a number, but unfortunately you are a poor Babylonian back in 2000 B. C. without a calculator. Fortunately, your buddy down the road has come up with a cute little algorithm (he discovered it while minding his sheep, sharp guy!) that gets a pretty good approximation of a square root. Here is the algorithm:

1. Prompt the user for a number *n*, of which you will find its square root
2. Make an initial *guess* of the square root (n/2 is a good first guess).
3. Create a new float variable *temp*
4. Set *temp* = *n*/*guess*
5. Update *guess* to have the value *guess*=(*guess* + *temp*)/2

Repeat steps 4 and 5 to get ever closer to the real answer.

Your Task

Your task is to implement the above little algorithm (which is more commonly known as Newton's method. It is controversial whether ancient Babylonian's actually knew this algorithm). **To make it simpler**, iterate 5 times the step 4-5 calculation that should be sufficient for a square root approximation (however, for the approximation to be more accurate the iteration could be done more than 5 times).

Write a Python program to iterate the step 4-5 calculation with 5, 6, and 7 time respectively in order to compare the approximation results and report your answers in the three decimal points of accuracy.

```
n = int(input("Input num to find square root: "))
guess = n / 2
temp = n / guess
for i in range(1,8):
    for x in range(i):
        temp = n / guess
        guess = (guess + temp) / 2.0
    if i > 4:
        print(f"The algorithm is looped {i} times: {temp:.3f}")
```

2. Write a Python program using the turtle module and **while** loops to print out the calendar of 12 months of year 2021 in the following format.

Month#1						
Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Month#2						
Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28						

