IT–314 Lab8

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Q1. Previous Date Program
Equivalence Partitioning:

Tester Action and Input Data (Day, Month, Year)	**Expected Outcome**
Input: 15, 6, 2010 (Valid)	Previous date: 14/6/2010
Input: 1, 3, 2011 (Valid)	Previous date: 28/2/2011
Input: 32, 5, 2012 (Invalid day)	Invalid date
Input: 31, 13, 2014 (Invalid month)	Invalid date

Boundary Value Analysis:

Tester Action and Input Data (Day, Month, Year)	**Expected Outcome**
Input: 1, 1, 2010 (Boundary case)	Previous date: 31/12/2009
Input: 29, 2, 2012 (Leap year boundary case)	Previous date: 28/2/2012
Input: 31, 12, 2015 (Boundary case)	Previous date: 30/12/2015
Input: 1, 3, 2016 (Leap year boundary case)	Previous date: 29/2/2016

Q2:
P1: Linear Search Program
Equivalence Partitioning:

Tester Action and Input Data (Array, Value)	**Expected Outcome**
Input: [5, 8, 12, 3], 8	Index 1
Input: [7, 10, 15, 19], 15	Index 2

Tester Action and Input Data (Array, Value)	Expected Outcome
Input: [1, 2, 3], 4	-1 (not found)

Boundary Value Analysis:

Tester Action and Input Data (Array, Value)	Expected Outcome
Input: [], 5 (Empty array)	-1 (not found)
Input: [1, 2, 3], 1 (First element)	Index 0
Input: [1, 2, 3], 3 (Last element)	Index 2

P2: Count items program
Equivalence Partitioning:

Tester Action and Input Data (Array, Value)	Expected Outcome
Input: [5, 8, 12, 3], 8	1
Input: [7, 10, 15, 7, 7], 7	3
Input: [1, 2, 3], 4	0

Boundary Value Analysis:

Tester Action and Input Data (Array, Value)	Expected Outcome
Input: [], 5 (Empty array)	0
Input: [5, 5, 5], 5	3

P3: Binary Search Program
Equivalence Partitioning:

Tester Action and Input Data (Sorted Array, Value)	**Expected Outcome**
Input: [3, 6, 8, 12, 15], 8	Index 2
Input: [1, 2, 3, 4], 3	Index 2
Input: [5, 7, 9, 11], 10	-1 (not found)

Boundary Value Analysis:

Tester Action and Input Data (Sorted Array, Value)	**Expected Outcome**
Input: [1, 3, 5, 7], 1 (First element)	Index 0
Input: [1, 3, 5, 7], 7 (Last element)	Index 3
Input: [1, 3, 5, 7], 2 (Not present)	-1 (not found)

P4: Triangle Program(Integer Inputs)
Equivalence Partitioning:

Tester Action and Input Data (a, b, c)	**Expected Outcome**
Input: 3, 3, 3	Equilateral triangle
Input: 5, 5, 3	Isosceles triangle
Input: 6, 7, 8	Scalene triangle
Input: 2, 5, 10	Invalid triangle

Boundary Value Analysis:

Tester Action and Input Data (a, b, c)	Expected Outcome
Input: 1, 1, 2	Invalid triangle
Input: 3, 4, 5 (Right-angled triangle)	Scalene triangle
Input: 6, 6, 10	Isosceles triangle
Input: 2, 2, 4	Invalid triangle

P5: Prefix Program
Equivalence Partitioning:

Tester Action and Input Data (String 1, String 2)	Expected Outcome
Input: "pre", "prefix"	true
Input: "sub", "substring"	true
Input: "app", "application"	true
Input: "miss", "mismatch"	false

Boundary Value Analysis:

Tester Action and Input Data (String 1, String 2)	Expected Outcome
Input: "sub", "" (Empty string)	false
Input: "", "substring" (Empty prefix)	true
Input: "longstring", "short" (Longer prefix)	false

P6: Triangle Program (Floating-Point Inputs)

a) Equivalence Classes

The following are the identified equivalence classes for the triangle program:

