EXPERIMENT 3

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- 2K18/SE/041

AIM:- Write a program to find the maximum in three numbers input by the user and generate test cases for the program using Worst Value Analysis.

THEORY:- This is a special form of boundary value analysis where we don't consider the 'single fault' assumption theory of reliability. Now, failures are also due to occurrence of more than one fault simultaneously. The implication of this concept in boundary value analysis is that all input values may have one of the following:

1. Minimum value
2. Just above minimum value
3. Just below maximum value
4. Maximum value
5. Nominal (Average) value

CODE:-

```
#include<iostream>

#include<bits/stdc++.h>

using namespace std;


int find_min(int nums[] , int len){

int max = INT_MIN;

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

{
```

```
if (nums[i] > max)
{
max = nums[i];
}
}
return max;
}

struct Testcase {
int num_vars,*variables;
int output;
Testcase(int num_vars , int* variables){
this->num_vars = num_vars;
this->variables = new int[num_vars];
memcpy(this->variables,variables,sizeof(int)*num_vars);
}
void run(){
output = find_min(variables,num_vars);
}
void print_result(){
for (int i = 0; i < num_vars; ++i)
{
cout<<variables[i]<<"\t";
}
cout<<"\t"<<output<<endl;
```

```
}
};
struct Testsuite {
int num_cases;
vector<Testcase> cases;
Testsuite(){
num_cases = 0;
}
void add_testcase(Testcase testcase){
num_cases++;
cases.push_back(testcase);
}
void add_all(vector<Testcase> v){
num_cases += v.size();
for (vector<Testcase>::iterator i = v.begin(); i != v.end(); ++i)
{
cases.push_back(*i);
}
}
void run(){
for (vector<Testcase>::iterator i = cases.begin(); i != cases.end(); ++i)
{
(*i).run();
}
}
```

```
void print_results(){
for (vector<Testcase>::iterator i = cases.begin(); i != cases.end(); ++i)
{
(*i).print_result();
}
cout<<"\nTotal No. of Test Cases(5^n) = "<<num_cases<<endl;
}
};
Testsuite generate_testcases(int num_vars , pair<int,int> ranges[] , int variables[], int i,
Testsuite &suite)
{
if (i == num_vars)   //base case
{
suite.add_testcase(Testcase(num_vars,variables));
return suite;
}
// 2. Minimum
variables[i] = ranges[i].first;
generate_testcases(num_vars,ranges,variables,i+1,suite);
// 3. Minimum + 1
variables[i] = ranges[i].first + 1;
generate_testcases(num_vars,ranges,variables,i+1,suite);
// 4. Nominal
variables[i] = (ranges[i].second + ranges[i].first)/2;
generate_testcases(num_vars,ranges,variables,i+1,suite);
```

