

Shortest Path: Breadth First Search

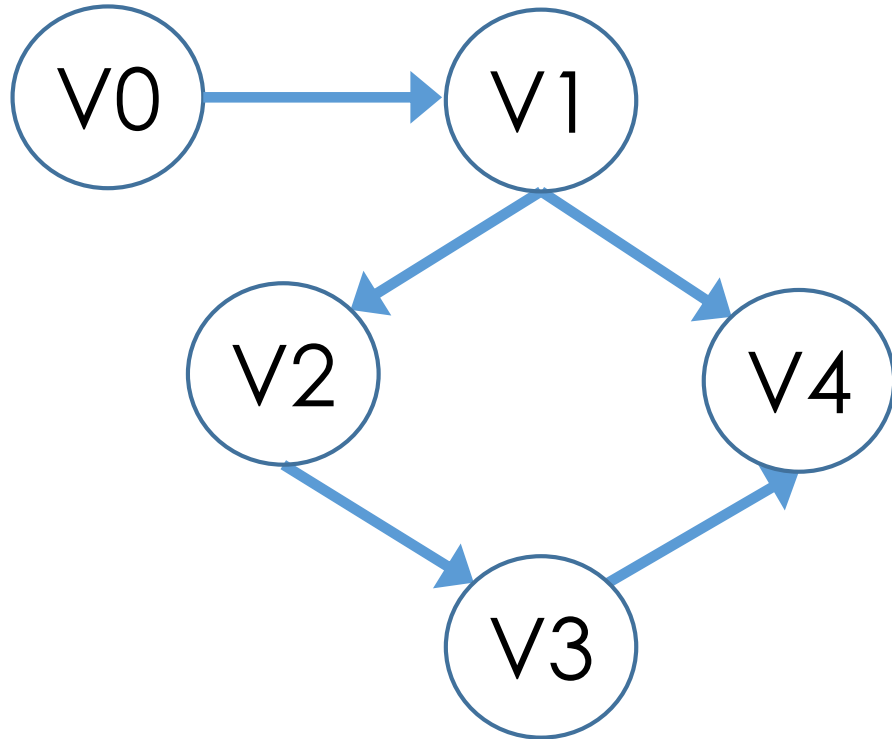


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by Christine Alvarado, Mia Minnes, and Leo Porter, 2015.

By the end of this video you will be able to...

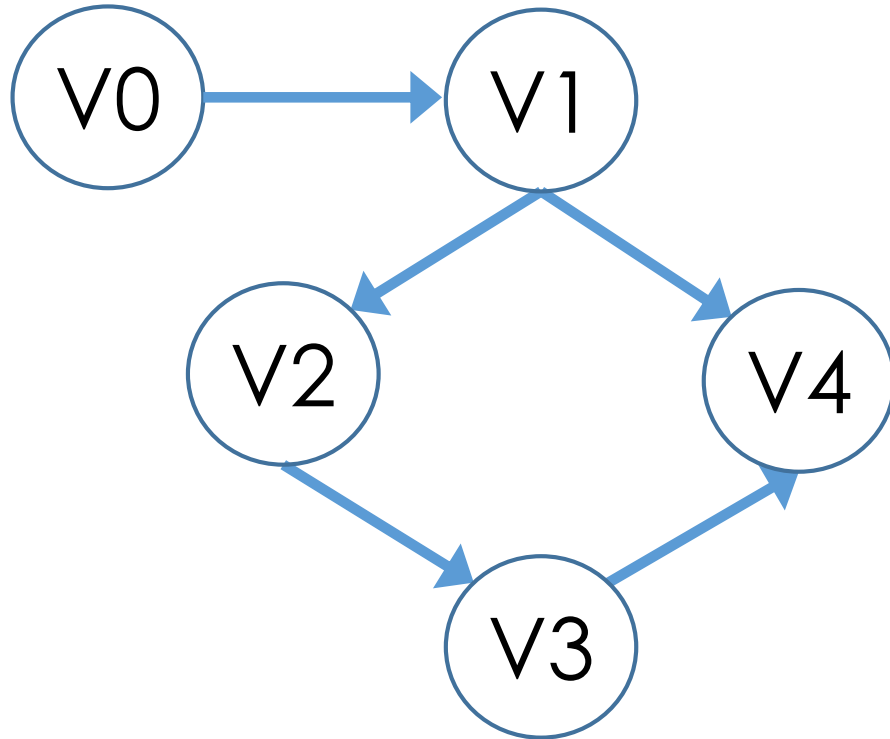
- Describe Breadth First Search's value for an unweighted graph

Breadth First Search

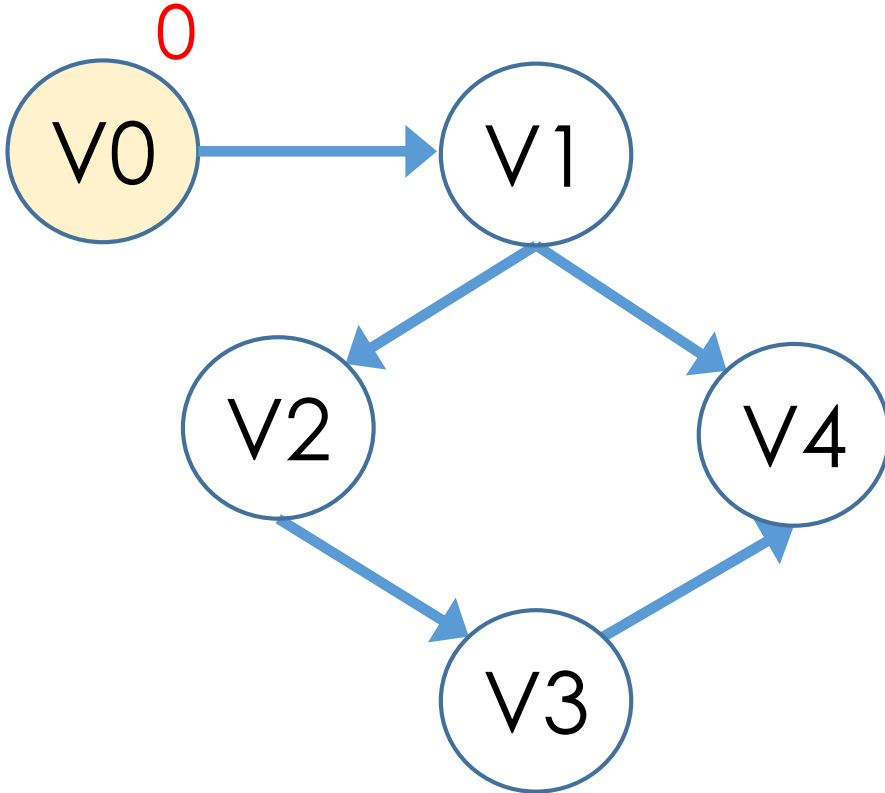


Breadth First Search

Let's try to find the distance from V0 to V4.



