

## **EXPERIMENT 4**

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- 2K18/SE/041

**AIM:-** Write a program to generate test cases for Robust Worst Case Testing.

**THEORY:-** In robustness testing, we add two more states i.e. just below minimum value (minimum value–)and just above maximum value (maximum value+). We also give invalid inputs and observe the behavior of the program. A program should be able to handle invalid input values, otherwise it may fail and give unexpected output values. There are seven states (minimum –, minimum, minimum +, nominal, maximum–, maximum, maximum +) and a total of  $7^n$  test cases will be generated. This will be the largest set of test cases and requires the maximum effort to generate such test Cases.

### **CODE:-**

```
#include<iostream>

#include<bits/stdc++.h>

using namespace std;

int findmaximum(int arr[3], int minarr[3], int maxarr[3])
{
    for(int i=0;i<3;i++)
        if(arr[i]<minarr[i] || arr[i]>maxarr[i])
            return -1;
```

```

int largest = arr[0];

if(largest<arr[1])

    largest = arr[1];

else if(largest<arr[2] )

    largest = arr[2];


return largest;

}

void WorstRobustApproach(int n){

int minarr[10], maxarr[10], opt[10];

for(int i=0;i<n;i++)

{

cout<<"Enter the min & max limit of the variable "<<(i+1)<<": ";

cin>>minarr[i]>>maxarr[i];

opt[i] = (maxarr[i]+minarr[i])/2;

}


int numTestCases = pow(7,n);

int testCases[numTestCases][n];


for(int i=n-1;i>=0;i--)

{

int flag=0, t=1, k;

for(int k=0;k<(n-i-1);k++) t*=7;

for(int j=0;j<numTestCases;j++)

```

[illegible]



```

        cout<<"\t"<<endl;
    }
    cout<<" ";
    for(int i=0;i<50;i++) cout<<" ";    cout<<" ";
    cout<<"\nTotal No. of Test Cases( $7^n$ ) = "<<numTestCases;
}

int main()
{
    int numofvar;
    cout<<"Enter no. of variables : ";
    cin>>numofvar;
    WorstRobustApproach(numofvar);
    return 0;
}

```

## OUTPUT:-

```
C:\Users\Ashish\Desktop\worstrobust.exe
Enter no. of variables : 3
Enter the min & max limit of the variable 1: 0 300
Enter the min & max limit of the variable 2: 0 300
Enter the min & max limit of the variable 3: 0 300

TEST CASES ARE..
```

A	B	C	OUTPUT
-1	-1	-1	invalid input
-1	-1	0	invalid input
-1	-1	1	invalid input
-1	-1	150	invalid input
-1	-1	299	invalid input
-1	-1	300	invalid input
-1	-1	301	invalid input
-1	0	-1	invalid input
-1	0	0	invalid input
-1	0	1	invalid input
-1	0	150	invalid input
-1	0	299	invalid input
-1	0	300	invalid input
-1	0	301	invalid input
-1	1	-1	invalid input
-1	1	0	invalid input
-1	1	1	invalid input
-1	1	150	invalid input
-1	1	299	invalid input
-1	1	300	invalid input
-1	1	301	invalid input
-1	150	-1	invalid input
-1	150	0	invalid input
-1	150	1	invalid input
-1	150	150	invalid input
-1	150	299	invalid input
-1	150	300	invalid input
-1	150	301	invalid input
-1	299	-1	invalid input
-1	299	0	invalid input
-1	299	1	invalid input

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-1	299	150	invalid input
-1	299	299	invalid input
-1	299	300	invalid input
-1	299	301	invalid input
-1	300	-1	invalid input
-1	300	0	invalid input
-1	300	1	invalid input
-1	300	150	invalid input
-1	300	299	invalid input
-1	300	300	invalid input
-1	300	301	invalid input
-1	301	-1	invalid input
-1	301	0	invalid input
-1	301	1	invalid input
-1	301	150	invalid input
-1	301	299	invalid input
-1	301	300	invalid input
-1	301	301	invalid input
0	-1	-1	invalid input
0	-1	0	invalid input
0	-1	1	invalid input
0	-1	150	invalid input
0	-1	299	invalid input
0	-1	300	invalid input
0	-1	301	invalid input
0	0	-1	invalid input
0	0	0	0
0	0	1	1
0	0	150	150
0	0	299	299
0	0	300	300
0	0	301	invalid input
0	1	-1	invalid input
0	1	0	1
0	1	1	1
0	1	150	1
0	1	299	1
0	1	300	1

