

**Modern Education Society's  
Wadia College of Engineering, Pune-01  
Department of Computer Engineering**

<b>NAME OF STUDENT:</b>	<b>CLASS:</b>
<b>SEMESTER/YEAR:</b>	<b>ROLL NO:</b>
<b>DATE OF PERFORMANCE:</b>	<b>DATE OF SUBMISSION:</b>
<b>EXAMINED BY:</b>	<b>EXPERIMENT NO: 04</b>

**ASSIGNMENT NO:4 (Group B)**

**Title: Implement a solution for a Constraint Satisfaction Problem using Branch and Bound and Backtracking for n-queens problem or a graph coloring problem.**

**Aim :**

To Implement a solution for a Constraint Satisfaction Problem using Branch and Bound and Backtracking for n-queens problem or a graph coloring problem.

**Objectives:**

To apply algorithmic strategies while solving problems

**Apparatus:**

**Theory:**

In Branch and Bound solution, after building a partial solution, we figure out that there is no point going any deeper as we are going to hit a dead end. The idea is to place queens one by one in different columns, starting from the leftmost column. When we place a queen in a column, we check for clashes with already placed queens. In the current column, if we find a row for which there is no clash, we mark this row and column as part of the solution. If we do not find such a row due to clashes, then we backtrack and return false.”

**Algorithm:**

1. For the 1st Queen, there are total 8 possibilities as we can place 1st Queen in any row of first column. Let's place Queen 1 on row 3.
2. After placing 1st Queen, there are 7 possibilities left for the 2nd Queen. But wait, we don't really have 7 possibilities. We cannot place Queen 2 on rows 2, 3 or 4 as those cells are under attack from Queen 1. So, Queen 2 has only  $8 - 3 = 5$  valid positions left.
3. After picking a position for Queen 2, Queen 3 has even fewer options as most of the cells in its column are under attack from the first 2 Queens.

**Questions:**

- 1) What is N-Queen problem in AI?
- 2) How do you use a graph to solve a coloring problem?