NATIONAL UNIVERSITY
OF COMPUTER & EMERGING SCIENCES
PESHAWAR CAMPUS

Problem Set:	Assignment: AG03	**Semester**:	Fall 2018
Points:	*See autograder*		
Date Set:	*See autograder*	**Due Date**:	*See autograder*
Course:	CS118 Prog. Fundamentals	**Instructor**:	Dr. Nauman

1 Square Roots and Guesses

Since you are reading this, you have already downloaded and extracted the zip file.

1.1 Tasks to do

1. Open the file `a03.py` and look between the markers. You may ignore the code outside the markers completely.
   You may run the code by typing the following from the shell: `python a03.py`
   This will not run the tests but the code itself.
2. Assumptions and requirements:
   (a) For all these taks, your results must be accurate up to *five decimal places*.
   (b) For the whole assignment, assume no negative numbers will be passed to any functions.
   (c) You must not use the functions in the `math` or another library during this assignment. If you break this rule, you risk getting zero score on the whole assignment.
3. There are three main tasks to complete.
   (a) Write a function named `improve_guess`, which takes a number n and a guess g as input. This improvement in guess will be made according to the rule proposed by your enemy of old – Newton. According to this rule:

   If you have a guess g for the square root of a number x, then the difference between the two values g and $(g^2 - x)/2g$ is a better guess.

   Read through this statement carefully and write the function accordingly.
   (b) Now, write a function `sqrt` similar to what we wrote in the class, except it should use the new `improve_guess` function you just defined. Assume this function will only be given guesses greater than or equal to 0. Make any modifications needed to fix the errors (if any).
   (c) To get full marks on the assignment, you also need to make a slight modification to the `sqrt` function. As you know, this function is called multiple times. So, just before you return the actual value of the square root, you need to print how many times the function was called.
   For instance, if for square root of 36, if we started with guess 0.1, then had the guess 2.5 and finally 6, the function should print the following:
   `Took:  3 steps`
   Hint: When you call the function, you can "tell it" how many times it has been called before.
4. You may change the values in function calls at the end of the file `a03.py` to check the functions.
5. Run local tests and if they pass, submit the assignment using the submission command given on the Autograder assignment page. (Same as the first assignment.)