



**SYMBIOSIS INSTITUTE OF TECHNOLOGY**

**DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY**

# **Software Testing and Quality Assurance**

## **Lab Assignment – 4**

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**BRANCH: CS (C4)**

**Question:** Consider a program for the determination of the nature of roots of a quadratic equation, its input is a triple of positive integers and value from interval 0 to 100. The program output may have one of the following words- not a quadratic equation, real roots, imaginary roots and equal roots. Design boundary value test cases

**Code** (written in C++):

```
#include<iostream>
using namespace std;
int cond1(int*, int, int);
int result;
int fun_call(int *a, int b, int c)
{
    int res;
    int i;
    if(*a==0){
        res = (b^2-(4*(a)*c));
        cout<<endl<<" b*b-4*a*c = "<<res<<endl;
        return -1;
    }
    else{
        result = (b^2-(4*(a)*c));
        cout<<endl<<" b*b-4*a*c = "<<result<<endl;
        return result;
    }
}

int main()
{
    int i=0; int ret; int lb, ub, max, min, mid;
    lb = 0; ub = 100; max = ub; min = lb; mid = ((lb+ub)/2); int max_1 = max-1;
    int min_1 = min-1; int arr[8] = {lb,mid,max_1,min_1,ub};
    do{
        cout<<"\nThe value of i is "<<arr[i]<<endl;
        ret = fun_call(&arr[i], mid,mid);
        if(ret == -1){
            cout<<"The coefficients are "<<arr[i]<<"\t"<<mid<<"\t"<<mid;
            cout<<"\n Not a quadratic equation "<<endl;
            i++;
        }
        if(result>0){
            cout<<"The coefficients are "<<arr[i]<<"\t"<<mid<<"\t"<<mid;
            cout<<"\nThe nature of the roots is real and unequal"<<endl;
            i++;
        }
        else if(result<0){
            cout<<"The coefficients are "<<arr[i]<<"\t"<<mid<<"\t"<<mid;
            cout<<"\n The nature of the roots is imaginary and unequal"<<endl;
            i++;
        }
    }
```

```

else{
    cout<<"The coefficients are "<<arr[i]<<"\t"<<mid<<"\t"<<mid;
    cout<<"\n The nature of the roots is real and equal"<<endl;
    i++;
}
}while(arr[i] != '\0');
}

```

### Output:

```

The value of i is 0

b*b-4*a*c = 48
The coefficients are 0 50 50
Not a quadratic equation

The value of i is 0

b*b-4*a*c = -7500
The coefficients are 50 50 50
The nature of the roots is real and equal

The value of i is 99

b*b-4*a*c = -19816
The coefficients are 99 50 50
The nature of the roots is imaginary and unequal

The value of i is -1

b*b-4*a*c = 248
The coefficients are -1 50 50
The nature of the roots is real and unequal

The value of i is 100

b*b-4*a*c = -20016
The coefficients are 100 50 50
The nature of the roots is imaginary and unequal

Process returned 0 (0x0) execution time : 0.078 s
Press any key to continue.

```

### Test Cases:

Sr. No.	a	b	c	Expected output
1	0	50	50	Not a quadriatic
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	0	Equal Roots
10	50	50	1	Real Roots
11	50	50	50	Real Roots
12	50	50	99	Imaginary Roots
13	50	50	100	Imaginary Roots