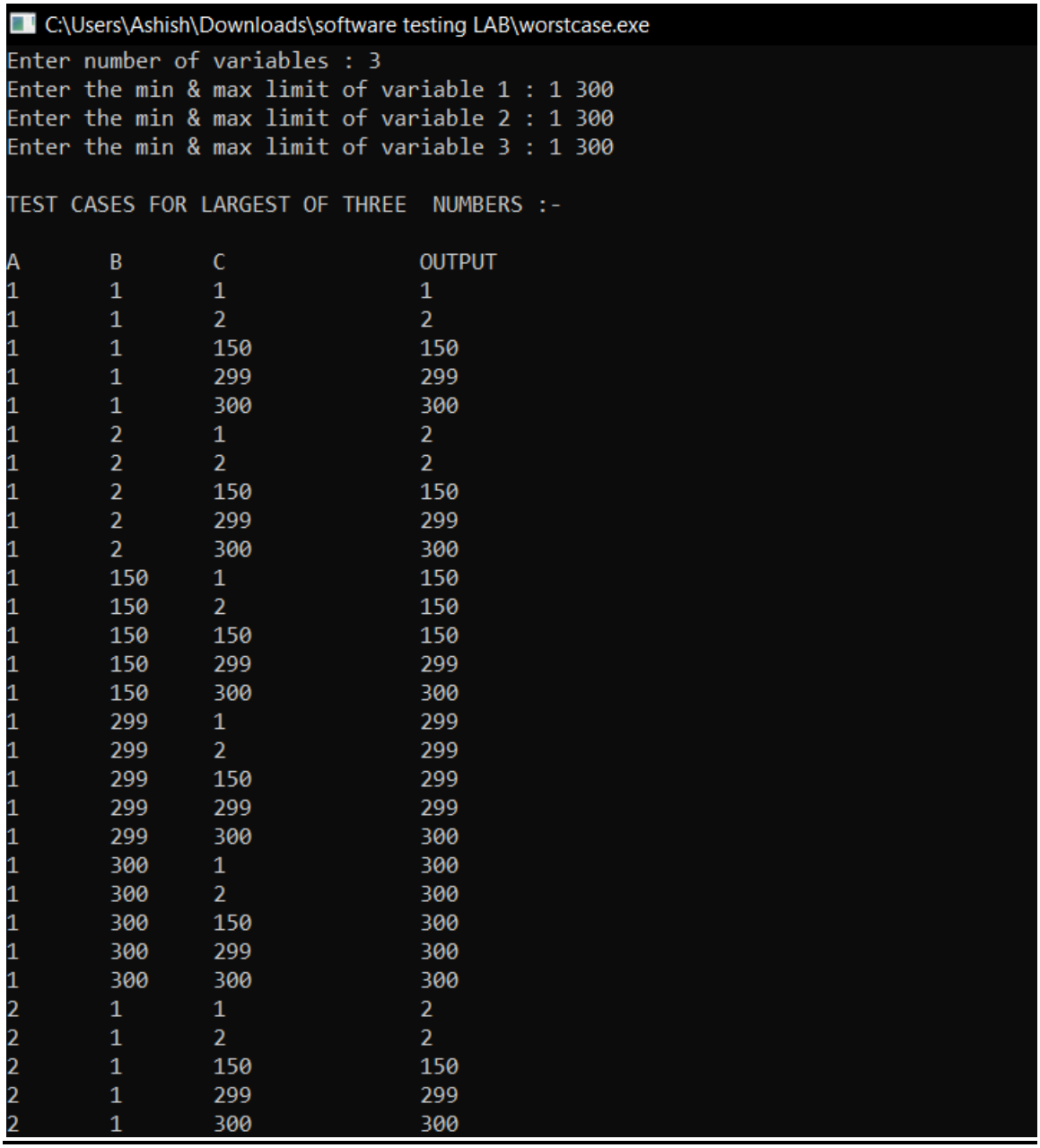
```
// 5. Maximum - 1
variables[i] = ranges[i].second-1;
generate_testcases(num_vars,ranges,variables,i+1,suite);
// 6. Maximum
variables[i] = ranges[i].second;
generate_testcases(num_vars,ranges,variables,i+1,suite);
return suite;
}

int main()
{
int num_vars = 0;
cout<<"Enter number of variables : ";
cin>>num_vars;
pair<int,int> ranges[num_vars];
for (int i = 0; i < num_vars; ++i)
{
cout<<"Enter the min & max limit of variable "<<i+1<<" : ";
cin>>ranges[i].first>>ranges[i].second;
}

Testsuite suite;
int variables[num_vars];
cout<<"\nTEST CASES FOR LARGEST OF THREE  NUMBERS :-\n"<<endl;
```

```
if(num_vars==2){
   cout<<"A\t";
    cout<<"B\t";
    cout<<"\tOUTPUT\t";
}
   if(num_vars==3){
   cout<<"A\t";
    cout<<"B\t";
    cout<<"C\t";
    cout<<"\tOUTPUT\t";
}
   if(num_vars==4){
   cout<<"A\t";
    cout<<"B\t";
    cout<<"C\t";
    cout<<"D\t";
    cout<<"\tOUTPUT\t";
}
cout<<endl;
suite = generate_testcases(num_vars , ranges ,variables, 0, suite);
suite.run();
suite.print_results();
return 0;
}
```