……

Month#12						
Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

```
from turtle import *
speed(0)
def square(n):
    for i in range(4):
        fd(n)
        left(90)
def calender_frame(list_m):
    day = ["Sun","Mon","Tue","Wed","Thu","Fri","Sat"]
    for i in range(len(list_m)):
        if i % 7 == 0 and i != 0 :
            left(180)
            fd(25 * 7)
            right(90)
            fd(25)
            right(90)
        square(25)
```

```
        fd(4)
        write(list_m[i])
        fd(21)
    left(180)
    fd(25 * 7)
    right(90)
    fd(25)
    right(90)
    for i in range(len(day)):
        if i % 7 == 0 and i != 0 :
            left(180)
            fd(25 * 7)
            right(90)
            fd(25)
            right(90)
        square(25)
        fd(4)
        if i == 0:
            write(day[i])
            fd(21)
            continue
        write(day[i])
        fd(21)
    left(180)
    fd(25 * 7)
    right(90)
    fd(25)
    right(90)


def calender(n):
    date = {1: ['31', '', '', '', '', '', '',
                '24', '25', '26', '27', '28', '29', '30',
                '17', '18', '19', '20', '21', '22', '23',
                '10', '11', '12', '13', '14', '15', '16',
                '3', '4', '5', '6', '7', '8', '9',
                '', '', '', '', '', '1', '2'],
            2: ['28', '', '', '', '', '', '',
                '21', '22', '23', '24', '25', '26', '27',
                '14', '15', '16', '17', '18', '19', '20',
                '7', '8', '9', '10', '11', '12', '13',
                '', '1', '2', '3', '4', '5', '6'],
            3: ['28', '29', '30', '31', '', '', '',
                '21', '22', '23', '24', '25', '26', '27',
                '14', '15', '16', '17', '18', '19', '20',
                '7', '8', '9', '10', '11', '12', '13',
                '', '1', '2', '3', '4', '5', '6'],
            4: ['25', '26', '27', '28', '29', '30', '',
                '18', '19', '20', '21', '22', '23', '24',
                '11', '12', '13', '14', '15', '16', '17',
                '4', '5', '6', '7', '8', '9', '10',
                '', '', '', '', '1', '2', '3'],
            5: ['30', '31', '', '', '', '', '',
                '23', '24', '25', '26', '27', '28', '29',
                '16', '17', '18', '19', '20', '21', '22',
                '9', '10', '11', '12', '13', '14', '15',
                '2', '3', '4', '5', '6', '7', '8',
                '', '', '', '', '', '', '1', ],
```

```
        6: ['27', '28', '29', '30', '', '', '',
            '20', '21', '22', '23', '24', '25', '26',
            '13', '14', '15', '16', '17', '18', '19',
            '6', '7', '8', '9', '10', '11', '12',
            '', '', '1', '2', '3', '4', '5'],
        7: ['25', '26', '27', '28', '29', '30', '31',
            '18', '19', '20', '21', '22', '23', '24',
            '11', '12', '13', '14', '15', '16', '17',
            '4', '5', '6', '7', '8', '9', '10',
            '', '', '', '', '1', '2', '3'],
        8: ['29', '30', '31', '', '', '', '',
            '22', '23', '24', '25', '26', '27', '28',
            '15', '16', '17', '18', '19', '20', '21',
            '8', '9', '10', '11', '12', '13', '14',
            '1', '2', '3', '4', '5', '6', '7'],
        9: ['25', '26', '27', '28', '29', '30', '',
            '18', '19', '20', '21', '22', '23', '24',
            '11', '12', '13', '14', '15', '16', '17',
            '4', '5', '6', '7', '8', '9', '10', '',
            '', '', '', '1', '2', '3'],
        10: ['31', '', '', '', '', '', '',
             '24', '25', '26', '27', '28', '29', '30',
             '17', '18', '19', '20', '21', '22', '23',
             '10', '11', '12', '13', '14', '15', '16',
             '3', '4', '5', '6', '7', '8', '9',
             '', '', '', '', '', '1', '2'],
        11: ['28', '29', '30', '', '', '', '',
             '21', '22', '23', '24', '25', '26', '27',
             '14', '15', '16', '17', '18', '19', '20',
             '7', '8', '9', '10', '11', '12', '13',
             '', '1', '2', '3', '4', '5', '6'],
        12: ['26', '27', '28', '29', '30', '31', '',
             '19', '20', '21', '22', '23', '24', '25',
             '12', '13', '14', '15', '16', '17', '18',
             '5', '6', '7', '8', '9', '10', '11',
             '', '', '', '1', '2', '3', '4']}
    calender_frame(date[n])
    for i in range(2):
        fd(25 * 7)
        left(90)
        fd(25)
        left(90)
    fd(10)
    write(f"Month#{n}")
    fd(-10)
    right(90)
    fd(25 * ((len(date[n])//7)+1))
    left(90)
x = -600
y = -280
count = 0
month = 9
penup()
goto(x, y)
pendown()
h = 0
w = 0
while count != 12:
```

```
    if count == 4:
        month = 5
    elif count == 8:
        y+= 20
        month = 1
    if w == 4:
        w = 0
        y += 200
        penup()
        goto(x, y)
        pendown()
    calender(month)
    fd(25*7)
    penup()
    fd(60)
    pendown()
    month += 1
    w += 1
    count += 1
done()
```

3. Write a Python program that prompts the user to enter any integer, greater than or equal to 1, and the program displays the output with the pattern like the following **examples**:

Input: 1

```
*
```

Input: 3

```
*
**
***
**
*
**
*
*
```

Input: 5

```
*
**
***
****
*****
****
***
**
*
**
***
****
***
**
*
**
***
**
*
**
*
```

```
    *
asterisk_count  = int(input("Please enter an integer equal to or greater than 1 : "))
if asterisk_count != 1:
   repetition = asterisk_count
   for y in range(repetition):
      for i in range(1, asterisk_count + 1):
         for x in range(i):
            print("*", end="")
         print("")
      for i in range(asterisk_count - 1, 1, -1):
         for x in range(i):
            print("*", end="")
         print("")
      asterisk_count -= 1
   print("*")
```