

Course/ Batch: BTech/ SCSET

Course Code: CSET244

Semester: Even

Session: 2024-2025

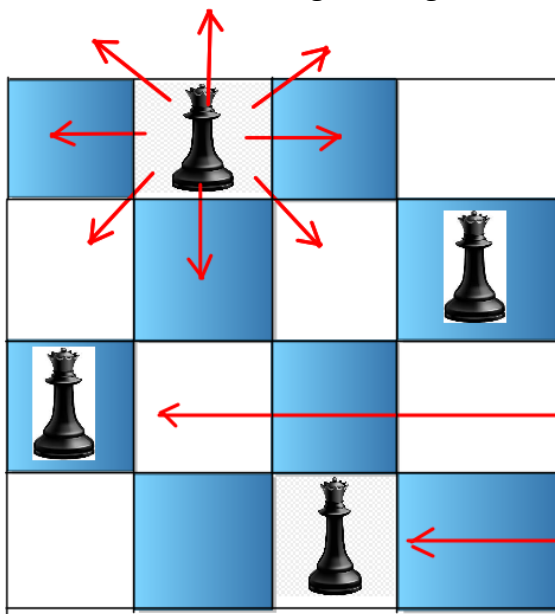
Course Type: Core

Course Name: Design and Analysis of Algorithms

Tutorial Assignment: Week 12

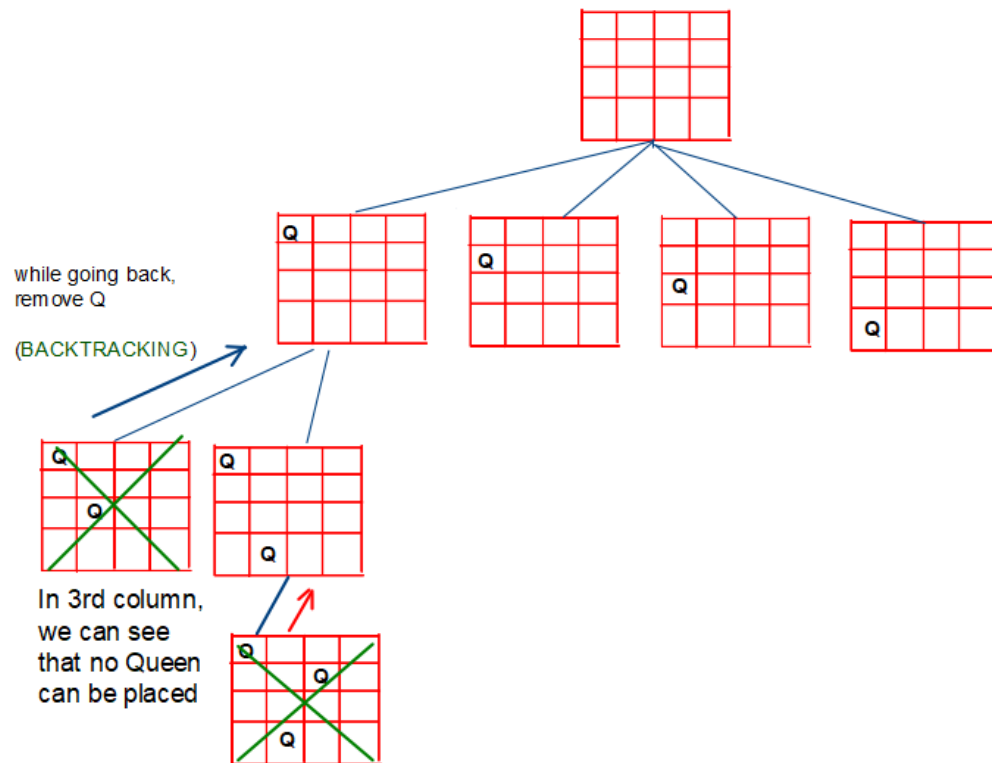
Tutorial title: BACKTRACKING

Q1 Intuition: Using the concept of Backtracking, we will place Queen at different positions of the chessboard and find the right arrangement where all the n queens can be placed on the $n \times n$ grid.

