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AIM:	To implement the N-Queen problem using backtracking.
Program	

ALGORITHM/ THEORY:	Place (k, i)
	2. {
	3. For j ← 1 to k - 1
	4. do if (x [j] = i)
	5. or (Abs x [j]) - i) = (Abs (j - k))
	6. then return false;
	7. return true;
	8. }
	
	1. N - Queens (k, n)
	2. {
	3. For i ← 1 to n
	4. do if Place (k, i) then
	5. {
	6. x [k] ← i;
	7. if (k ==n) then
	8. write (x [1....n));
	9. else
	10. N - Queens (k + 1, n);
	11. }
	12. }

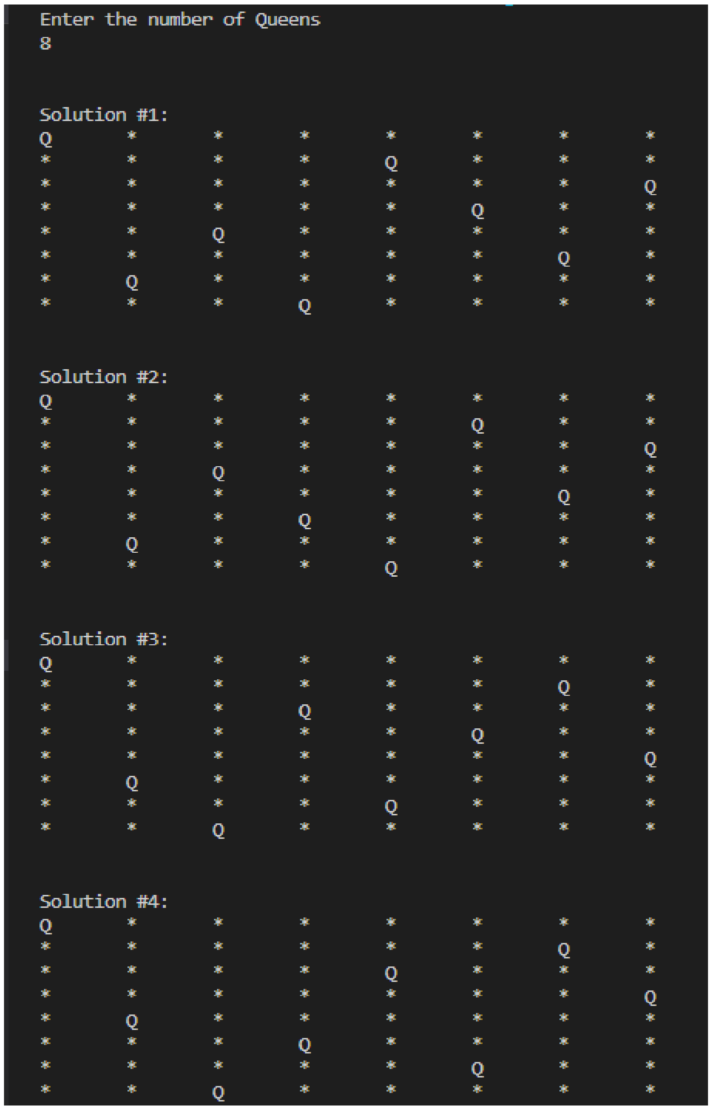
PROGRAM:

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

int a[30],count=0;
int place(int pos) {
int i;
for (i=1;i<pos;i++) {
if((a[i]==a[pos])||((abs(a[i]-a[pos])==abs(i-pos))))
return 0;
}
return 1;
}
void print_sol(int n) {
int i,j;
count++;
printf("\n\nSolution #%d:\n",count);
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)&&!place(k))
a[k]++;
if(a[k]<=n) {
if(k==n)
print_sol(n); else {
k++;
a[k]=0;
}
} else
k--;
}
}
void main() {
int i,n;
// clrscr();
printf("Enter the number of Queens\n");
scanf("%d",&n);
queen(n);
printf("\nTotal solutions=%d",count);
// getch();
}
```

RESULT:



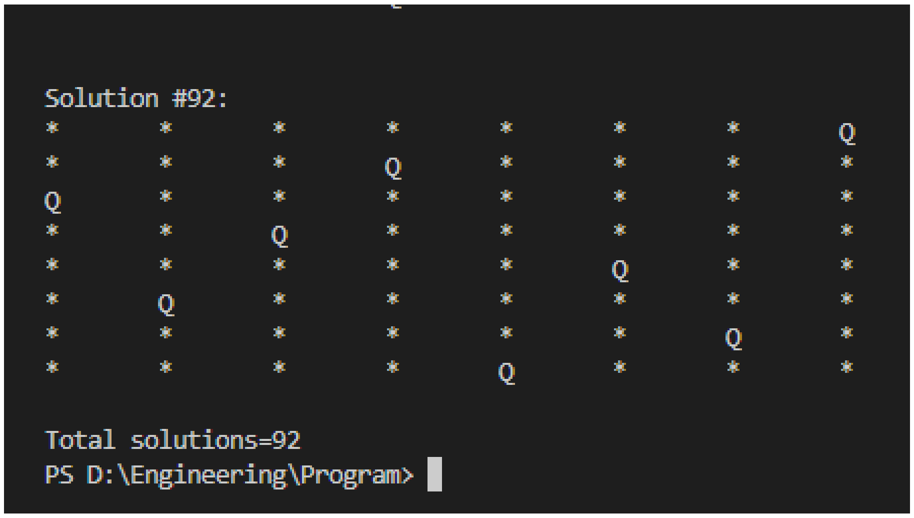
```
Enter the number of Queens
8


Solution #1:
Q       *       *       *       *       *       *       *
*       *       *       *       Q       *       *       *
*       *       *       *       *       *       *       Q
*       *       *       *       *       Q       *       *
*       *       Q       *       *       *       *       *
*       *       *       *       *       *       Q       *
*       Q       *       *       *       *       *       *
*       *       *       Q       *       *       *       *


Solution #2:
Q       *       *       *       *       *       *       *
*       *       *       *       *       Q       *       *
*       *       *       *       *       *       *       Q
*       *       Q       *       *       *       *       *
*       *       *       *       *       *       Q       *
*       *       *       Q       *       *       *       *
*       Q       *       *       *       *       *       *
*       *       *       *       Q       *       *       *


Solution #3:
Q       *       *       *       *       *       *       *
*       *       *       *       *       *       Q       *
*       *       *       Q       *       *       *       *
*       *       *       *       *       Q       *       *
*       *       *       *       *       *       *       Q
*       Q       *       *       *       *       *       *
*       *       *       *       Q       *       *       *
*       *       Q       *       *       *       *       *


Solution #4:
Q       *       *       *       *       *       *       *
*       *       *       *       *       *       Q       *
*       *       *       *       Q       *       *       *
*       *       *       *       *       *       *       Q
*       Q       *       *       *       *       *       *
*       *       *       Q       *       *       *       *
*       *       *       *       *       Q       *       *
*       *       Q       *       *       *       *       *
```



```
Solution #92:
*       *       *       *       *       *       *       Q
*       *       *       Q       *       *       *       *
Q       *       *       *       *       *       *       *
*       *       Q       *       *       *       *       *
*       *       *       *       *       Q       *       *
*       Q       *       *       *       *       *       *
*       *       *       *       *       *       Q       *
*       *       *       *       Q       *       *       *

Total solutions=92
PS D:\Engineering\Program>
```

CONCLUSION:	**Thus, we have implemented a solution to the N-Queen problem.**