AI - LAB Experiment - 4

- ASHISH KUMAR
- 2K18/SE/041

Ques : Write a program for finding the solution for Missionaries and Cannibals problem.

CODE:

```
#include<iostream>
#include<bits/stdc++.h>
#include<iomanip>
using namespace std;

int im = 3, ic = 3, i, j, fm = 0, fc = 0, status = 0, flag = 0, select = 0;
void display(char bpass1, char bpass2)
{
 cout << "\n\n\n";
 for (int i = 0; i < fm; i++) { cout << " M "; }
 for (int i = 0; i < fc; i++) { cout << " C "; }
 if (flag == 0)
  cout << "     _________WATER_________<B0(" << bpass1 << "," << bpass2 << ")AT>  ";
 else
  cout << "     <BO(" << bpass1 << "," << bpass2 << ")AT>_________WATER_____________  ";
```

```
 for (int i = 0; i < im; i++) { cout << " M "; }
 for (int i = 0; i < ic; i++) { cout << " C "; }
}
int win()
{
 if (fc == 3 && fm == 3) { return 0; }
 else { return 1; }
}
void solution()
{
 while (win())
 {
  if (flag == 0){
   switch (select)
   {
   case 1:display('C', ' ');
    ic++;
    break;
   case 2:display('C', 'M');
    ic++; im++;
    break;
   }
   if (((im - 2) >= ic && (fm + 2) >= fc) || (im - 2) == 0)
   {
    im = im - 2;
```

```
 select = 1;
 display('M', 'M');
 flag = 1;
}
else if ((ic - 2) < im && (fm == 0 || (fc + 2) <= fm) || im == 0)
{
 ic = ic - 2;
 select = 2;
 display('C', 'C');
 flag = 1;
}
else if ((ic--) <= (im--) && (fm++) >= (fc++))
{
 ic = ic - 1;
 im = im - 1;
 select = 3;
 display('M', 'C');
 flag = 1;
}
}
else
{
 switch (select)
 {
```

```
case 1:display('M', 'M');
    fm = fm + 2;
    break;
   case 2:display('C', 'C');
    fc = fc + 2;
    break;
   case 3:display('M', 'C');
    fc = fc + 1;
    fm = fm + 1;
    break;
   }
   if (win())
   {
    if (((fc > 1 && fm == 0) || im == 0))
    {
     fc--;
     select = 1;
     display('C', ' ');
     flag = 0;
    }
    else if ((ic + 2) > im)
    {
     fc--;
     fm--;
     select = 2;
```

```
    display('C', 'M');
    flag = 0;
   }
  }
 }
}
int main()
{
 cout << " \n\t\t\t\tMISSIONARIES AND CANNIBAL PROBLEM SOLUTION";
 display(' ', ' ');
 solution();
 display(' ', ' ');
 cout << "\n\n";
 system("pause");
return 0;
}
```

OUTPUT:


C:\Users\Ashish\Desktop\Untitled1.exe
MISSIONARIES AND CANNIBAL PROBLEM SOLUTION
_____WATER_____<B0(,)AT> M M M C C C
_____WATER_____<B0(C,C)AT> M M M C
<BO(C,C)AT>_____WATER_____ M M M C
C <BO(C,)AT>_____WATER_____ M M M C
C _____WATER_____<B0(C,)AT> M M M C
C _____WATER_____<B0(C,C)AT> M M M
C <BO(C,C)AT>_____WATER_____ M M M
C C <BO(C,)AT>_____WATER_____ M M M
C C _____WATER_____<B0(C,)AT> M M M
C C _____WATER_____<B0(M,M)AT> M C
C C <BO(M,M)AT>_____WATER_____ M C
M C <BO(C,M)AT>_____WATER_____ M C
M C _____WATER_____<B0(C,M)AT> M C


C:\Users\Ashish\Desktop\Untitled1.exe
M C _____WATER_____<B0(M,M)AT> C C
M C <BO(M,M)AT>_____WATER_____ C C
M M M <BO(C,)AT>_____WATER_____ C C
M M M _____WATER_____<B0(C,)AT> C C
M M M _____WATER_____<B0(C,C)AT> C
M M M <BO(C,C)AT>_____WATER_____ C
M M M C <BO(C,)AT>_____WATER_____ C
M M M C _____WATER_____<B0(C,)AT> C
M M M C _____WATER_____<B0(C,C)AT>
M M M C <BO(C,C)AT>_____WATER_____
M M M C C C <BO(,)AT>_____WATER_____
Press any key to continue . . .