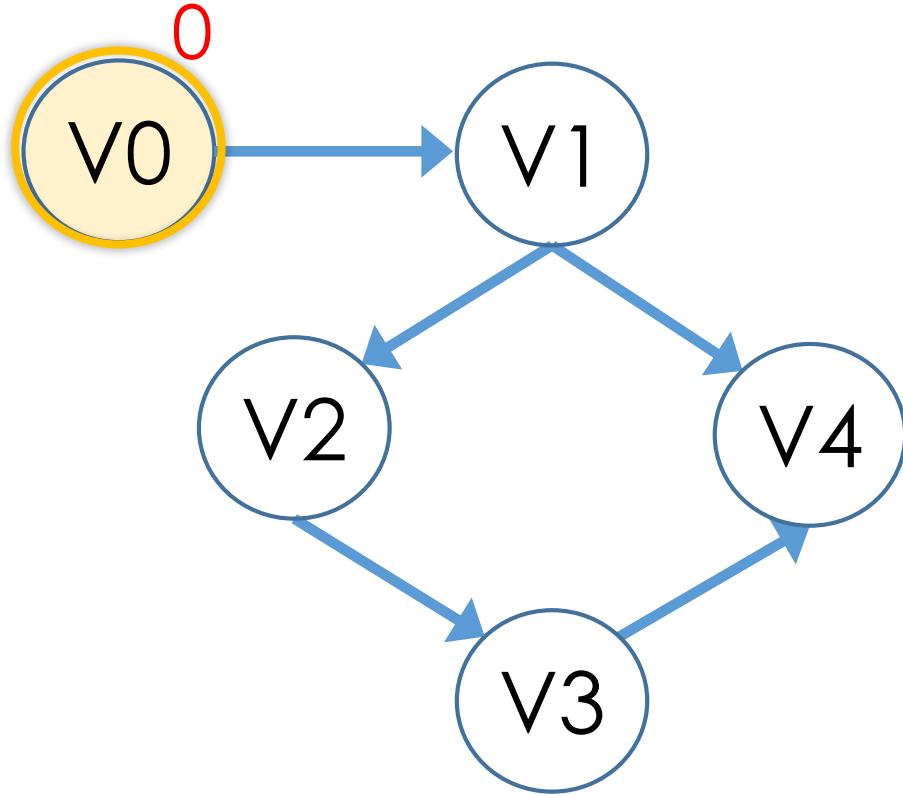
Breadth First Search



Let's try to find the distance from V0 to V4.

Queue: V0

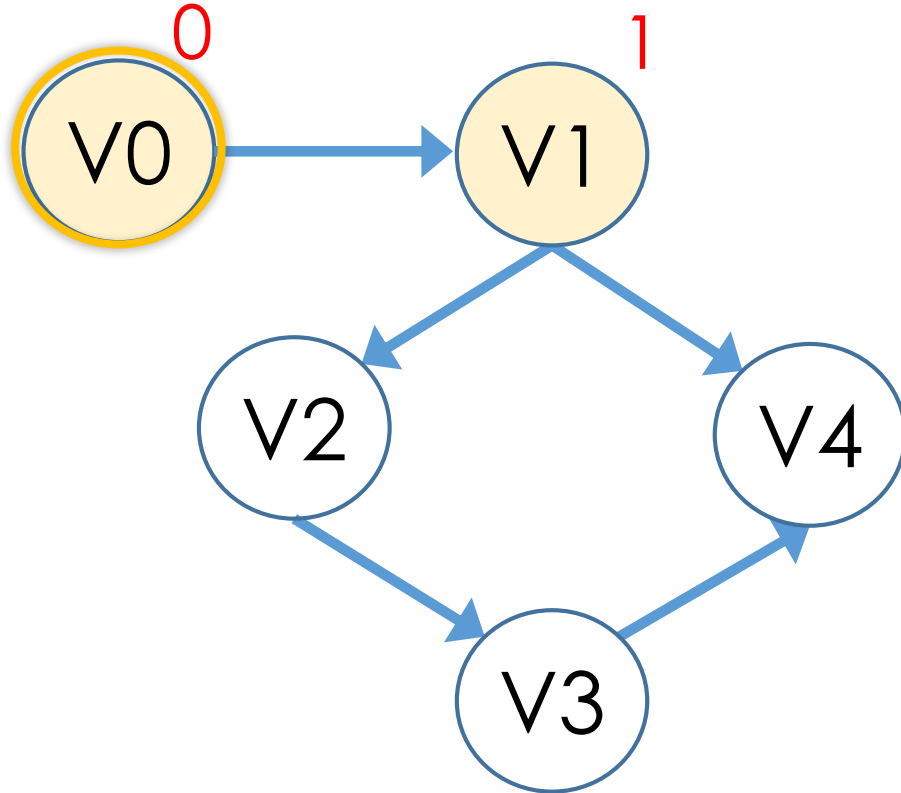
Breadth First Search



Let's try to find the distance from V0 to V4.

