Lecture 36: Graphs & Ethics

CS 62
Fall 2017
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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

```java
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
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](https://www.nytimes.com/)
  *NYTimes*

• [How to Fix Silicon Valley’s Sexist Algorithms](https://www.technologyreview.com/)
  *MIT Technology Review*

• [Technology is Biased Too. How do we fix it?](https://fivethirtyeight.com/)
  *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?