EXPERIMENT 5

- ASHISH KUMAR
- 2K18/SE/041

AIM:- Write a program to generate test cases for Equivalence Class Testing.

THEORY:- A large number of test cases are generated for any program. It is neither feasible nor desirable to execute all such test cases. We want to select a few test cases and still wish to achieve a reasonable level of coverage. Many test cases do not test any new thing and they just execute the same lines of source code again and again. We may divide input domain into various categories with some relationship and expect that every test case from a category exhibits the same behaviour. If categories are well selected, we may assume that if one representative test case works correctly, others may also give the same results. This assumption allows us to select exactly one test case from each category and if there are four categories, four test cases may be selected. Each category is called an equivalence class and this type of testing is known as equivalence class testing.

CODE:-

```
#include<iostream>

#include<bits/stdc++.h>

#include<time.h>

#include<math.h>

using namespace std;


int main(){

 int n;
```

```
int MAXN=0;
srand(time(0));
cout<<"Enter number of variables: ";
cin>>n;
int upper[n], lower[n], value[n][3],wc[n];
for(int i=0; i<n; i++){
cout<<"Enter lower limit of variable "<<i+1<<": ";
cin>>lower[i];
cout<<"Enter upper limit of variable "<<i+1<<": ";
cin>>upper[i];
if(upper[i] - lower[i]<2){
cout<<endl<<"Unable to apply Equivalence Class Testing because of invalid range specified by the user"<<endl;
exit(0);
}
}
for(int i=0;i<n;i++){
value[i][0]=lower[i] - 1 ;
value[i][1]=(rand() % upper[i]) + lower[i];
value[i][2]=upper[i] + 1;
}
cout<<endl<<"Input Domain Test Cases are : "<<endl;
cout<<"-------------------------------------------------------------------------------";
cout<<endl<<"Test Case\t";
```

```
  if(n==2){
  cout<<"A\t\t";
   cout<<"B\t\t";
   cout<<"Expected Output\t";
}
   if(n==3){
   cout<<"A\t\t";
   cout<<"B\t\t";
   cout<<"C\t\t";
  cout<<"Expected Output\t";
}
   if(n==4){
   cout<<"A\t\t";
   cout<<"B\t\t";
   cout<<"C\t\t";
   cout<<"D\t\t";
   cout<<"Expected Output\t";
}

 int tc=1,k,check=0;
 for(int i=0;i<n;i++)
 wc[i]=0;
 for(int i=0,j=0; i<pow(3,n);i++){
 cout<<endl<<"I"<<tc<<"\t";
 while(j<n){
```

```
k=wc[j];
cout<<"\t"<<value[j][k]<<"\t";
j++;
}
for(j=0; j<n;j++)
if(wc[j]!=1){
check=1;
break;
}
if(check==1){
cout<<"Input values are out of range\t";
check=0;
}
else{
        int max=0;
        if(value[0][1]>=value[1][1] && value[0][1] >=value[2][1])
            max=value[0][1];
        else if (value[1][1]>= value[0][1] && value[1][1] >=value[2][1])
            max=value[1][1];
        else
           max= value[2][1];
        cout<<max<<"\t";
}
```

```
j=0;
wc[j]++;
for(j=0;j<n;j++)
if (wc[j]==3){
wc[j]=0;
wc[j+1]++;
}
j=0;
tc++;
if(tc>pow(3,n))
break;
}
tc=0;
  if(n==2){
  int res=pow(3,n);
   cout<<"\n\nTotal No. of input Test Cases(3^n) = "<<res<<endl;
}
  if(n==3){
  int res=pow(3,n);
 cout<<"\n\nTotal No. of input Test Cases(3^n) = "<<res<<endl;
}
  if(n==4){
  int res=pow(3,n);
  cout<<"\n\nTotal No. of input Test Cases(3^n) = "<<res<<endl;
}
```

```
 cout<<endl<<endl<<"\nOutput Domain Test Cases are : "<<endl;
 cout<<"-------------------------------------------------------------------------------";
 cout<<endl<<"Test Case\t";
 if(n==2){
   cout<<"A\t\t";
   cout<<"B\t\t";
   cout<<"Expected Output\t";
}
  if(n==3){
  cout<<"A\t\t";
   cout<<"B\t\t";
   cout<<"C\t\t";
   cout<<"Expected Output\t";
}
  if(n==4){
   cout<<"A\t\t";
   cout<<"B\t\t";
   cout<<"C\t\t";
   cout<<"D\t\t";
   cout<<"Expected Output\t";
}
cout<<endl<<"O1\t";
for(int i=0;i<n;i++)
cout<<"\t"<<value[i][0]<<"\t";
```

```
cout<<"Input values are out of range";
cout<<endl<<"O2\t";
for(int i=0;i<n;i++)
cout<<"\t"<<value[i][1]<<"\t";
 MAXN=value[0][1];
for(int i=0;i<n;i++)
{
                if(MAXN<value[i][1])
                {
                   MAXN=value[i][1];
                 }
}
cout<<MAXN<<endl;
return 0;
}
```

OUTPUT:-

```
C:\Users\Ashish\Downloads\software testing LAB\equivalenceclass.exe
Enter number of variables: 3
Enter lower limit of variable 1: 1
Enter upper limit of variable 1: 300
Enter lower limit of variable 2: 1
Enter upper limit of variable 2: 300
Enter lower limit of variable 3: 1
Enter upper limit of variable 3: 300

Input Domain Test Cases are :
-------------------------------------------------------------------------------
Test Case       A               B               C               Expected Output
I1              0               0               0       Input values are out of range
I2              265             0               0       Input values are out of range
I3              301             0               0       Input values are out of range
I4              0               229             0       Input values are out of range
I5              265             229             0       Input values are out of range
I6              301             229             0       Input values are out of range
I7              0               301             0       Input values are out of range
I8              265             301             0       Input values are out of range
I9              301             301             0       Input values are out of range
I10             0               0               300     Input values are out of range
I11             265             0               300     Input values are out of range
I12             301             0               300     Input values are out of range
I13             0               229             300     Input values are out of range
I14             265             229             300     300
I15             301             229             300     Input values are out of range
I16             0               301             300     Input values are out of range
I17             265             301             300     Input values are out of range
I18             301             301             300     Input values are out of range
I19             0               0               301     Input values are out of range
I20             265             0               301     Input values are out of range
I21             301             0               301     Input values are out of range
I22             0               229             301     Input values are out of range
I23             265             229             301     Input values are out of range
I24             301             229             301     Input values are out of range
I25             0               301             301     Input values are out of range
I26             265             301             301     Input values are out of range
I27             301             301             301     Input values are out of range

Total No. of input Test Cases(3^n) = 27



Output Domain Test Cases are :
-------------------------------------------------------------------------------
Test Case       A               B               C               Expected Output
O1              0               0               0       Input values are out of range
O2              265             229             300     300
```