Queue: ~~V0~~

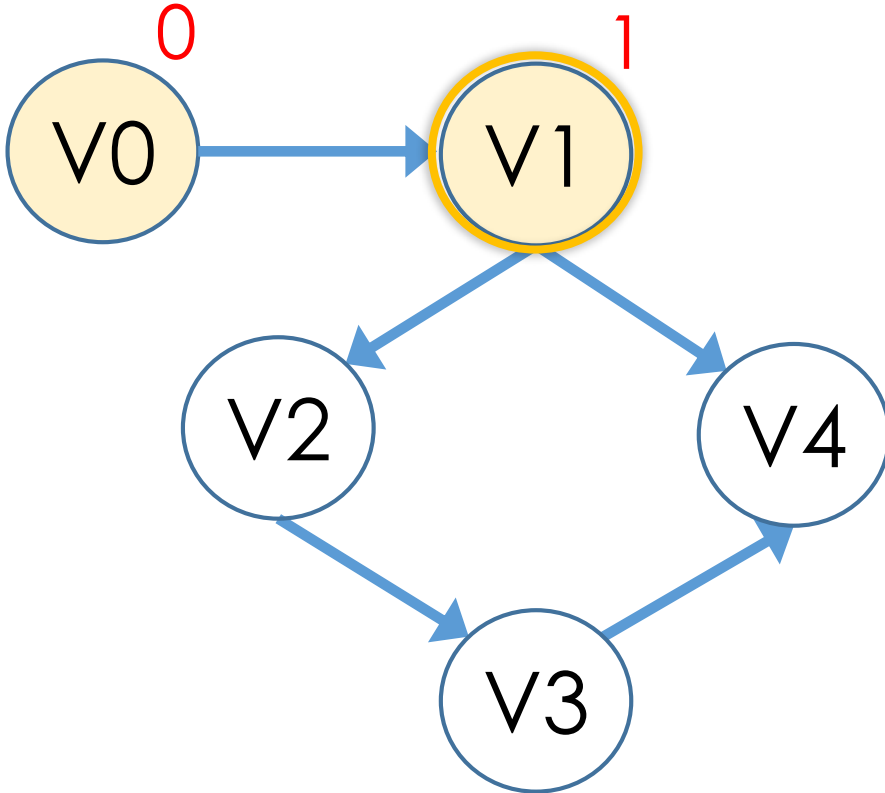
Breadth First Search



Let's try to find the distance from V0 to V4.

Queue: ~~V0~~ V1

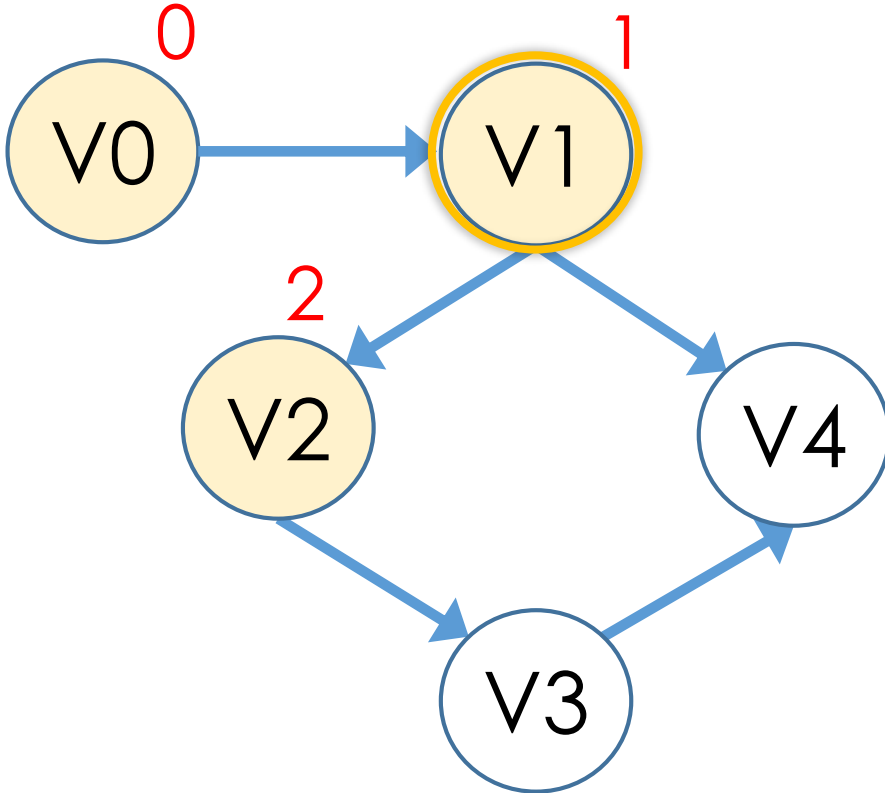
Breadth First Search



Let's try to find the distance from V0 to V4.

Queue: ~~V0~~ ~~V1~~

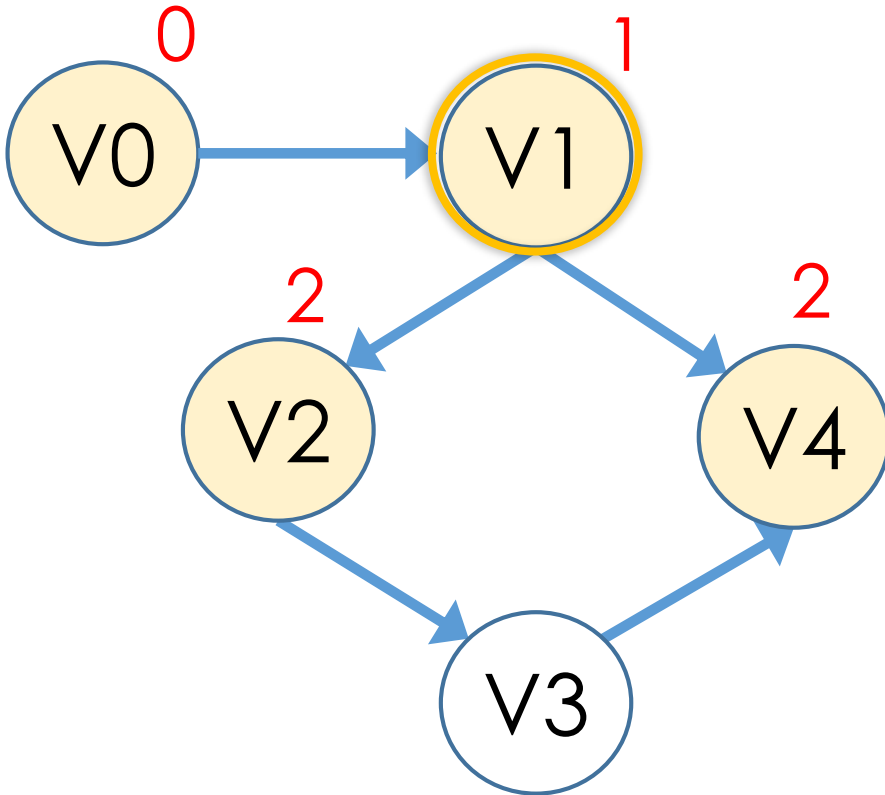
Breadth First Search



Let's try to find the distance from V0 to V4.