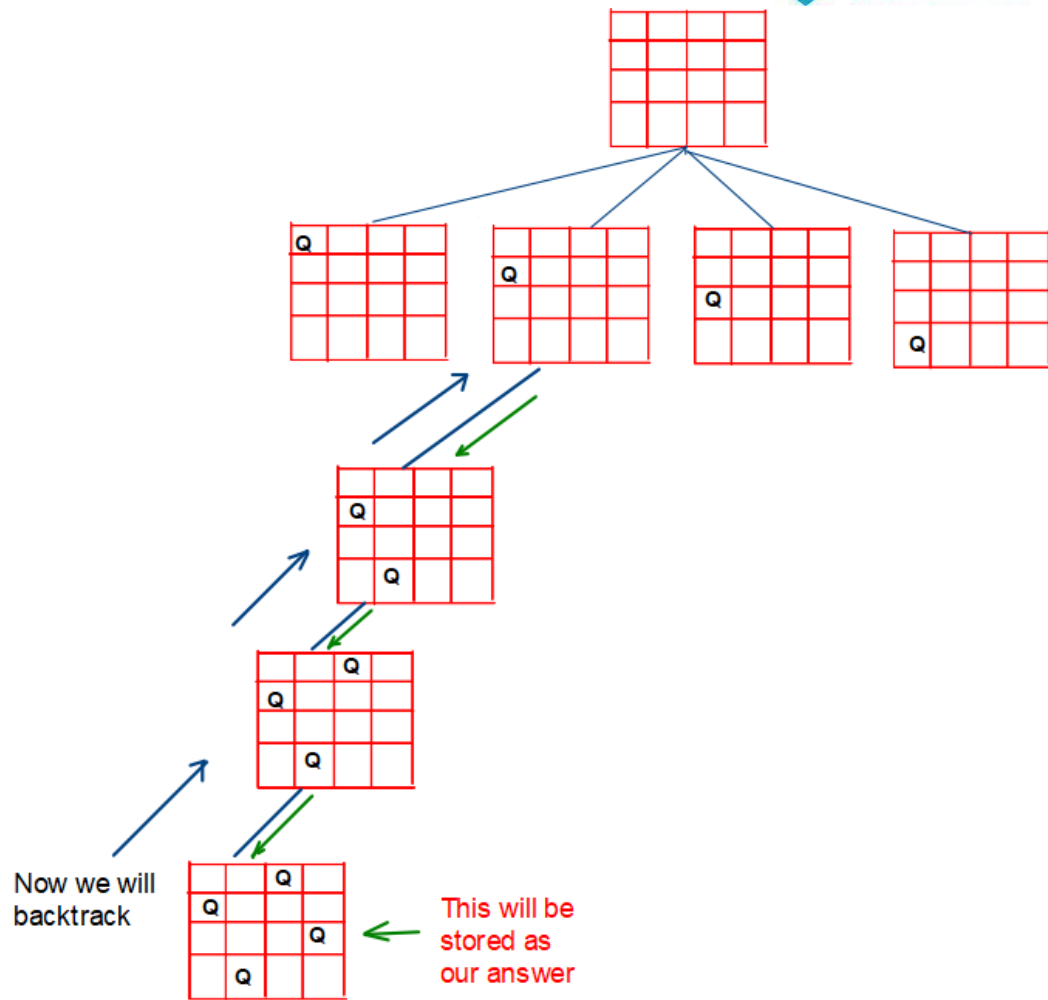


Here is a position where queen will not attack other queen

