AI & Data Structures Projects

This repository includes a collection of academic and practice projects related to **Artificial Intelligence (AI)** and **Data Structures**, implemented in Python and C++.

🔍AI Search Algorithms (Python)

1. N-Puzzle Solver (`Final-N-Puzzle.py`)

- Solves the classic 8-puzzle or 15-puzzle problem.
- Implements search algorithms:
- A* (A-star) with Manhattan distance heuristic
- Breadth-First Search (BFS)
- Depth-First Search (DFS)
- Easy to extend for other puzzle sizes.

📩How to Run

```
python Final-N-Puzzle.py
```

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2. Travelling Salesman Problem (TSP) (`Final-TSP.py`)

- Solves the TSP using heuristic search methods.
- Reads input from a distance matrix or coordinates.
- Outputs the optimal or near-optimal tour.

📩How to Run

```
python Final-TSP.py
```

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3. Helper Functions (`qu.py`)

- Contains shared or utility functions that assist other Python files.

🧱Data Structure Project (C++)

Linked List Implementation (`LinkList-project.cpp`)

- Classic implementation of a singly linked list.
- Basic operations include:
- Insertion (at beginning, end, and at position)
- Deletion
- Displaying the list

📩How to Compile & Run (Linux/MacOS)

```
g++ LinkList-project.cpp -o linkedlist
./linkedlist
```

📩On Windows (using MinGW or similar)

```
g++ LinkList-project.cpp -o linkedlist.exe
linkedlist.exe
```

📁Folder Structure

```
├── Final-N-Puzzle.py       # N-Puzzle solver using A*, BFS, DFS
├── Final-TSP.py            # Travelling Salesman Problem solver
├── qu.py                   # Python helper module
├── LinkList-project.cpp    # C++ linked list implementation
```

📚License

This project is intended for **educational purposes only**.