Queue: ~~V0~~ ~~V1~~ V2

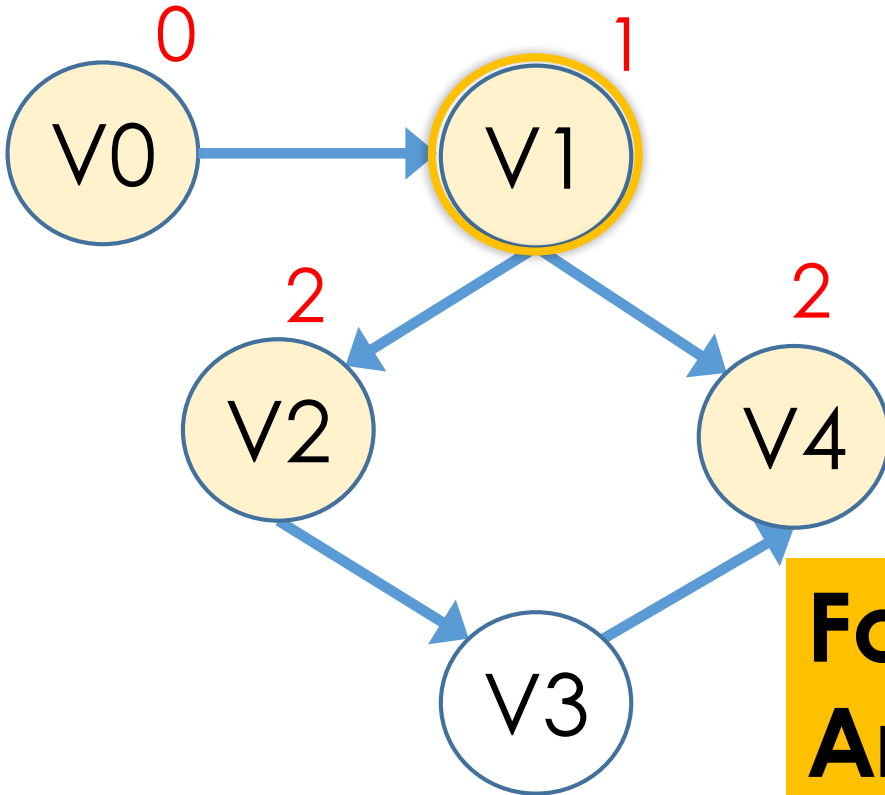
Breadth First Search



Let's try to find the distance from V0 to V4.

Queue: ~~V0~~ ~~V1~~ V2

Breadth First Search

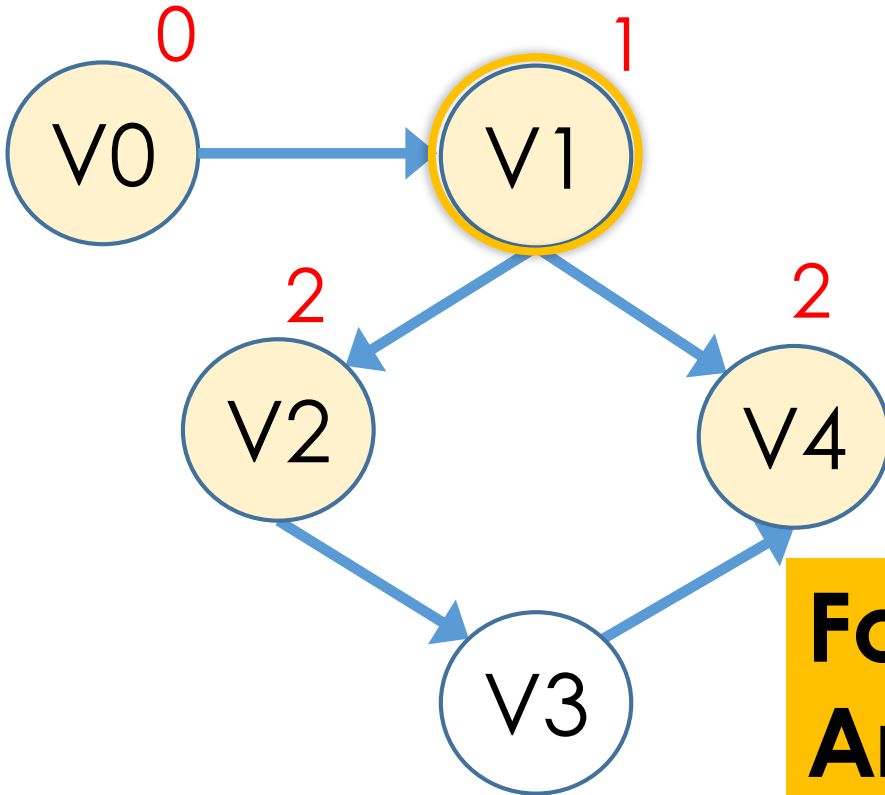


Let's try to find the distance from V0 to V4.

