Written Assignment unit 5
May 13, 2020

Part one

```
def my_sqrt(a):
    x = 19
    while True:
        y = (x + a/x) / 2.0
        if y == x:
            break
        x = y
    return y
```

Output

$python3 main.py

Part two

```
import math

input
def my_sqrt(a):
    x = 15
    while True:
        y = (x + a/x)/2.0
        if y == x:
            break
        x = y
    return x

def test_sqrt():
    for a in range(1, 26):
        v1 = my_sqrt(a)
        v2 = math.sqrt(a)
        diff = abs(v1-v2)
        print("a = ", a, " | my_sqrt(a) = ", v1, " | math.sqrt(a) = ", v2, " | diff = ", diff)

def main():
    test_sqrt()
```

```
if __name__ == "__main__":
    main()
```

Output

```
a =  1  | my_sqrt(a) =  1.0  | math.sqrt(a) =  1.0  | diff =  0.0
a =  2  | my_sqrt(a) =  1.414213562373095  | math.sqrt(a) =  1.4142135623730951  | diff =
2.220446049250313e-16
a =  3  | my_sqrt(a) =  1.7320508075688772  | math.sqrt(a) =  1.7320508075688772  | diff =  0.0
a =  4  | my_sqrt(a) =  2.0  | math.sqrt(a) =  2.0  | diff =  0.0
a =  5  | my_sqrt(a) =  2.23606797749979  | math.sqrt(a) =  2.23606797749979  | diff =  0.0
a =  6  | my_sqrt(a) =  2.449489742783178  | math.sqrt(a) =  2.449489742783178  | diff =  0.0
a =  7  | my_sqrt(a) =  2.6457513110645907  | math.sqrt(a) =  2.6457513110645907  | diff =  0.0
a =  8  | my_sqrt(a) =  2.82842712474619  | math.sqrt(a) =  2.8284271247461903  | diff =
4.440892098500626e-16
a =  9  | my_sqrt(a) =  3.0  | math.sqrt(a) =  3.0  | diff =  0.0
a =  10  | my_sqrt(a) =  3.162277660168379  | math.sqrt(a) =  3.1622776601683795  | diff =
4.440892098500626e-16
a =  11  | my_sqrt(a) =  3.3166247903554  | math.sqrt(a) =  3.3166247903554  | diff =  0.0
a =  12  | my_sqrt(a) =  3.4641016151377544  | math.sqrt(a) =  3.4641016151377544  | diff =
0.0
a =  13  | my_sqrt(a) =  3.6055512754639896  | math.sqrt(a) =  3.605551275463989  | diff =
4.440892098500626e-16
a =  14  | my_sqrt(a) =  3.7416573867739413  | math.sqrt(a) =  3.7416573867739413  | diff =
0.0
a =  15  | my_sqrt(a) =  3.872983346207417  | math.sqrt(a) =  3.872983346207417  | diff =  0.0
a =  16  | my_sqrt(a) =  4.0  | math.sqrt(a) =  4.0  | diff =  0.0
a =  17  | my_sqrt(a) =  4.123105625617661  | math.sqrt(a) =  4.123105625617661  | diff =  0.0
a =  18  | my_sqrt(a) =  4.242640687119286  | math.sqrt(a) =  4.242640687119285  | diff =
8.881784197001252e-16
a =  19  | my_sqrt(a) =  4.358898943540673  | math.sqrt(a) =  4.358898943540674  | diff =
8.881784197001252e-16
a =  20  | my_sqrt(a) =  4.47213595499958  | math.sqrt(a) =  4.47213595499958  | diff =  0.0
a =  21  | my_sqrt(a) =  4.58257569495584  | math.sqrt(a) =  4.58257569495584  | diff =  0.0
a =  22  | my_sqrt(a) =  4.69041575982343  | math.sqrt(a) =  4.69041575982343  | diff =  0.0
a =  23  | my_sqrt(a) =  4.795831523312719  | math.sqrt(a) =  4.795831523312719  | diff =  0.0
a =  24  | my_sqrt(a) =  4.898979485566356  | math.sqrt(a) =  4.898979485566356  | diff =  0.0
a =  25  | my_sqrt(a) =  5.0  | math.sqrt(a) =  5.0  | diff =  0.0
```