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0	1	301	invalid input
0	150	-1	invalid input
0	150	0	150
0	150	1	150
0	150	150	150
0	150	299	150
0	150	300	150
0	150	301	invalid input
0	299	-1	invalid input
0	299	0	299
0	299	1	299
0	299	150	299
0	299	299	299
0	299	300	299
0	299	301	invalid input
0	300	-1	invalid input
0	300	0	300
0	300	1	300
0	300	150	300
0	300	299	300
0	300	300	300
0	300	301	invalid input
0	301	-1	invalid input
0	301	0	invalid input
0	301	1	invalid input
0	301	150	invalid input
0	301	299	invalid input
0	301	300	invalid input
0	301	301	invalid input
1	-1	-1	invalid input
1	-1	0	invalid input
1	-1	1	invalid input
1	-1	150	invalid input
1	-1	299	invalid input
1	-1	300	invalid input
1	-1	301	invalid input
1	0	-1	invalid input



Select C:\Users\Ashish\Desktop\worstrobust.exe

1	0	0	1
1	0	1	1
1	0	150	150
1	0	299	299
1	0	300	300
1	0	301	invalid input
1	1	-1	invalid input
1	1	0	1
1	1	1	1
1	1	150	150
1	1	299	299
1	1	300	300
1	1	301	invalid input
1	150	-1	invalid input
1	150	0	150
1	150	1	150
1	150	150	150
1	150	299	150
1	150	300	150
1	150	301	invalid input
1	299	-1	invalid input
1	299	0	299
1	299	1	299
1	299	150	299
1	299	299	299
1	299	300	299
1	299	301	invalid input
1	300	-1	invalid input
1	300	0	300
1	300	1	300
1	300	150	300
1	300	299	300
1	300	300	300
1	300	301	invalid input
1	301	-1	invalid input
1	301	0	invalid input
1	301	1	invalid input
1	301	150	invalid input
1	301	299	invalid input
1	301	300	invalid input

Select C:\Users\Ashish\Desktop\worstrobust.exe

1	301	301	invalid input
150	-1	-1	invalid input
150	-1	0	invalid input
150	-1	1	invalid input
150	-1	150	invalid input
150	-1	299	invalid input
150	-1	300	invalid input
150	-1	301	invalid input
150	0	-1	invalid input
150	0	0	150
150	0	1	150
150	0	150	150
150	0	299	299
150	0	300	300
150	0	301	invalid input
150	1	-1	invalid input
150	1	0	150
150	1	1	150
150	1	150	150
150	1	299	299
150	1	300	300
150	1	301	invalid input
150	150	-1	invalid input
150	150	0	150
150	150	1	150
150	150	150	150
150	150	299	299
150	150	300	300
150	150	301	invalid input
150	299	-1	invalid input
150	299	0	299
150	299	1	299
150	299	150	299
150	299	299	299
150	299	300	299
150	299	301	invalid input
150	300	-1	invalid input
150	300	0	300
150	300	1	300
150	300	150	300
150	300	299	300
150	300	300	300
150	300	301	invalid input
150	301	-1	invalid input
150	301	0	invalid input

