Software Testing and Reliability

Lecture 6

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Test Case Selection Strategies

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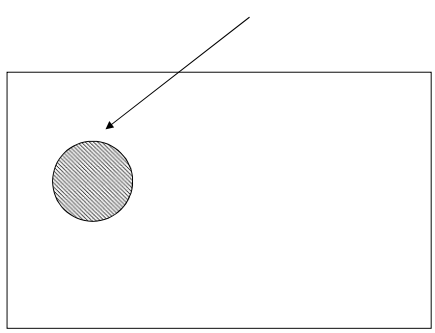
Consider a program that accepts two integers as inputs

Input domain for a faulty program

failure-causing inputs



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Example 1

Recognition and classification of triangles

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Example 1 (Continued)

Given a program which

- Reads in 3 integers as the lengths of a triangle;
- Output the types of triangle – right-angled triangle, isosceles triangle, equilateral triangle, scalene triangle

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Question?

What would be your test cases?

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How to select test cases?

Informal yet simple approach:

- Outputs
- Inputs

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Inputs?

3 integers

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Outputs?

types of triangles

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Outputs?

How many types of triangles?

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Possible Test Cases

- Right-angled triangle – (3, 4, 5)
- Equilateral triangle – (6, 6, 6)
- Isosceles triangle – (3, 3, 5)
- Scalene triangle – (3, 4, 6)

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Additional Test Cases

order of 3 integers not important

- Right-angled triangle – (3, 4, 5); (4, 3, 5); ..
- Equilateral triangle – 6, 6, 6
- Isosceles triangle – (3, 3, 5); (3, 5, 3); ..
- Scalene triangle – (3, 4, 6); (6, 3, 4); ..

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test cases for a valid triangle

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Example 1 (continued)

Given a program which

- Reads in 3 integers as the lengths of a triangle;
- Output the types of triangle – right-angled triangle, isosceles triangle, equilateral triangle, scalene triangle, *not a triangle*

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Properties of a Triangle

- Lengths are positive integers as inputs
- Sum of the lengths of any two sides should not be less than the length of the remaining side

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Additional Test Cases (not a triangle)

- Positive integers as inputs
  - (-3, 4, 5)
- Sum of the lengths of any two sides should not be less than the length of the remaining side
  - (4, 3, 9)

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Commonly overlooked test cases

- Non-negative
  - (-3, 4, 4); *(4, 0, 4)*
- Sum of the lengths of any two sides should not be less than the length of the remaining side
  - (4, 3, 9); *(4, 3, 7)*

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Valid and Invalid Test Cases

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Example 1 (continued)

Given a program which

- Reads in 3 *positive* integers as the lengths of a triangle;
- Output the types of triangle – right-angled triangle, isosceles triangle, equilateral triangle, scalene triangle, *not a triangle*

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- Failure-causing test case, failing test case
- Successful test case, passing test case

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Summary

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