Team contributions Report

Project Title: Real World Path Visualizer

Team Work Distribution

1. Algorithm Implementation (Hoda, Yomna, Salma, Youssef)

Responsibilities:

Study and understand the search algorithms:

- **Breadth-First Search (BFS)**
- **Depth-First Search (DFS)**
- **Depth-Limited Search (DLS)**
- **Iterative Deepening Search (IDS)**
- **Uniform-Cost Search (UCS)**
- **A* Search with Euclidean distance heuristic**
- **Implement all algorithms using Python.**
- **Integrate the algorithms with graph structures using NetworkX.**
- **Ensure algorithms work correctly on real-world road networks.**

Measure performance metrics:

- **Path length**

- **Execution time**
- **Number of explored nodes**
- **Standardize algorithm outputs for fair comparison.**

2. Map Processing (Mahmoud, Mohammed)

Responsibilities:

- **Download real city maps from OpenStreetMap using OSMnx.**
- **Convert map data into graph representations suitable for search algorithms.**
- **Handle nodes (intersections) and edges (roads).**
- **Assign edge weights based on geographical distance.**
- **Map user-selected start and goal locations to the nearest graph nodes.**
- **Validate and preprocess map data to ensure correctness.**

3. GUI Development (Mahmoud, Mohammed)

Responsibilities:

- **Design and implement the graphical user interface using Tkinter.**
- **Integrate TkinterMapView for interactive map visualization.**

Provide UI components for:

- **City selection**
- **Algorithm selection**

- Start and goal point selection
- Algorithm execution
- Visualize algorithm execution step-by-step.
- Display explored nodes and final path using color coding.
- Present performance statistics clearly to the user.

4. Testing & Documentation (all team members)

Responsibilities:

- Test all algorithms on multiple cities and scenarios.
- Verify correctness and optimality of generated paths.
- Compare algorithms based on defined evaluation metrics.
- Create tables and charts for performance comparison.
- Document the system architecture and implementation details.
- Prepare the final project report and include screenshots of the application