Select C:\Users\Ashish\Desktop\worstrobust.exe

150	301	1	invalid input
150	301	150	invalid input
150	301	299	invalid input
150	301	300	invalid input
150	301	301	invalid input
299	-1	-1	invalid input
299	-1	0	invalid input
299	-1	1	invalid input
299	-1	150	invalid input
299	-1	299	invalid input
299	-1	300	invalid input
299	-1	301	invalid input
299	0	-1	invalid input
299	0	0	299
299	0	1	299
299	0	150	299
299	0	299	299
299	0	300	300
299	0	301	invalid input
299	1	-1	invalid input
299	1	0	299
299	1	1	299
299	1	150	299
299	1	299	299
299	1	300	300
299	1	301	invalid input
299	150	-1	invalid input
299	150	0	299
299	150	1	299
299	150	150	299
299	150	299	299
299	150	300	300
299	150	301	invalid input
299	299	-1	invalid input
299	299	0	299
299	299	1	299
299	299	150	299
299	299	299	299
299	299	300	300
299	299	301	invalid input
299	300	-1	invalid input
299	300	0	300
299	300	1	300
299	300	150	300
299	300	299	300
299	300	300	300

Select C:\Users\Ashish\Desktop\worstrobust.exe

299	300	301	invalid input
299	301	-1	invalid input
299	301	0	invalid input
299	301	1	invalid input
299	301	150	invalid input
299	301	299	invalid input
299	301	300	invalid input
299	301	301	invalid input
300	-1	-1	invalid input
300	-1	0	invalid input
300	-1	1	invalid input
300	-1	150	invalid input
300	-1	299	invalid input
300	-1	300	invalid input
300	-1	301	invalid input
300	0	-1	invalid input
300	0	0	300
300	0	1	300
300	0	150	300
300	0	299	300
300	0	300	300
300	0	301	invalid input
300	1	-1	invalid input
300	1	0	300
300	1	1	300
300	1	150	300
300	1	299	300
300	1	300	300
300	1	301	invalid input
300	150	-1	invalid input
300	150	0	300
300	150	1	300
300	150	150	300
300	150	299	300
300	150	300	300
300	150	301	invalid input
300	299	-1	invalid input
300	299	0	300
300	299	1	300
300	299	150	300
300	299	299	300
300	299	300	300

Select C:\Users\Ashish\Desktop\worstrobust.exe

300	299	301	invalid input
300	300	-1	invalid input
300	300	0	300
300	300	1	300
300	300	150	300
300	300	299	300
300	300	300	300
300	300	301	invalid input
300	301	-1	invalid input
300	301	0	invalid input
300	301	1	invalid input
300	301	150	invalid input
300	301	299	invalid input
300	301	300	invalid input
300	301	301	invalid input
301	-1	-1	invalid input
301	-1	0	invalid input
301	-1	1	invalid input
301	-1	150	invalid input
301	-1	299	invalid input
301	-1	300	invalid input
301	-1	301	invalid input
301	0	-1	invalid input
301	0	0	invalid input
301	0	1	invalid input
301	0	150	invalid input
301	0	299	invalid input
301	0	300	invalid input
301	0	301	invalid input
301	1	-1	invalid input
301	1	0	invalid input
301	1	1	invalid input
301	1	150	invalid input
301	1	299	invalid input
301	1	300	invalid input
301	1	301	invalid input
301	150	-1	invalid input
301	150	0	invalid input
301	150	1	invalid input
301	150	150	invalid input
301	150	299	invalid input
301	150	300	invalid input
301	150	301	invalid input
301	299	-1	invalid input
301	299	0	invalid input
301	299	1	invalid input

Select C:\Users\Ashish\Desktop\worstrobust.exe

301	299	150	invalid input
301	299	299	invalid input
301	299	300	invalid input
301	299	301	invalid input
301	300	-1	invalid input
301	300	0	invalid input
301	300	1	invalid input
301	300	150	invalid input
301	300	299	invalid input
301	300	300	invalid input
301	300	301	invalid input
301	301	-1	invalid input
301	301	0	invalid input
301	301	1	invalid input
301	301	150	invalid input
301	301	299	invalid input
301	301	300	invalid input
301	301	301	invalid input

Total No. of Test Cases( $7^n$ ) = 343

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Process exited after 7.773 seconds with return value 0

Press any key to continue . . .