# Experiment No. 1

## Aim: Implement N Queen Problem using Backtracking

## Theoretical Background:

## Algorithm:

1) Start in the leftmost column

2) If all queens are placed return true

3) Try all rows in the current column. Do following for every tried row.

a. If the queen can be placed safely in this row then mark this [row, column] as part of the solution and recursively check if placing queen here leads to a solution.
b. If placing queen in [row, column] leads to a solution then return true.
c. If placing queen doesn't lead to a solution then unmark this [row, column] (Backtrack) and go to step (a) to try other rows.

4) If all rows have been tried and nothing worked, return false to trigger Backtracking.

**Program:**

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
void queen(int row,int n);
 int board[20],count;
 int main(){
 int n,i,j;
 clrscr();
 printf(" - N Queens Problem Using Backtracking -");
 printf("\n\nEnter number of Queens:");
 scanf("%d",&n);
queen(1,n);
 getch();
 return 0;
```

```
//function for printing the solution
void print(int n)
{
 int i,j;
 printf("\n\nSolution %d:\n\n",++count);
 for(i=1;i<=n;++i)
  printf("\t%d",i);
 for(i=1;i<=n;++i)
 {
printf("\n\n%d",i);
  for(j=1;j<=n;++j) //for nxn board
  {
   if(board[i]==j)
    printf("\tQ"); //queen at i,j position
   else
    printf("\t-"); //empty slot
     } }}

/*funtion to check conflicts If no conflict for desired postion returns 1 otherwise
returns 0*/
int place(int row,int column)
{
 int i;
 for(i=1;i<=row-1;++i) {
 //checking column and digonal conflicts
  if(board[i]==column)
   return 0;
  else
   if(abs(board[i]-column)==abs(i-row))
    return 0; } return 1; //no conflicts
}
```

```
//function to check for proper positioning of queen
void queen(int row,int n){
 int column;
 for(column=1;column<=n;++column) {
  if(place(row,column))  {
   board[row]=column; //no conflicts so place queen
   if(row==n) //dead end
    print(n); //printing the board configuration
   else //try queen with next position
    queen(row+1,n);
}
 }
}
```

Output:

Conclusion:

Thus, in this experiment we have studied about N-Queen problem and how to solve it by using Backtracking algorithm.