**Assignment No: 6**

**Problem Statement:-**

Implement basic search strategies for the 8-Queens Problem.

**Theory:-**

The **8-Queens Problem** is a classic puzzle where eight queens must be placed on an 8x8 chessboard such that no two queens can attack each other. This means that no two queens can share the same row, column, or diagonal.

**Methodology:-**

1. **State Representation**:
   * Represent the chessboard as a list of 8 elements where each index represents a row, and the value at that index represents the column where a queen is placed.
2. **Constraints**:
   * No two queens can share the same row, column, or diagonal.
   * Diagonal conflicts can be detected by checking if the absolute difference between row indices equals the absolute difference between column indices.
3. **Search Strategies**:
   * **Backtracking**: Recursively attempt to place queens in valid positions. If a conflict arises, backtrack and try a different position.
   * **Heuristics**: Use methods like **Least Constraining Value** to minimize conflicts and speed up the search process.
4. **Optimizations**:
   * Advanced techniques like **local search** or **constraint propagation** can be used to find solutions more efficiently.

**Conclusion:-**

We solved the 8-Queens problem using backtracking, exploring all valid configurations and ensuring that no two queens attack each other.