LaTeX Presentation on Graph Theory

Team:Changuk,Farhad,Parag,Michael

February 20,2024

Introduction to Graph Theory

- Graph theory studies relationships between entities represented as nodes and connections as edges.
- Widely used in computer science, networking, social sciences, etc.
- Today, we'll explore basic concepts and create graphs using LaTeX.

Graph Basics

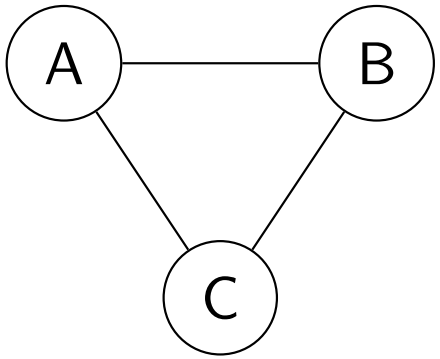

Figure: An example graph.

- Nodes (Vertices)
- Edges
- Directed vs. Undirected
- Weighted vs. Unweighted

Graph Illustration with LaTeX

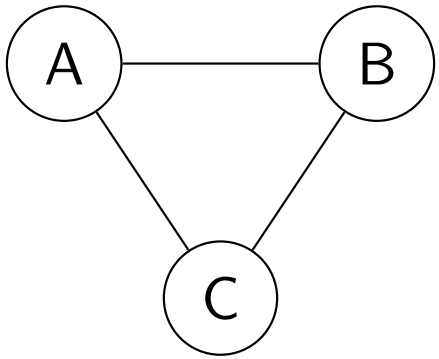

Figure: A simple graph created with LaTeX and `tikz`.

Directed vs. Undirected Graphs

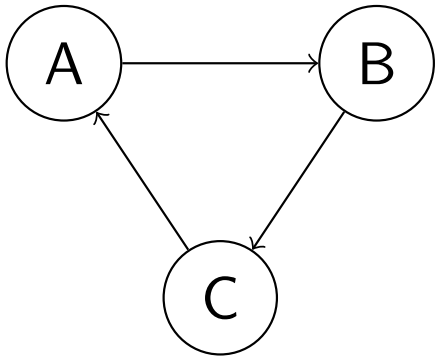

Figure: Directed graph.

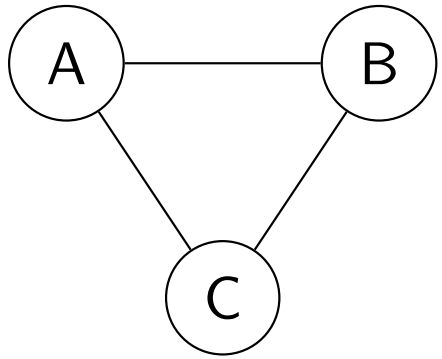

Figure: Undirected graph.

Weighted Graphs

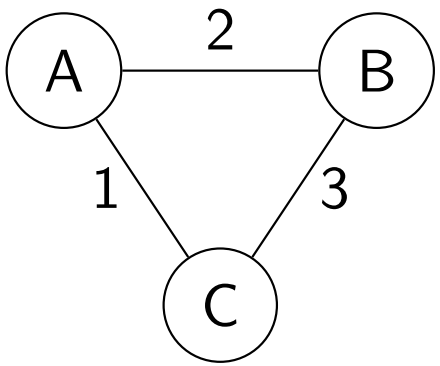

Figure: Weighted graph.

- Edges have associated weights.
- Reflects the cost or distance between nodes.

Graph Algorithms - BFS and DFS

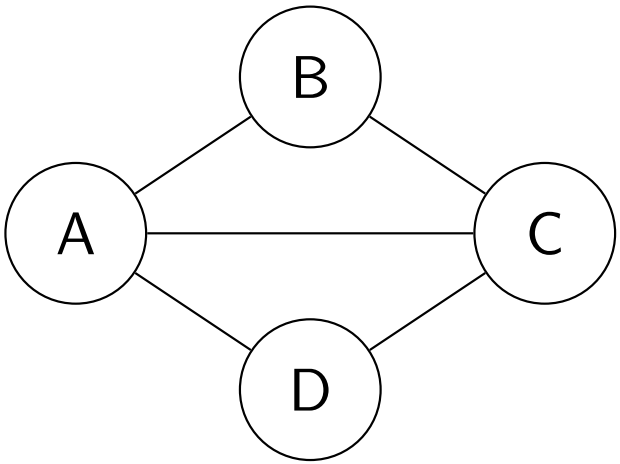

Figure: Example graph for BFS and DFS.

- **BFS (Breadth-First Search):**
  - Start from the source node (A).
  - Visit neighbors before moving to the next level.
- **DFS (Depth-First Search):**
  - Start from the source node (A).
  - Explore as far as possible before backtracking.

BFS and DFS - Example

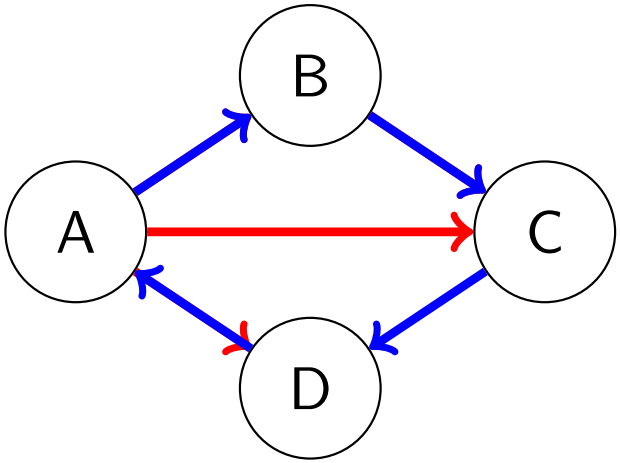

Figure: BFS and DFS on the example graph.

- **BFS (Breadth-First Search):**
  - Start from the source node (A).
  - Visit neighbors before moving to the next level.
- **DFS (Depth-First Search):**
  - Start from the source node (A).
  - Explore as far as possible before backtracking.

Common Graph Algorithms

- Breadth-First Search (BFS)
- Depth-First Search (DFS)
- Dijkstra's Algorithm
- Kruskal's Algorithm
- Eulerian and Hamiltonian Paths

Graphs in LaTeX - Advanced

- `tikz` package allows advanced customization.
- Create complex graphs with precise control.
- Ideal for academic and technical presentations.

Conclusion

- Graph theory is a powerful tool with diverse applications.
- LaTeX provides an efficient way to create high-quality presentations.
- Experiment with `tikz` for more advanced graph representations.
- Thank you for your attention!