# Project Proposal: War Map

## 1. Project Title:

War Map

## 2. Introduction:

The "War Map" project is a simulation-based program that analyzes movement across a battlefield. The program represents a grid-based map where different terrains and obstacles are marked. The goal is to determine the total distance that can be traversed from a given starting position while avoiding obstacles.

## 3. Objectives:

- To develop a grid-based map system where different terrains and obstacles are represented.  
- To implement depth-first search (DFS) to determine the reachability of different areas.  
- To calculate the total area that can be explored from a starting position.  
- To ensure efficient traversal using optimized search algorithms.

## 4. Features:

- Grid Representation: The battlefield is represented as a 2D grid where different characters denote different types of terrain.  
- Obstacle Handling: Walls or restricted areas are marked and cannot be traversed.  
- Pathfinding Algorithm: Uses DFS to explore connected and accessible areas.  
- User Input: Users provide the map size and the grid configuration.  
- Exploration Calculation: The program determines how far a unit can travel from a given starting position.  
- Output Display: Outputs the number of reachable grid cells.

## 5. Methodology:

- Input Handling:  
 - Read the dimensions of the map (rows and columns).  
 - Populate the grid with characters representing terrain and obstacles.  
 - Identify the starting position.  
- Algorithm Implementation:  
 - Use DFS to explore all reachable areas.  
 - Maintain a `visited` array to prevent redundant exploration.  
 - Count the total traversable distance.  
- Output Calculation:  
 - Display the number of reachable grid cells from the starting position.

## 6. Expected Outcomes:

- A functional war map simulation that correctly identifies accessible areas.  
- Efficient implementation of DFS for pathfinding.  
- A user-friendly interface for inputting map data.  
- Accurate calculation of the maximum traversable area.

## 7. Future Enhancements:

- Implementation of additional pathfinding algorithms such as BFS.  
- Integration of different types of terrains with movement penalties.  
- Visualization of the grid and movement path using graphical tools.  
- Multiplayer or AI-based simulations for strategic planning.

## 8. Conclusion:

This project serves as a foundation for battlefield navigation simulations. The "War Map" program provides insight into movement strategies in an obstacle-laden environment using DFS. It can be further extended for use in military simulations, gaming applications, and real-world pathfinding problems.