It314_Software Engineering
LAB 8

S.no	Equivalence Class	Acceptance
E1	Month value is non-numeric	Invalid
E2	Month value is less than 1	Invalid
E3	Month value is between 1 and 12 (inclusive)	Valid
E4	Month value is greater than 12	Invalid
E5	Month value is a decimal number	Invalid
E6	Month value is a negative number	Invalid
E7	Month value is zero	Invalid
E8	Month value contains leading zeros	Valid
E9	Year Negative value	Invalid
E10	Year Zero	Invalid
E11	Year Far future value	Invalid
E12	Day value greater than 31	Invalid
E13	Day non-integer value	Invalid
E14	Year two-digit representation	Invalid
E15	Day exceeds maximum for specific month	Invalid

E16	Year Pre-Gregorian calendar	Invalid
E17	Day Ordinal representation	Invalid
E18	Year decimal	Invalid
E19	Year non-numeric characters	Invalid
E20	Day Single digit value between 1 and 9	Valid
E21	Day Double digit value between 10 and 31	Valid
E22	Year Four-digit value for current century	Valid
E23	Year Four-digit value for previous century	Valid
E24	Year Four-digit value for next century	Valid

Black Box test cases for the Data tuple based on Equivalence class above table:

S.No	Test input data (day-month-year)	Expected outcome	Classes covered
1	05,05,1990	04,05,1990	E3,E8,E20,E23
2	3rd,6,2004	Error message	E17
3	31,04,2023	Error message	E15,E21,E22
4	15,13,2025	Error message	E4,E21,E24
5	-5,07,2022	Error message	E6,E3,E22
6	10,0,2021	Error message	E7,E21,E22
7	01,01,0000	Error message	E10,E20,E3
8	29,02,2100	Error message	E15,E21,E24
9	31,04,2023	Error message	E15,E21,E22
10	15,13,2025	Error message	E4,E21,E24
11	-5,07,2022	Error message	E6,E3,E22
12	10,0,2021	Error message	E7,E21,E22
13	01,01,0000	Error message	E10,E20,E3
14	29,02,2100	Error message	E15,E21,E24
15	30,06,2023	29,06,2023	E3,E21,E22
16	01,12,9999	Error message	E11,E20,E3
17	14,Feb,2024	Error message	E1,E21,E22
18	32,08,2026	Error message	E12,E3,E24
19	31,12,2023	30,12,2023	E3,E21,E22

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: A² + B² = C²

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