



National University
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Data Structures (AI-K)

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Project Report

Purpose and Goal: Understanding of graph algorithms and implementing on the given Data Sets to get the desired results.

Data Base Used: General Relativity and Quantum Cosmology collaboration network Dataset

Algorithm Used : Dijkstra, In-Algorithm, Out-Algorithm, BFS, WCC, SCC

First Task – Graph Stats

1. **Number of Nodes:** 5242
2. **Number of Edges:** 28980
3. **Number of Source Nodes:** 0 (**Reason:** There is no vertex with In-Degree 0 in this data set)
4. **Number of Sink nodes:** 0 (**Reason:** There is no vertex with Out-Degree 0 in this data set)
5. **Number of Isolated Nodes:** 0 (**Reason:** There is no vertex with Out-Degree=In-Degree in this data set
6. **Number of Bridge edges:** 2284
7. **Number of Articulation Nodes:** 813
8. **Shortest path length distribution:**
9. **Diameter:** 17
10. **In-Degree Distribution:**
11. **Out-Degree Distribution:**
12. **Largest Strongly Connected Component (SCC):** 4158
13. **Size Distribution SCCs:**
14. **Largest Weakly Connected Component (WCC):** 4158
15. **Size Distribution WCCs:**

Conclusion: The project gave us a deep insight into the understanding and working of graphs. We learned and implemented some interesting graph algorithms like Dijkstra, In-Algorithm, Out- Algorithm, and used BFS for graph traversing.

"We learned something new and exciting in this project. "