Queue: ~~V0~~ ~~V1~~ V2

**Found V4.
Are we done?**

Breadth First Search

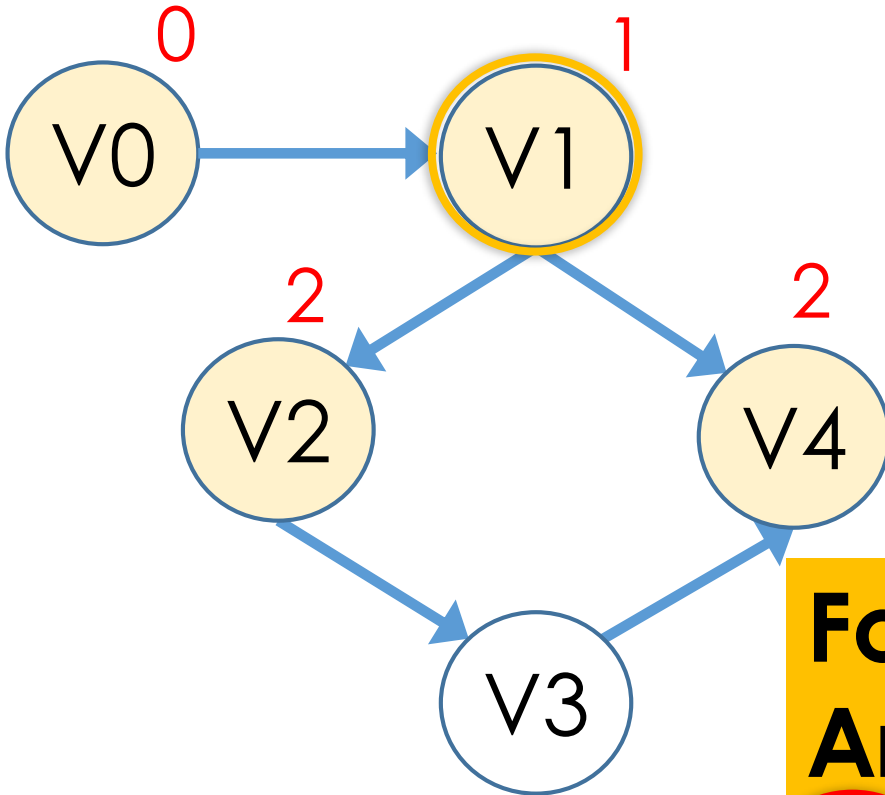


Let's try to find the distance from V0 to V4.

Queue: ~~V0~~ ~~V1~~ V2

**Found V4.
Are we done?
A. Yes
B. No
C. Maybe**

Breadth First Search



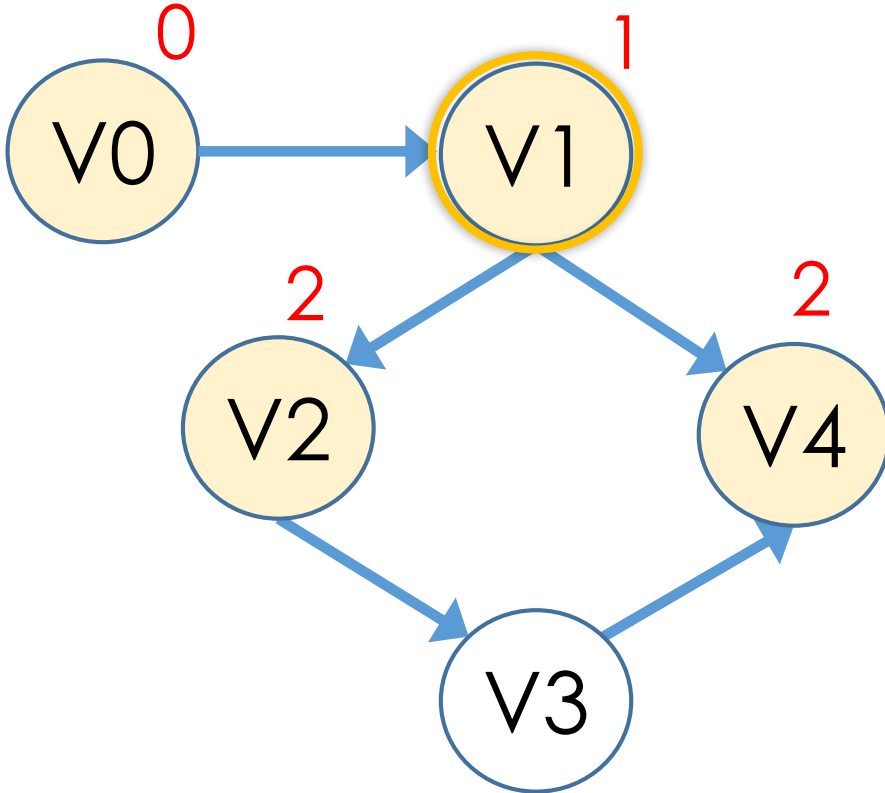
Let's try to find the distance from V0 to V4.

Queue: ~~V0~~ ~~V1~~ V2

**Found V4.
Are we done?**

- A. Yes**
- B. No**
- C. Maybe**

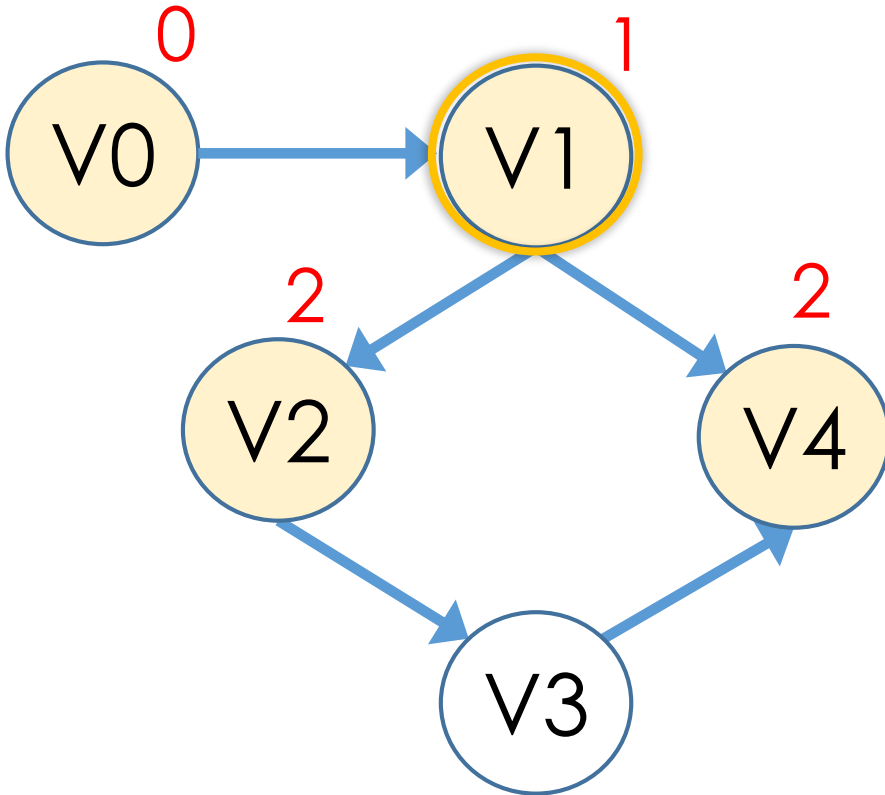
Breadth First Search



Let's try to find the distance from V0 to V4.

