Triangle Test Report

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"I pledge my honor that I have abided by the Stevens Honor System."

Assignment Description

The goal of this assignment is to test and debug a Python function, classifyTriangle(a, b, c), that determines the type of triangle based on the lengths of its sides. The task included:

- Designing a set of test cases to evaluate the correctness of the given (buggy) implementation.
- Running the tests to identify logic and validation errors.
- Fixing the code and verifying that all defects were resolved.
- Documenting the process, results, and lessons learned.

Summary of Results

Two versions of the program were tested: the original buggy version and the fixed version.

- Buggy version: 4 passed / 10 failed
- Fixed version: 14 passed / 0 failed

After fixing all logic and validation errors, the corrected implementation passed every unit test successfully. This project demonstrated how systematic testing helps uncover multiple independent defects. Through automated unit tests, I found logic errors in input validation, triangle inequality conditions, and right-triangle detection. Sorting sides before checking the Pythagorean theorem was essential for accurate classification. This assignment reinforced the value of test-driven development, debugging discipline, and thorough edge-case testing.

Detailed Results

Techniques Used:

- Black-box testing to design comprehensive test cases before modifying the code.
- Automated testing using Python's unittest framework.
- Iterative debugging: running tests, identifying failing cases, applying targeted fixes, and re-testing.

Assumptions and Constraints:

- Inputs must be positive integers less than or equal to 200.
- Non-integer, zero, or negative inputs are considered invalid.
- The triangle inequality must hold: (a + b > c), (b + c > a), (a + c > b).

Data Inputs

Category	# Cases	Examples
Right Triangle	2	(3,4,5), (5,3,4)
Equilateral	2	(1,1,1), (10,10,10)
Isosceles	2	(5,5,8), (8,5,5)
Scalene	2	(7,8,9), (4,6,9)
Not a Triangle	2	(1,2,3), (2,3,6)
Invalid Input	4	(0,5,5), (-1,5,5), (3.5,4,5), (201,10,10)

Total Tests Executed: 14

Explanation of Results
Buggy Version:

- Passed: 4
- Failed: 10

Major Issues Found:

- Input validation incorrectly checked b <= b instead of b <= 0.
- Triangle inequality uses differences instead of sums.
- Right-triangle check failed due to missing square operations.
- Equilateral conditions incorrectly compare sides.
- Typographical error: 'Isoceles' instead of 'Isosceles.'

Fixed Version:

- Passed: 14 / 14
- All defects resolved.
- Added strict validation and consistent classification logic.

Summary Comparison

Metric	Buggy Version	Fixed Version
Tests Planned	14	14
Tests Executed	14	14
Tests Passed	4	14
Defects Found	10	0
Defects Fixed	0	10