**CSI 31 / Basic Program Design Outline for Computing Square Root of Positive Number.**

**Program Name** prob\_4\_newton\_method.py

**General description of the problem to be solved.**

This program computes the square root of a positive number

**Program design tasks**

The tasks that the **main** function must perform are to:

1. *Print an introduction describing the program to the user*
2. *Getting the value for the variables* ***x*** *and* ***t***
3. *Assigns initial value for* ***guess*** *as guess = x/2*
4. *Calculate the* ***guess (****guess = (guess + (x/guess)) / 2****)*** *by running a loop for* ***t*** *number of times,*
5. *Calculate difference between the positive integer and square of variable* ***guess*** *and assigning the value to* ***diff*** *variable*
6. *Finally, printing the value of* ***guess*** *and* ***diff*** *to the screen.*

**Input:** The program will prompt the user to enter the positive integer and number of times to perform Newton’s method. (called x and n).

Enter a positive integer for computing square root:

How many times to perform Newton's method:

**Output:** The program will print out the value of **guess** which will berounded to two point decimal and **diff** inabsolute value.

**List of variables needed.**

The variables needed are the two inputs such as **x** and **t.** These variable are used to calculate **guess** and **diff**.

**#CSI 31 NOBI ALAM NOUFEEL prob\_4\_newton\_method.py**

**def intro():**

**print("This program calculates square root of a number using Newton's method.")**

**print()**

**return**

**def userInput():**

**x = int(input("Enter a positive integer for computing square root: "))**

**t = int(input("How many times to perform Newton's method: "))**

**print()**

**return x,t**

**def process(x,t):**

**guess = x/2**

**for i in range(t):**

**guess = (guess + (x/guess)) / 2**

**diff =abs( x - guess\*\*2)**

**return guess,diff**

**def main():**

**intro()**

**x,t = userInput()**

**guess,diff = process(x,t)**

**print("The square root of",x,"is approximately",round(guess,2))**

**print("The difference between",x,"and the square of ",guess,"is",round(diff,2))**

**main()**

**"""**

**This program calculates square root of a number using Newton's method.**

**Enter a positive integer for computing square root: 625**

**How many times to perform Newton's method: 6**

**The square root of 625 is approximately 25.0**

**The difference between 625 and the square of 25.001746971327186 is 0.09**

**"""**