

PROGRAM 18

Implement “N-Queens Problem” using Backtracking.

//Code

```
#include<stdio.h>
```

```
#include<math.h>
```

```
int canplace(int r,int c[50])
```

```
{
```

```
    int i;
```

```
    for(i=0;i<r;i++)
```

```
    {
```

```
        if(c[i]==c[r] || abs(c[i]-c[r])==abs(i-r))
```

```
        return 0;
```

```
    }
```

```
    return 1;
```

```
}
```

```
void display(int c[50],int n)
```

```
{
```

```
    int i,j;
```

```
    char cb[10][10];
```

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

```
        for(j=0;j<n;j++)
```

```
            cb[i][j]='-';
```

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

```
        cb[i][c[i]]='q';
```

```
    printf("*****\n");
```

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

```
    {
```

```
        for(j=0;j<n;j++)
```

```
        {
```

```
            printf("%c\t ",cb[i][j]);
```

```

    }
    printf("\n");
}
}

```

```

void nqueen(int n)
{
    int r,c[50];
    c[0]=-1;
    r=0;
    while(r>=0)
    {
        c[r]++;
        while(c[r]<n && !canplace(r,c))
            c[r]++;
        if(c[r]<n)
        {
            if(r==n-1)
            {
                display(c,n);
                printf("\n");
            }
            else
            {
                r++;
                c[r]=-1;
            }
        }
        else
            r--;
    }
}

```

```

int main()
{
    int n;

```

```
printf("enter the number of queens\n");  
scanf("%d",&n);  
nqueen(n);  
}
```

//Output

```
❏ clang++-7 -pthread -std=c++17 -o main main.cpp  
❏ ./main  
enter the number of queens  
4  
*****  
-   q   -   -  
-   -   -   q  
q   -   -   -  
-   -   q   -  
  
*****  
-   -   q   -  
q   -   -   -  
-   -   -   q  
-   q   -   -  
  
❏ □
```