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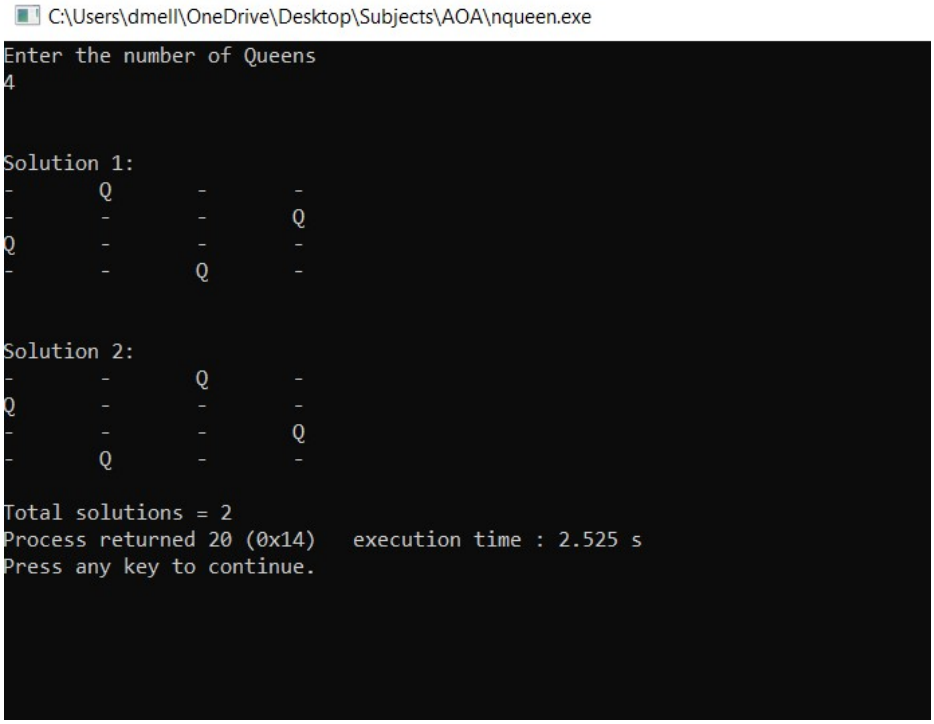
Experiment 13: N-Queen Algorithm

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
int a[30],c=0;
int placequeen(int position) {
	int i;
	for (i=1;i<position;i++) {
		if((a[i]==a[position])||((abs(a[i]-a[position])==abs(i-position))))
			return 0;
	}
	return 1;
}
void print_sol(int n) {
	int i,j;
	c++;
	printf("\n\nSolution %d: \n",c);
	for (i=1;i<=n;i++) {
		for (j=1;j<=n;j++) {
			if(a[i]==j)
				printf("Q\t");
			else
				printf("-\t");
		}
		printf("\n");
	}
}
void queen(int n) {
	int k=1;
	a[k]=0;
	while(k!=0) {
		a[k]=a[k]+1;
		while((a[k]<=n)&&!placequeen(k))
			a[k]++;
		if(a[k]<=n) {
			if(k==n)
				print_sol(n);
			else {
				k++;
				a[k]=0;
			}
		} else
			k--;
	}
}
```

```
int main() {
	int i,n;
	printf("Enter the number of Queens\n");
	scanf("%d",&n);
	queen(n);
	printf("\nTotal solutions = %d",c);
	return 0;
}
```

Output:



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Experiment 13 : N- Queen Problem

Postlab

Q1

① Backtracking is a technique based on algorithm to solve problem. It uses recursive calling to find the solution by building a solution step by step increasing values with time

② It removes the solution that doesn't give rise to the solution of the problem based on the constraints given to solve the problem

③ Backtracking algorithm is applied to some specific types of problem.

a) Decision problem used to find a feasible solution of the problem.

b) Optimisation problem used to find best solution that can be applied

c) Enumeration problem used to find set of all feasible solution of problem

④ In backtracking problem, the algorithm tries to find a sequence path to the solution which has some small checkpoints from where the problem can backtrack if no feasible solution is found for the problem.