Experiment 2 : Write a program to find the roots of a quadratic equation and perform boundary value analysis.

Solution:

```
#include <bits/stdc++.h>
using namespace std;
void nature_of_roots(int a, int b, int c)
{
	if (a == 0) {
		cout << "Not a Quadratic Equation" << endl;
		return;
	}
	int D = b * b - 4 * a * c;
	if (D > 0) {
		cout << "Real Roots" << endl;
	}
	else if (D == 0) {
		cout << "Equal Roots" << endl;
	}
	else {
		cout << "Imaginary Roots" << endl;
	}
}
void checkForAllTestCase()
{
	cout << "Testcase" << "\ta\tb\tc\tActual Output" << endl;
	cout << endl;
	int a, b, c;
	int testcase = 1;
	while (testcase <= 13) {
	if (testcase == 1) {
		a = 0;
		b = 50;
		c = 50;
	}
	else if (testcase == 2) {
		a = 1;
		b = 50;
		c = 50;
	}
	else if (testcase == 3) {
		a = 50;
		b = 50;
		c = 50;
	}
	else if (testcase == 4) {
		a = 99;
		b = 50;
		c = 50;
	}
	else if (testcase == 5) {
```

```
                a = 100;
                b = 50;
                c = 50;
        }
        else if (testcase == 6) {
                a = 50;
                b = 0;
                c = 50;
        }
        else if (testcase == 7) {
                a = 50;
                b = 1;
                c = 50;
        }
        else if (testcase == 8) {
                a = 50;
                b = 99;
                c = 50;
        }
        else if (testcase == 9) {
                a = 50;
                b = 100;
                c = 50;
        }
        else if (testcase == 10) {
                a = 50;
                b = 50;
                c = 0;
        }
        else if (testcase == 11) {
                a = 50;
                b = 50;
                c = 1;
        }
        else if (testcase == 12) {
                a = 50;
                b = 50;
                c = 99;
        }
        else if (testcase == 13) {
                a = 50;
                b = 50;
                c = 100;
        }
        cout << "\t" << testcase << "\t" << a << "\t" << b << "\t" << c << "\t";
        nature_of_roots(a, b, c);
        cout << endl;
        testcase++;
}
}
int main()
{
```

```
checkForAllTestCase();
return 0;
}
```

Output :

```
Testcase        a       b       c       Actual Output

        1       0       50      50      Not a Quadratic Equation

        2       1       50      50      Real Roots

        3       50      50      50      Imaginary Roots

        4       99      50      50      Imaginary Roots

        5       100     50      50      Imaginary Roots

        6       50      0       50      Imaginary Roots

        7       50      1       50      Imaginary Roots

        8       50      99      50      Imaginary Roots

        9       50      100     50      Equal Roots

        10      50      50      0       Real Roots

        11      50      50      1       Real Roots

        12      50      50      99      Imaginary Roots

        13      50      50      100     Imaginary Roots
```

Expected Output :

Test Case	a	b	c	Expected output
1	0	50	50	Not Quadratic
2	1	50	50	Real Roots
3	50	50	50	Imaginary Roots
4	99	50	50	Imaginary Roots
5	100	50	50	Imaginary Roots
6	50	0	50	Imaginary Roots
7	50	1	50	Imaginary Roots
8	50	99	50	Imaginary Roots
9	50	100	50	Equal Roots
10	50	50	0	Real Roots
11	50	50	1	Real Roots
12	50	50	99	Imaginary Roots
13	50	50	100	Imaginary Roots