Wadia College of Engineering, Pune-01

Department of Computer Engineering

NAME:	CLASS:
ROLL NO:	SEMESTER/YEAR:
DATE OF PERFORMANCE:	DATE OF SUBMISSION:
EXAMINED:	EXPERIMENT NO: 04

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.

<u>Questions:</u>

1) What is N-Queen problem in AI?

2) How do you use a graph to solve a coloring problem?