COMP-4100 Software Verification and Testing

Assignment One

**Name:** Brett Robert Shepley

**Student #:** 104826157

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Purpose

Write a function in a programming language like Python, Java, C++ that solves the problem of triangle type. Your function should successfully pass at least 10 test cases and should fail on 2 test cases.

Program Details

**Run Command:** python “triangle-test.py”

This program fulfills all requirements. When creating this program, the idea of passing specific test cases was kept in mind. The Python programming language was chosen due to the developer being familiar with this technology and because this language is easy to use and fast to develop programs. The method for passing 13/15 test cases is an if statement that uses the triangle inequality test as its condition.

**Run Command:** python “triangle-test-upgrade.py”

Another version of this program was created to show that the failed test cases in the first version can be fixed with an upgraded version of the previously shown program. This upgraded version has a try and catch statement to handle a non-integer value and default values if the function is called with less than three input values. This program will pass all test cases.

Test Cases and Findings

|  |  |  |  |
| --- | --- | --- | --- |
| Test Conducted | Input Used | Final Output | Reason For Output |
| Valid Equilateral Triangle | triangle-test(1,1,1) | Pass | Passed the triangle inequality test and was valid integer input |
| Valid Isosceles Triangle | triangle-test(3,3,2) | Pass | Passed the triangle inequality test and was valid integer input |
| Valid Scalene Triangle | triangle-test(4,2,3) | Pass | Passed the triangle inequality test and was valid integer input |
| Invalid Isosceles Triangle | triangle-test(2,2,4) | Pass | Failed the triangle inequality test |
| Invalid Scalene Triangle | triangle-test(1,2,3) | Pass | Failed the triangle inequality test |
| Permutations for Isosceles Triangle Sides | triangle-test(3,3,4)  triangle-test(3,4,3)  triangle-test(4,3,3) | Pass | Passed the triangle inequality test and valid integer input |
| Input With One Side Being Zero | triangle-test(3,4,0) | Pass | Failed the triangle inequality test |
| Input With One Side Being Negative | triangle-test(1,1,-1) | Pass | Failed the triangle inequality test |
| Input With the Sum of Two Sides Being Equal to The Third Side | triangle-test(1,1,2) | Pass | Failed the triangle inequality test |
| Permutations of previous case, Sum of Two Sides Being Equal to The Third Side | triangle-test(1,2,1)  triangle-test(2,1,1) | Pass | Failed the triangle inequality test |
| Three integers >0 such that the sum of two of the numbers is less than the third | triangle-test(1,1,3) | Pass | Failed the triangle inequality test |
| Permutations of previous case, three integers >0 such that the sum of two of the numbers is less than the third | triangle-test(1,3,1)  triangle-test(3,1,1) | Pass | Failed the triangle inequality test |
| Input All Sides Equal to Zero | triangle-test(0,0,0) | Pass | Failed the triangle inequality test |
| Input Non-Integer Value | triangle-test(0,0,’a’) | Fail | Throws a ValueError exception, program crashes |
| Input Wrong Number of Arguments | triangle-test(1,1) | Fail | Throws a TypeError exception, program crashes |