Problem 5

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function: tan(x)
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SOEN 6011: Software Engineering Processes

17 July 2022

1 Description about the trace to the requirements

- FR1:All the input of the test cases below are in radians, which are with the expected output according to the radians' status.

- FR2::All the input of the test cases below are real numbers with only one period ".".

- FR3:Every test case only includes one input number.

- NFR1: The local test environment is
  java version "12.0.1"2019-04-16
  Java(TM) SE Runtime Environment (build 12.0.1+12)
  Java HotSpot(TM) 64-Bit Server VM (build 12.0.1+12, mixed mode, sharing)

2 Test Cases

All test cases below are written based on Tips/Guidelines for writing test cases with some editings.[1] The expected outouts were calculated and given by the calculator on the mobile phone.

1. Test Case 1

   - input:0.0
   - output by Algorithm 1:0.0
   - output by Algorithm 2:0.0
   - expected output:0.0
   - Algorithm 1 result:Pass
   - Algorithm 2 result:Pass

2. Test Case 2

   - input:0.15
   - output by Algorithm 1:0.151135
   - output by Algorithm 2:0.151135
   - expected output:0.151135
   - Algorithm 1 result:Pass
   - Algorithm 2 result:Pass

3. Test Case 3

   - input:0.30
   - output by Algorithm 1:0.309336
   - output by Algorithm 2:0.309336
   - expected output:0.309336
   - Algorithm 1 result:Pass
   - Algorithm 2 result:Pass

4. Test Case 4

   - input:0.45
   - output by Algorithm 1:0.483055
   - output by Algorithm 2:0.483055
   - expected output:0.483055
   - Algorithm 1 result:Pass
   - Algorithm 2 result:Pass

5. Test Case 5

   - input:0.60
   - output by Algorithm 1:0.684136
   - output by Algorithm 2:0.684136
   - expected output:0.684136
   - Algorithm 1 result:Pass
   - Algorithm 2 result:Pass

6. Test Case 6

   - input:0.75
   - output by Algorithm 1:0.931590
   - output by Algorithm 2:0.931596
   - expected output:0.931596
   - Algorithm 1 result:Fail
   - Algorithm 2 result:Pass

7. Test Case 7

   - input:0.90
   - output by Algorithm 1:1.260011
   - output by Algorithm 2:1.260158
   - expected output:1.260158
   - Algorithm 1 result:Fail
   - Algorithm 2 result:Pass

8. Test Case 8

   - input:1.05
   - output by Algorithm 1:1.740870
   - output by Algorithm 2:1.743315
   - expected output:1.743315
   - Algorithm 1 result:Fail
   - Algorithm 2 result:Pass

9. Test Case 9

   - input:1.20
   - output by Algorithm 1:2.540713
   - output by Algorithm 2:2.572151
   - expected output:2.572151
   - Algorithm 1 result:Fail
   - Algorithm 2 result:Pass

10. Test Case 10
    - input:1.35
    - output by Algorithm 1:4.084290
    - output by Algorithm 2:4.455221
    - expected output:4.455221
    - Algorithm 1 result:Fail
    - Algorithm 2 result:Pass

11. Test Case 11
    - input:1.50
    - output by Algorithm 1:14.100190
    - output by Algorithm 2:14.101419
    - expected output:14.101419
    - Algorithm 1 result:Fail
    - Algorithm 2 result:Pass

12. Test Case 12
    - input:1.57
    - output by Algorithm 1:1235.828402
    - output by Algorithm 2:1255.765591
    - expected output:1255.765591
    - Algorithm 1 result:Fail
    - Algorithm 2 result:Pass

3 Total

- Algorithm 1 accuracy: 41.60%

- Algorithm 2 accuracy: 100.00%

conclusion: Algorithm 2 has the better performance. Algorithm 1 met problems when the input x is over 0.60.

Referenties

[1] STC Admin, Tips/Guidelines for writing test cases, Softwaretestingclass.com, 2012.