Lecture 36: Graphs & Ethics

CS 62

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DFS pseudocode

```
for(every vertex v)
    visited[v]=false;
s=new Stack();
s.push(v1);
while(!s.isEmpty())
{
    v = s.pop();
    if (!visited[v])
    {
        visited[v] = true;
        for (every edge (v, w))
            if (!visited[w])
                s.push(w);
    }
}
```

BFS pseudocode

```
for(every vertex v)
    visited[v]=false;
q=new Queue();
q.enqueue(v1);
while(!q.isEmpty())
{
    v = q.dequeue();
    if (!visited[v])
    {
        visited[v] = true;
        for (every edge (v, w))
            if (!visited[w])
                q.enqueue(w);
    }
}
```

With great power…

- You now have the foundation to identify problems and create solutions

- As scientists, inventors, programmers, what responsibilities and challenges do you anticipate to face?

Best case - Worst Case

1. Write down one fear you have related to the trajectory of computer technology in the 21st century and/or beyond.

2. Write down one thing that you hope to see computer technology achieve within your lifetime.

Data Structures

- Data structures force input to conform
- Simplifying a complex world
- Errors can shut out users

Data and Identity – think pair share

Imagine you're building a data structure for personal profiles.

- What data type would you use to represent gender?

- What data type would you use to represent sex?

- How would a user enter this data?

Algorithms

- promise easy-to-understand effects
  e.g., "the data will be sorted"

- Algorithms enable new behavior/interactions

- What if your data is tainted?

- What if your algorithm has bias?

Cautionary Tales - think pair share

- [When an Algorithm Helps Send You to Prison](#)
  NYTimes

- [How to Fix Silicon Valley's Sexist Algorithms](#)
  MIT Technology Review

- [Technology is Biased Too. How do we fix it?](#)
  FiveThirtyEight

Data & Ethics

- Privacy
- Equity in access
- Societal impact
- Misinformation
- Discrimination
- Everything from sexism to white supremacy
- Weaponization
    - Both government and criminals etc.

Good intentions

- Imagine an app that contributes to society.
- How could it unintentionally cause harm?
- How could it be used intentionally to cause harm?