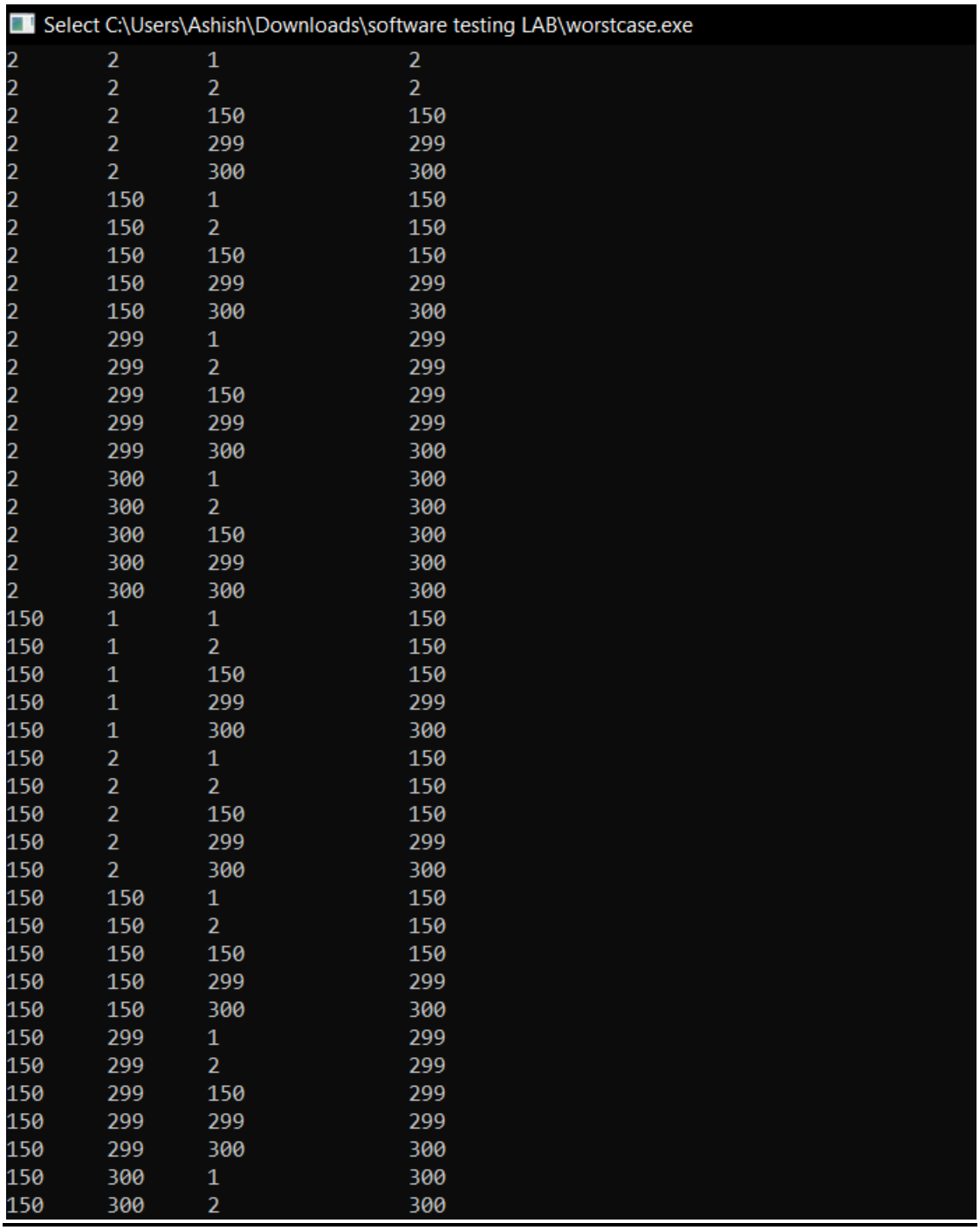
OUTPUT:-

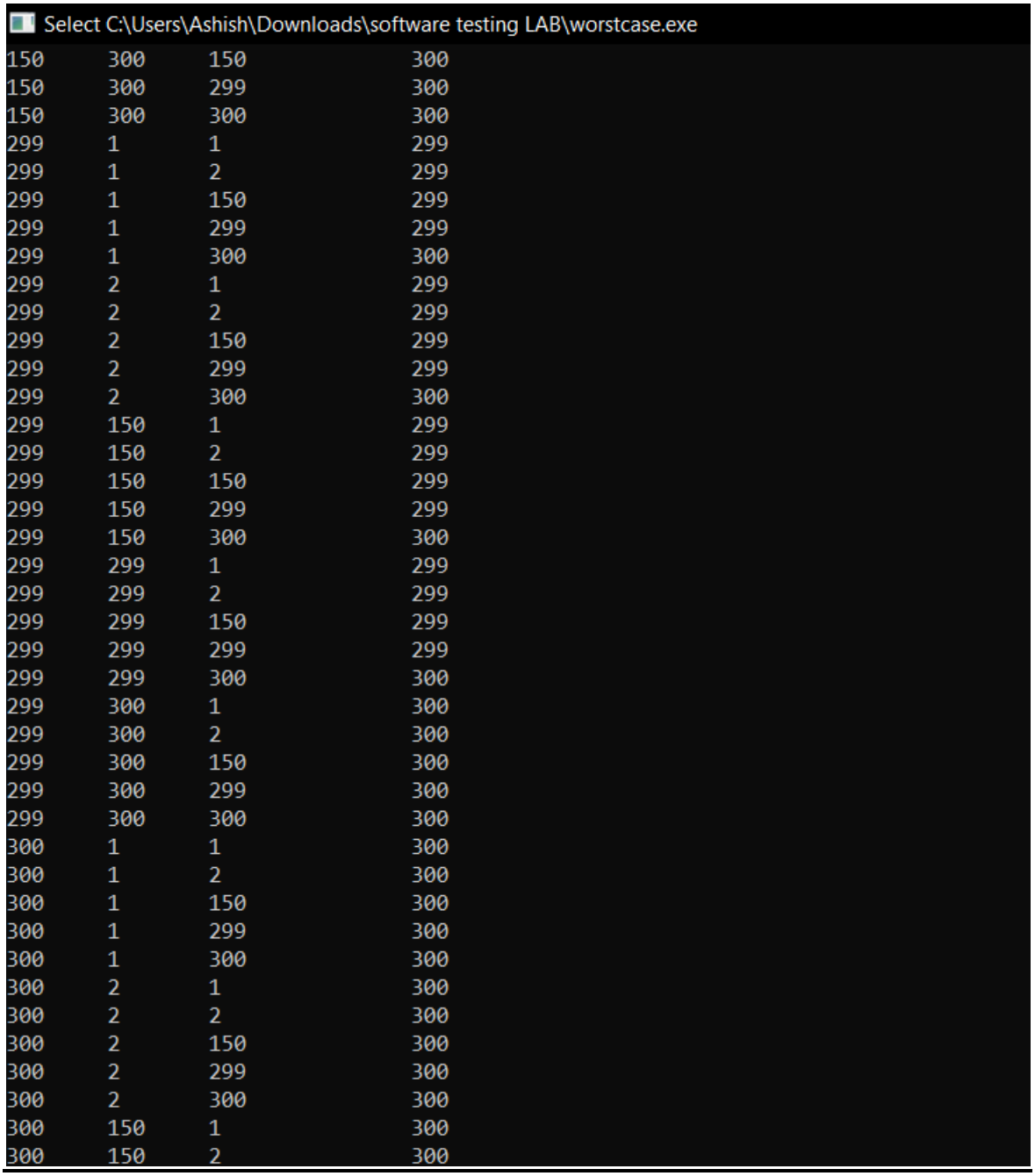


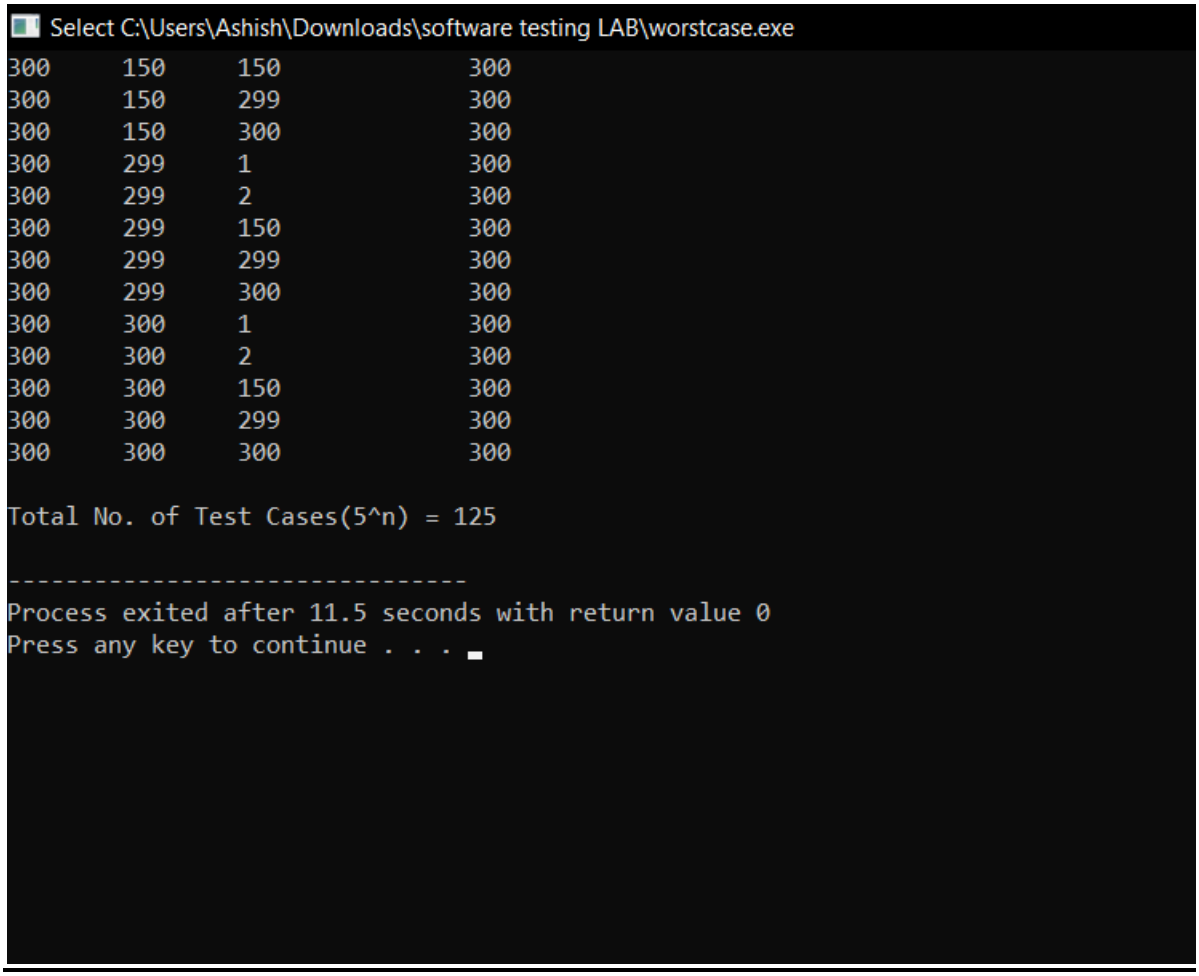
```
C:\Users\Ashish\Downloads\software testing LAB\worstcase.exe
Enter number of variables : 3
Enter the min & max limit of variable 1 : 1 300
Enter the min & max limit of variable 2 : 1 300
Enter the min & max limit of variable 3 : 1 300

TEST CASES FOR LARGEST OF THREE  NUMBERS :-

A       B       C               OUTPUT
1       1       1               1
1       1       2               2
1       1       150             150
1       1       299             299
1       1       300             300
1       2       1               2
1       2       2               2
1       2       150             150
1       2       299             299
1       2       300             300
1       150     1               150
1       150     2               150
1       150     150             150
1       150     299             299
1       150     300             300
1       299     1               299
1       299     2               299
1       299     150             299
1       299     299             299
1       299     300             300
1       300     1               300
1       300     2               300
1       300     150             300
1       300     299             300
1       300     300             300
2       1       1               2
2       1       2               2
2       1       150             150
2       1       299             299
2       1       300             300
```


