

Interview Skills

Graph Algorithms

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What is a Graph?

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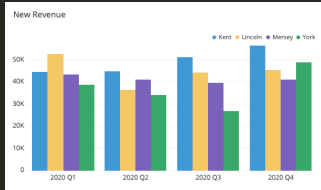


Figure 1: Not This Kind of Graph!



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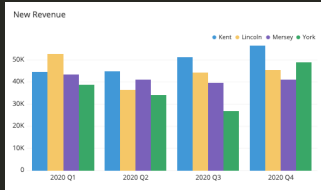


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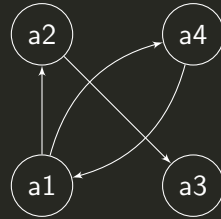


Figure 2: This Kind of Graph!

Characteristics of a Graph

- Set of Nodes S
- Set of Edges $E \subset S^{2*}$

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 - Network Connections[†]
 - Intersections and Streets

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 - Islands & Bridges
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- Position of nodes is for communication only
- Edges may have a “weight” assigned to them, which may represent distance in some cases

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Adjacency Matrix

- Very useful for mathematical proofs

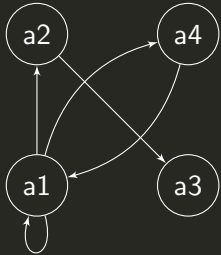


Figure 3: Visual Representation of a Graph

$$\begin{pmatrix} 1 & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \end{pmatrix}$$

Figure 4: The Same Graph as 3, in an Adjacency Matrix

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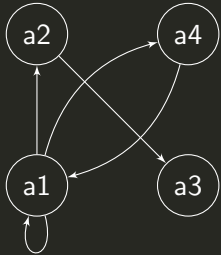


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- Memory usage causes issues when used in programs.



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- Graphs are most often represented as:
 - Node Lists
 - Edge Lists

Node List

0

1

1

```
1  vector<vector<int>> graph = {  
2      {0, 4},  
3      {2, 3, 0},  
4      {0, 4},  
5      {3, 1, 4},  
6      {2, 3}  
7  };
```



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