Queue: ~~V0~~ ~~V1~~ V2 |

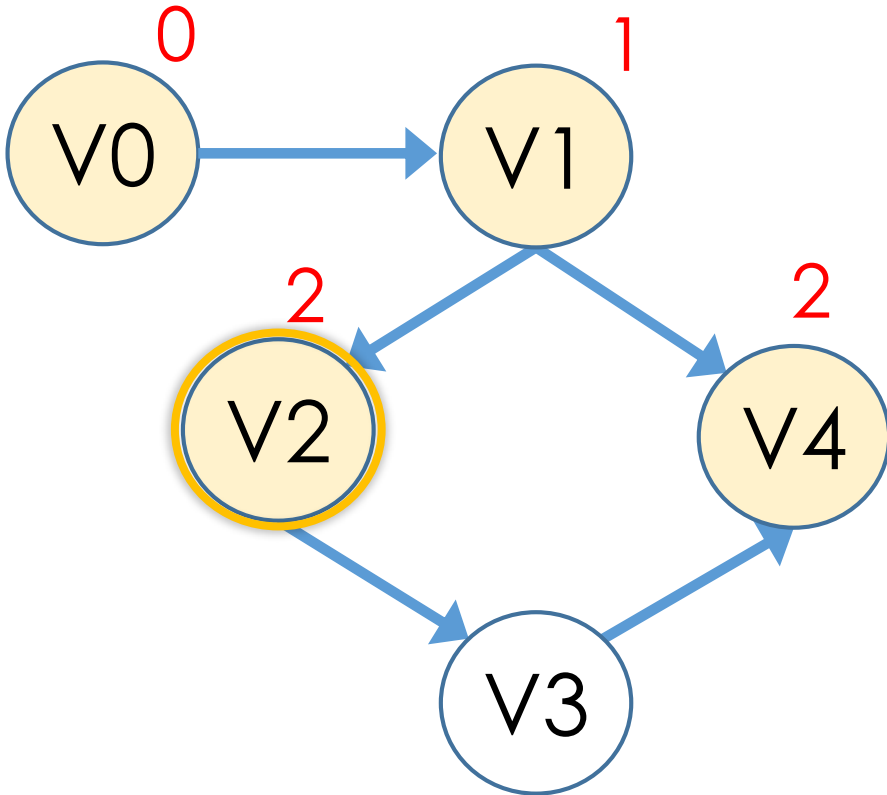
Breadth First Search



Let's try to find the distance from V0 to V4.

Queue: ~~V0~~ ~~V1~~ V2|V4

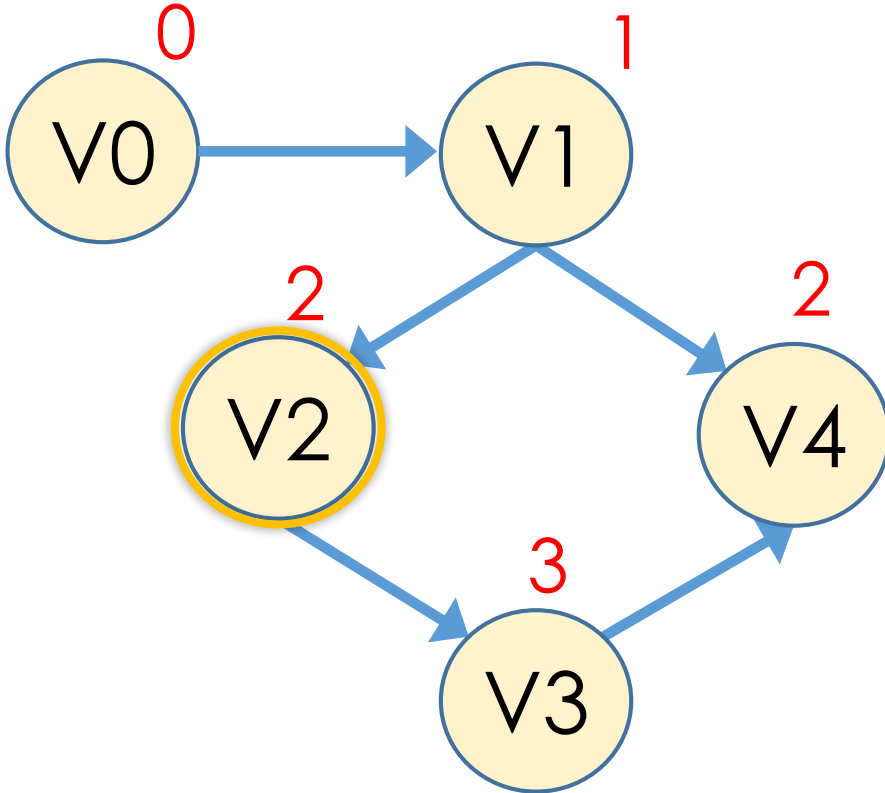
Breadth First Search



Let's try to find the distance from V0 to V4.