1. **Equilateral Triangle**: All sides are equal (A = B = C).
2. **Isosceles Triangle**: Two sides are equal (A = B, B = C, or A = C).
3. **Scalene Triangle**: No sides are equal (A ≠ B ≠ C).
4. **Right-angled Triangle**: Follows the property A2+B2=C2A^2 + B^2 = C^2A2+B2=C2.
5. **Invalid Triangle**: The sum of two sides is less than or equal to the third.

b) Test Cases to Cover the Identified Equivalence Classes

Input (A, B, C)	**Expected Outcome**	**Equivalence Class**
3.0, 3.0, 3.0	Equilateral triangle	Equilateral Triangle
5.0, 5.0, 3.0	Isosceles triangle	Isosceles Triangle
6.0, 7.0, 8.0	Scalene triangle	Scalene Triangle
2.0, 5.0, 10.0	Invalid triangle	Invalid Triangle
3.0, 4.0, 5.0	Scalene (right-angled)	Right-angled Triangle

c) Boundary Condition for Scalene Triangle: A + B > C

For the boundary condition A + B > C, the following test cases are used to verify the boundary:

Input (A, B, C)	**Expected Outcome**	**Boundary Condition**
3.0, 4.0, 7.0	Invalid triangle	A + B = C (boundary case)
3.0, 4.0, 6.9	Scalene triangle	A + B > C (valid case)
3.0, 4.0, 7.1	Scalene triangle	A + B < C (valid case)

d) Boundary Condition for Isosceles Triangle: A = C

For the boundary condition A = C, the following test cases verify the boundary:

Input (A, B, C)	Expected Outcome	Boundary Condition
5.0, 7.0, 5.0	Isosceles triangle	A = C (valid case)
5.0, 7.0, 4.9	Scalene triangle	A ≠ C (near-boundary case)
5.0, 7.0, 5.1	Scalene triangle	A ≠ C (near-boundary case)

e) Boundary Condition for Equilateral Triangle: A = B = C

For the boundary condition A = B = C, the following test cases verify the boundary:

Input (A, B, C)	Expected Outcome	Boundary Condition
3.0, 3.0, 3.0	Equilateral triangle	A = B = C (valid case)
3.0, 3.0, 2.9	Isosceles triangle	A ≠ B ≠ C (near-boundary)
3.0, 3.0, 3.1	Isosceles triangle	A ≠ B ≠ C (near-boundary)

f) Boundary Condition for Right-Angled Triangle: $A^2 + B^2 = C^2$

For the boundary condition $A^2 + B^2 = C^2$ (right-angle), the following test cases verify the boundary:

Input (A, B, C)	Expected Outcome	Boundary Condition
3.0, 4.0, 5.0	Scalene (right-angled)	$A^2 + B^2 = C^2$ (valid case)
3.0, 4.0, 5.1	Scalene triangle	$A^2 + B^2 < C^2$ (near-boundary)
3.0, 4.0, 4.9	Scalene triangle	$A^2 + B^2 > C^2$ (near-boundary)

g) Non-Triangle Case (Invalid Triangle)

For non-triangle cases, the following test cases explore the boundary conditions where the sum of two sides is less than or equal to the third:

Input (A, B, C)	Expected Outcome	Boundary Condition
1.0, 2.0, 3.0	Invalid triangle	A + B = C (boundary case)
1.0, 2.0, 3.1	Scalene triangle	A + B < C (valid case)
1.0, 2.0, 2.9	Scalene triangle	A + B > C (valid case)

h) Non-Positive Input (Invalid Case)

For non-positive input values, the following test cases ensure invalid inputs are handled correctly:

Input (A, B, C)	Expected Outcome	Boundary Condition
0.0, 3.0, 3.0	Invalid triangle	Non-positive value
-1.0, 2.0, 3.0	Invalid triangle	Negative value
3.0, 0.0, 4.0	Invalid triangle	Non-positive value
3.0, -2.0, 4.0	Invalid triangle	Negative value