

Project Report

Binary Heap and Dijkstra's Algorithm

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1 Introduction

Explain high level idea, name all challenges addressed in the upcoming sections

2 Binary Heap

Array vs Tree

3 Dijkstra's algorithm

implementation, termination proof, representation of the data, the proof, which helper lemmas are still needed full / in detail paper proof, always connecting to the progress in Lean

4 Reflection on LLM Usage

References

- [1] Wikipedia, *Dijkstra's algorithm*. https://en.wikipedia.org/wiki/Dijkstra%27s_algorithm.
- [2] Lean4, Mathlib4, *SimpleGraph documentation*. https://leanprover-community.github.io/mathlib4_docs/Mathlib/Combinatorics/SimpleGraph/Basic.html#SimpleGraph.
- [3] Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, *Introduction to Algorithms*, 3rd edition, MIT Press, Cambridge, MA, 2009.