Queue: ~~V0~~ ~~V1~~ ~~V2~~ | V4

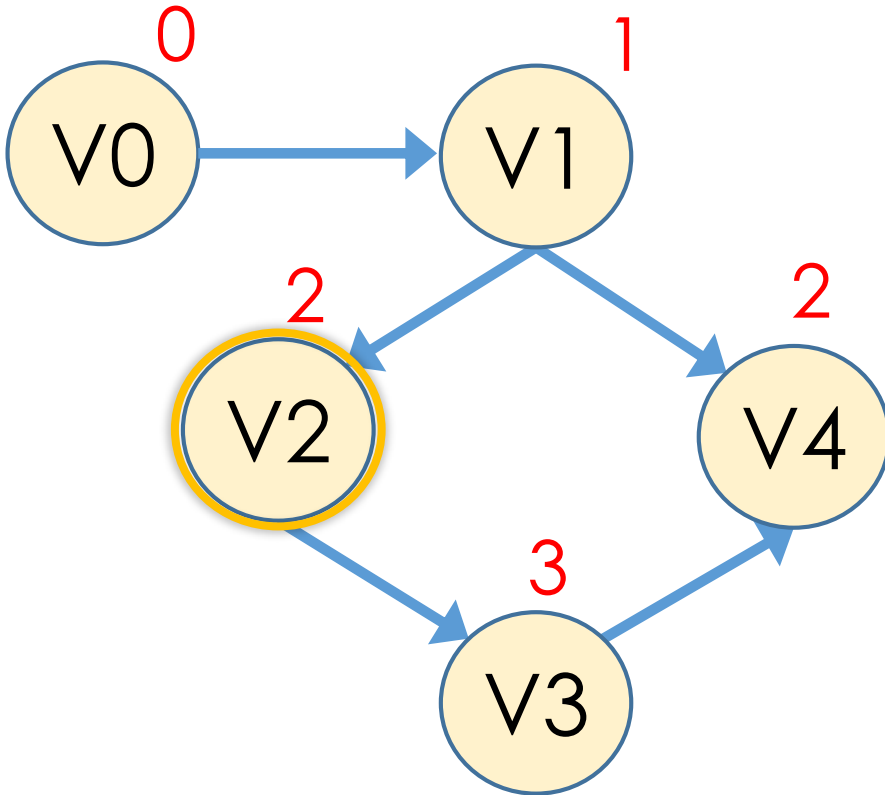
Breadth First Search



Let's try to find the distance from V0 to V4.

Queue: ~~V0~~ ~~V1~~ ~~V2~~ | V4 V3

Breadth First Search

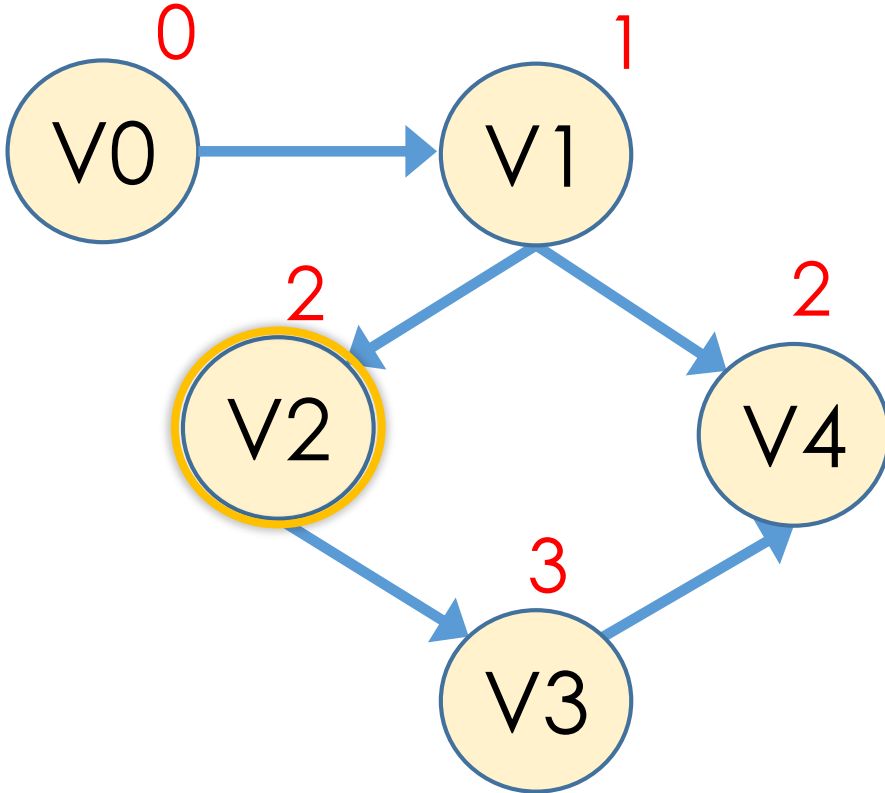


Let's try to find the distance from V0 to V4.

Queue: ~~V0~~ ~~V1~~ ~~V2~~ | V4 V3


Empty the queue

Breadth First Search

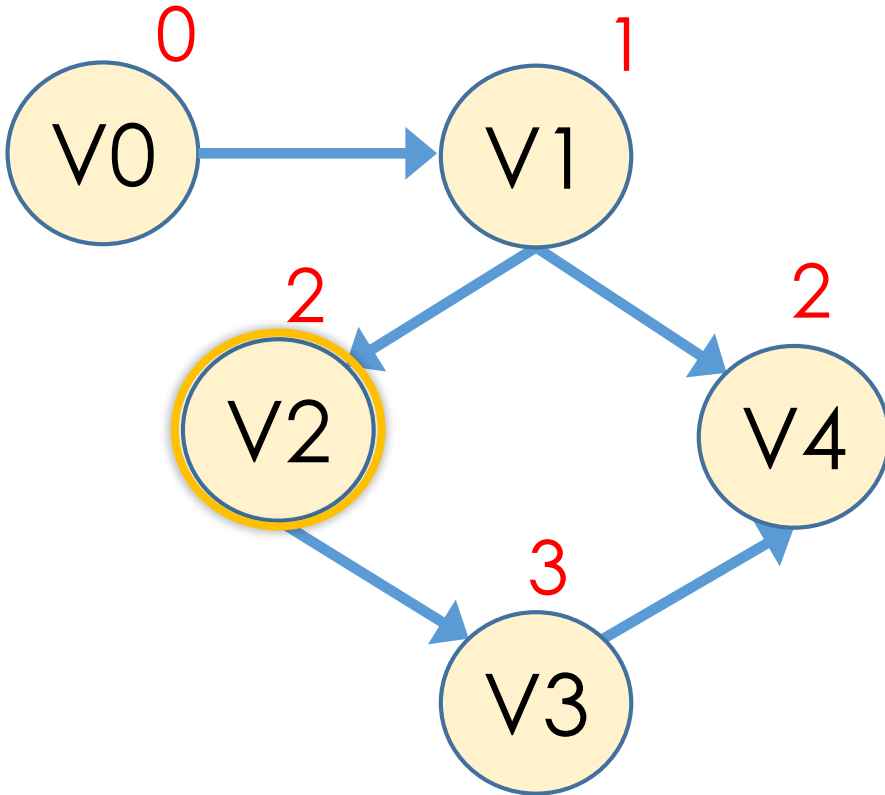


Let's try to find the distance from V0 to V4.