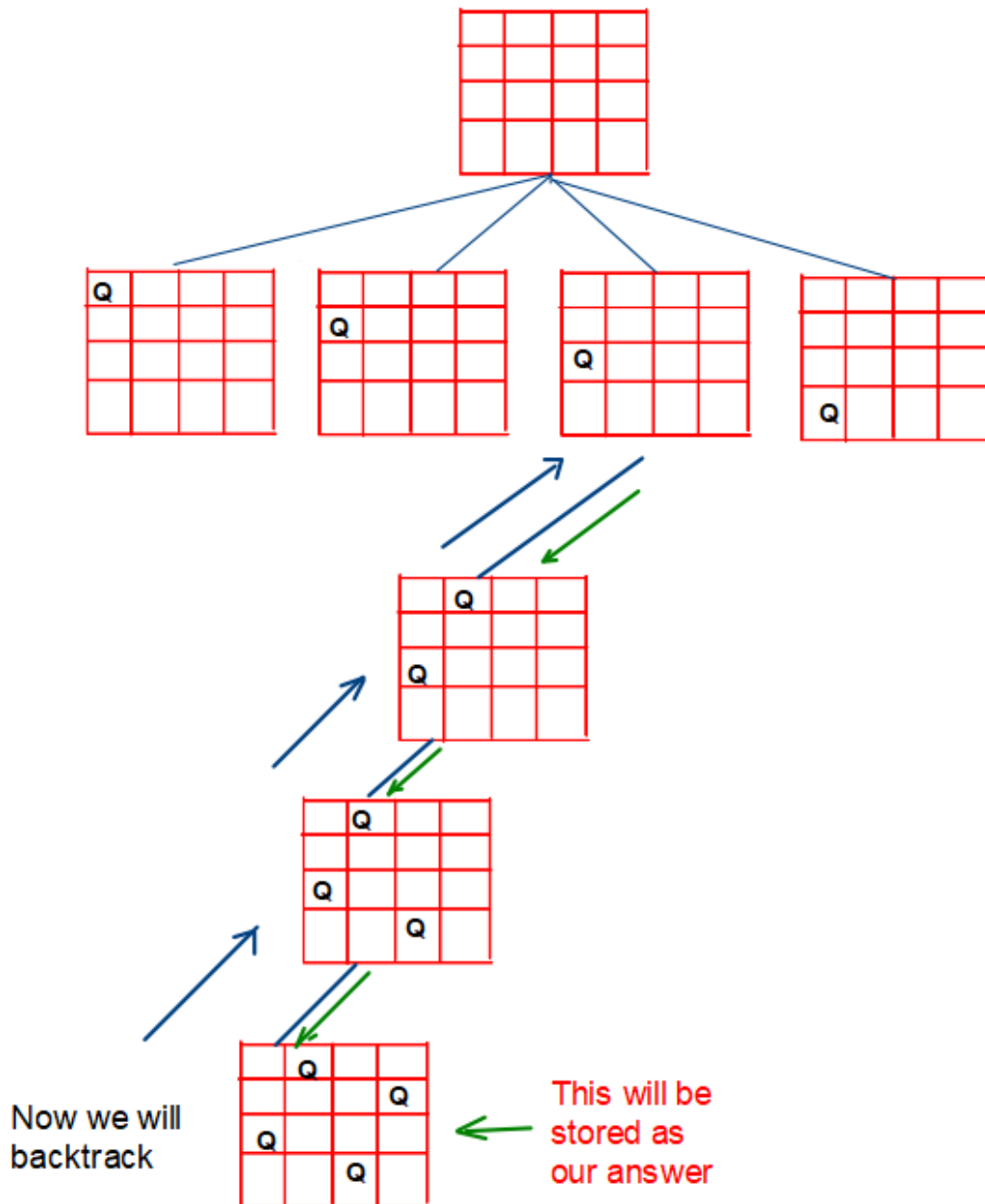
Similar case with other queens as well.



