

This assignment is based on Exercise 7.1 from your textbook.

Part 1

Encapsulate the following Python code from Section 7.5 in a function named `my_sqrt` that takes `a` as a parameter, chooses a starting value for `x`, and returns an estimate of the square root of `a`.

```
while True:
    y = (x + a/x) / 2.0
    if y == x:
        break
    x = y
```

Part 2

Write a function named `test_sqrt` that prints a table like the following using a `while` loop, where "diff" is the absolute value of the difference between `my_sqrt(a)` and `math.sqrt(a)`.

```
a = 1 | my_sqrt(a) = 1 | math.sqrt(a) = 1.0 | diff = 0.0
a = 2 | my_sqrt(a) = 1.41421356237 | math.sqrt(a) = 1.41421356237 | diff = 2.22044604925e-16
a = 3 | my_sqrt(a) = 1.73205080757 | math.sqrt(a) = 1.73205080757 | diff = 0.0
a = 4 | my_sqrt(a) = 2.0 | math.sqrt(a) = 2.0 | diff = 0.0
a = 5 | my_sqrt(a) = 2.2360679775 | math.sqrt(a) = 2.2360679775 | diff = 0.0
a = 6 | my_sqrt(a) = 2.44948974278 | math.sqrt(a) = 2.44948974278 | diff = 0.0
a = 7 | my_sqrt(a) = 2.64575131106 | math.sqrt(a) = 2.64575131106 | diff = 0.0
a = 8 | my_sqrt(a) = 2.82842712475 | math.sqrt(a) = 2.82842712475 | diff = 4.4408920985e-16
a = 9 | my_sqrt(a) = 3.0 | math.sqrt(a) = 3.0 | diff = 0.0
```

Modify your program so that it outputs lines for `a` values from 1 to 25 instead of just 1 to 9.

You should submit a script file and a plain text output file (.txt) that contains the test output. Multiple file uploads are permitted.

Your submission will be assessed using the following Aspects.

1. Does the submission include a `my_sqrt` function that takes a single argument and includes the `while` loop from the instructions?
2. Does the `my_sqrt` function initialize `x` and return its final value?
3. Does the `test_sqrt` function print `a` values from 1 to 25?
4. Does the `test_sqrt` function print the values returned by `my_sqrt` for each value of `a`?
5. Does the `test_sqrt` function print correct values from `math.sqrt` for each value of `a`?
6. Does the `test_sqrt` function print the absolute value of the differences between `my_sqrt` and `math.sqrt` for each value of `a`?
7. Does the `my_sqrt` function compute values that are almost identical to `math.sqrt` ("diff" less than $1e-14$)?