Queue: ~~V0~~ ~~V1~~ ~~V2~~ | V4 V3



Breadth First Search

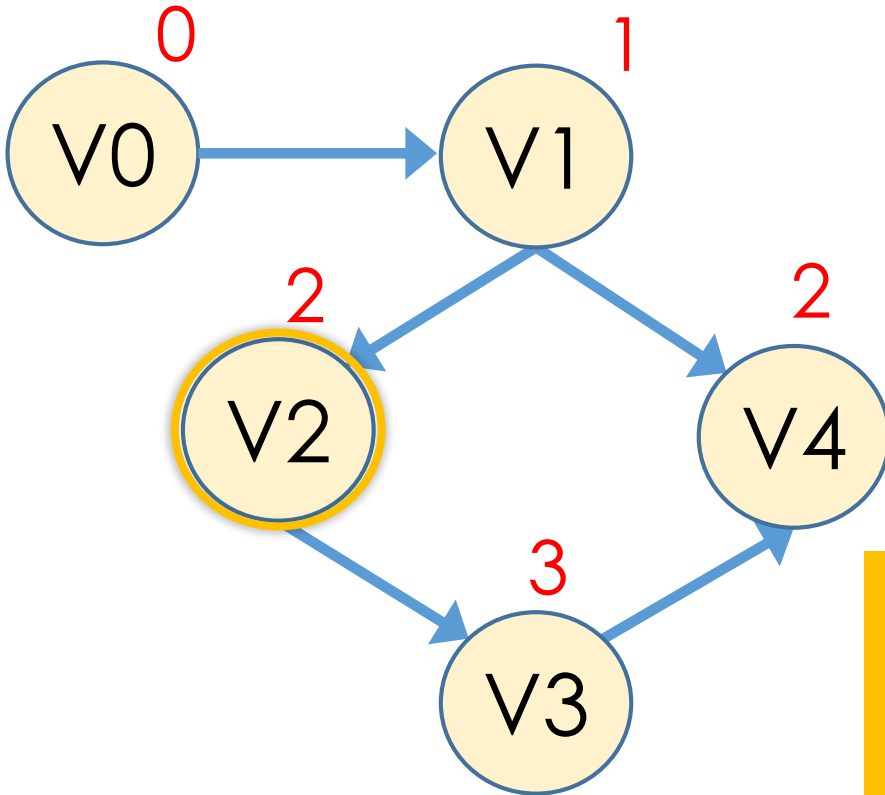


Let's try to find the distance from V0 to V4.

Queue: ⁰~~V0~~ ¹~~V1~~ ²~~V2~~ | ²V4 ³V3



Breadth First Search

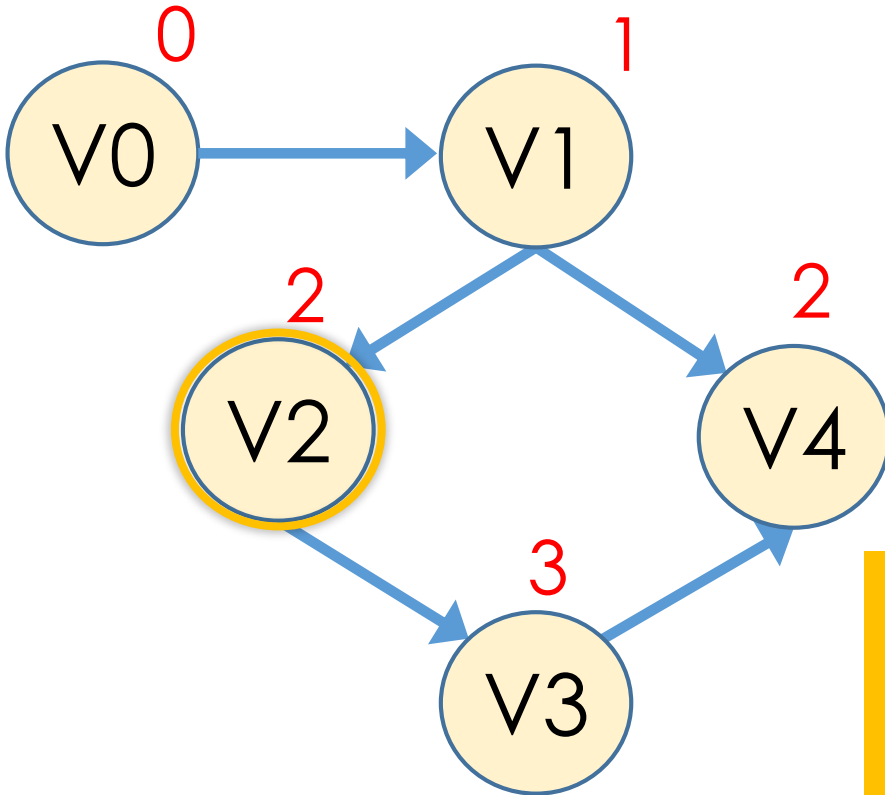


Let's try to find the distance from V0 to V4.

Queue: ⁰~~V0~~ ¹~~V1~~ ²~~V2~~ | ²V4 ³V3

**New nodes
are as
distant or
more distant**

Breadth First Search



Let's try to find the distance from V0 to V4.

Queue: ⁰V0 ¹V1 ²V2 | ²V4 ³V3

**Does BFS
work for all
graphs?**