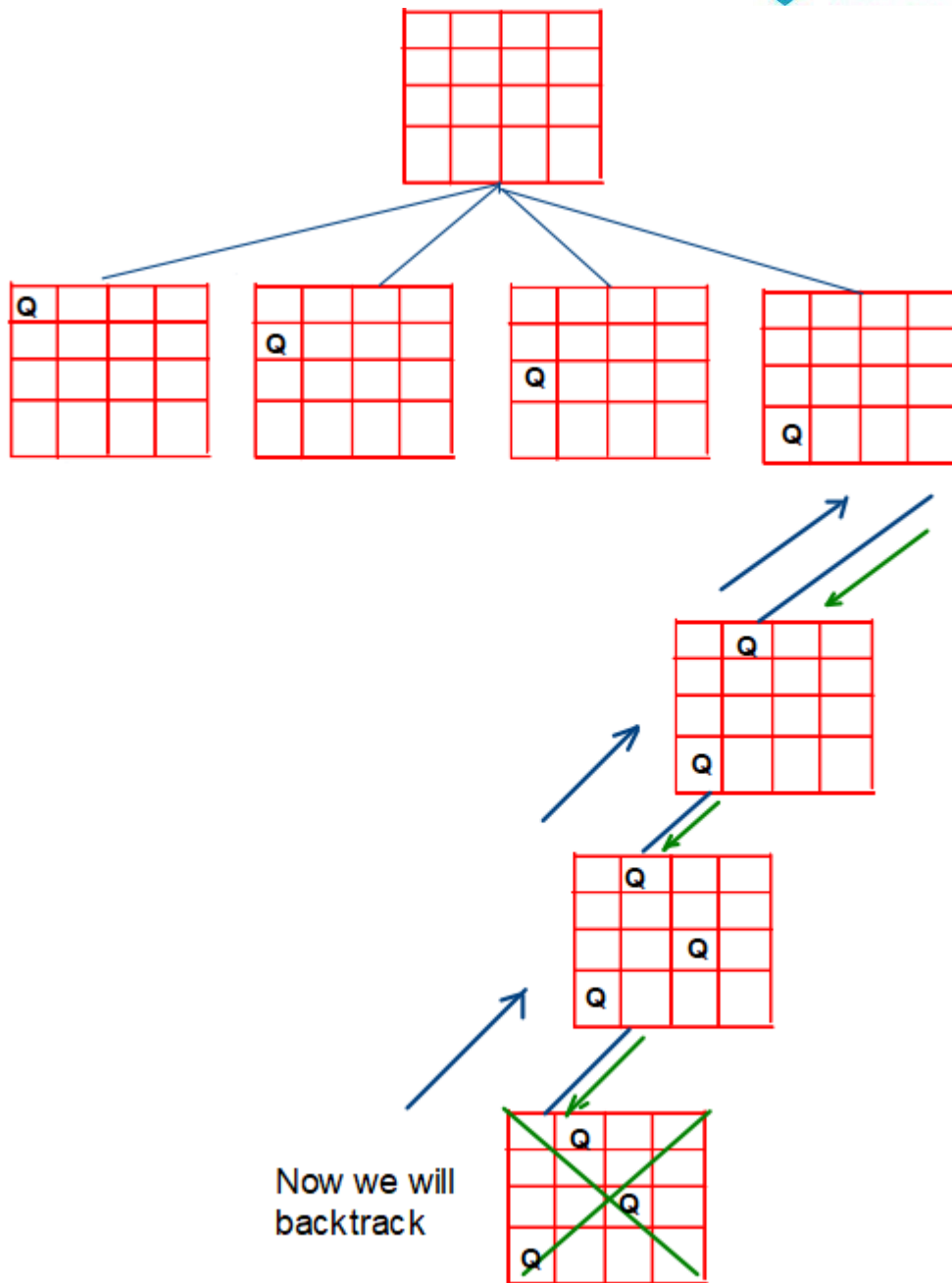
2nd position: One of the correct possible arrangements is found. So we will store it as our answer.



3rd position: One of the correct possible arrangements is found. So we will store it as our **answer**.



4th position: This is the position where we can see no possible arrangement is found where all queens can be placed since, at the 4th column, the Queen will be killed at all possible positions of row.



Answer: Option C

Q2. Option C : True , Min number of edges in a graph having k Chromatic Number is $\{ k(k-1) / 2 \}$.

Q3. Algorithm

- Consider a color and check if it is valid i.e. from the given vertex check whether its adjacent vertices have been coloured with the same color.
- If true, pick a different colour, else continue colouring the vertices.
- If no other color is left un-used, then backtrack.

Answer: Option C

Q4. The number of different Hamiltonian cycles in a complete undirected labeled graph on n vertices is $(n-1)!/2$.

Answer : Option D

Q5 Output should be (0, 1, 2, 4, 3, 0).

he following steps explain the working of backtracking approach –

- First, create an empty path array and add a starting vertex 0 to it.
- Next, start with vertex 1 and then add other vertices one by one.
- While adding vertices, check whether a given vertex is adjacent to the previously added vertex and hasn't been added already.
- If any such vertex is found, add it to the path as part of the solution, otherwise, return false.