Select C:\Users\Ashish\Downloads\software testing LAB\worstcase.exe
2 2 1 2
2 2 2 2
2 2 150 150
2 2 299 299
2 2 300 300
2 150 1 150
2 150 2 150
2 150 150 150
2 150 299 299
2 150 300 300
2 299 1 299
2 299 2 299
2 299 150 299
2 299 299 299
2 299 300 300
2 300 1 300
2 300 2 300
2 300 150 300
2 300 299 300
2 300 300 300
150 1 1 150
150 1 2 150
150 1 150 150
150 1 299 299
150 1 300 300
150 2 1 150
150 2 2 150
150 2 150 150
150 2 299 299
150 2 300 300
150 150 1 150
150 150 2 150
150 150 150 150
150 150 299 299
150 150 300 300
150 299 1 299
150 299 2 299
150 299 150 299
150 299 299 299
150 299 300 300
150 300 1 300
150 300 2 300


Select C:\Users\Ashish\Downloads\software testing LAB\worstcase.exe
150 300 150 300
150 300 299 300
150 300 300 300
299 1 1 299
299 1 2 299
299 1 150 299
299 1 299 299
299 1 300 300
299 2 1 299
299 2 2 299
299 2 150 299
299 2 299 299
299 2 300 300
299 150 1 299
299 150 2 299
299 150 150 299
299 150 299 299
299 150 300 300
299 299 1 299
299 299 2 299
299 299 150 299
299 299 299 299
299 299 300 300
299 300 1 300
299 300 2 300
299 300 150 300
299 300 299 300
299 300 300 300
300 1 1 300
300 1 2 300
300 1 150 300
300 1 299 300
300 1 300 300
300 2 1 300
300 2 2 300
300 2 150 300
300 2 299 300
300 2 300 300
300 150 1 300
300 150 2 300


Select C:\Users\Ashish\Downloads\software testing LAB\worstcase.exe
300 150 150 300
300 150 299 300
300 150 300 300
300 299 1 300
300 299 2 300
300 299 150 300
300 299 299 300
300 299 300 300
300 300 1 300
300 300 2 300
300 300 150 300
300 300 299 300
300 300 300 300
Total No. of Test Cases(5^n) = 125
Process exited after 11.5 seconds with return value 0
Press any key to continue . . .