Pre-Class Notes: The Algorithm Behind a Trillion-Dollar Industry

Overview

PageRank, the foundation of Google, is a groundbreaking algorithm that changed how information is ranked and accessed on the internet. It uses **graph theory** to evaluate the importance of web pages, turning links into measures of influence.

Key Concepts

1. PageRank

- Ranks web pages based on the structure of links.
- Measures a page's relevance by its connections.

2. Directed Graphs

- Represented by **nodes** (web pages) and **edges** (links).
- Used to map connections in a network.

3. Sources and Sinks

- **Sources**: Nodes with no incoming edges (no links point to them).
- **Sinks**: Nodes with no outgoing edges (dead ends).

What You'll Learn

1. How PageRank works using graph theory.

2. Identifying **sources** and **sinks** in a directed graph.
3. Visualizing networks and understanding their flow.

Why It Matters

PageRank powers search engines, social media algorithms, and recommendation systems, creating industries worth billions. Understanding it connects math to real-world impact.

Let’s uncover how this simple yet powerful idea transformed the digital world.