python + AI

Introduction to Artificial Intelligence with Python

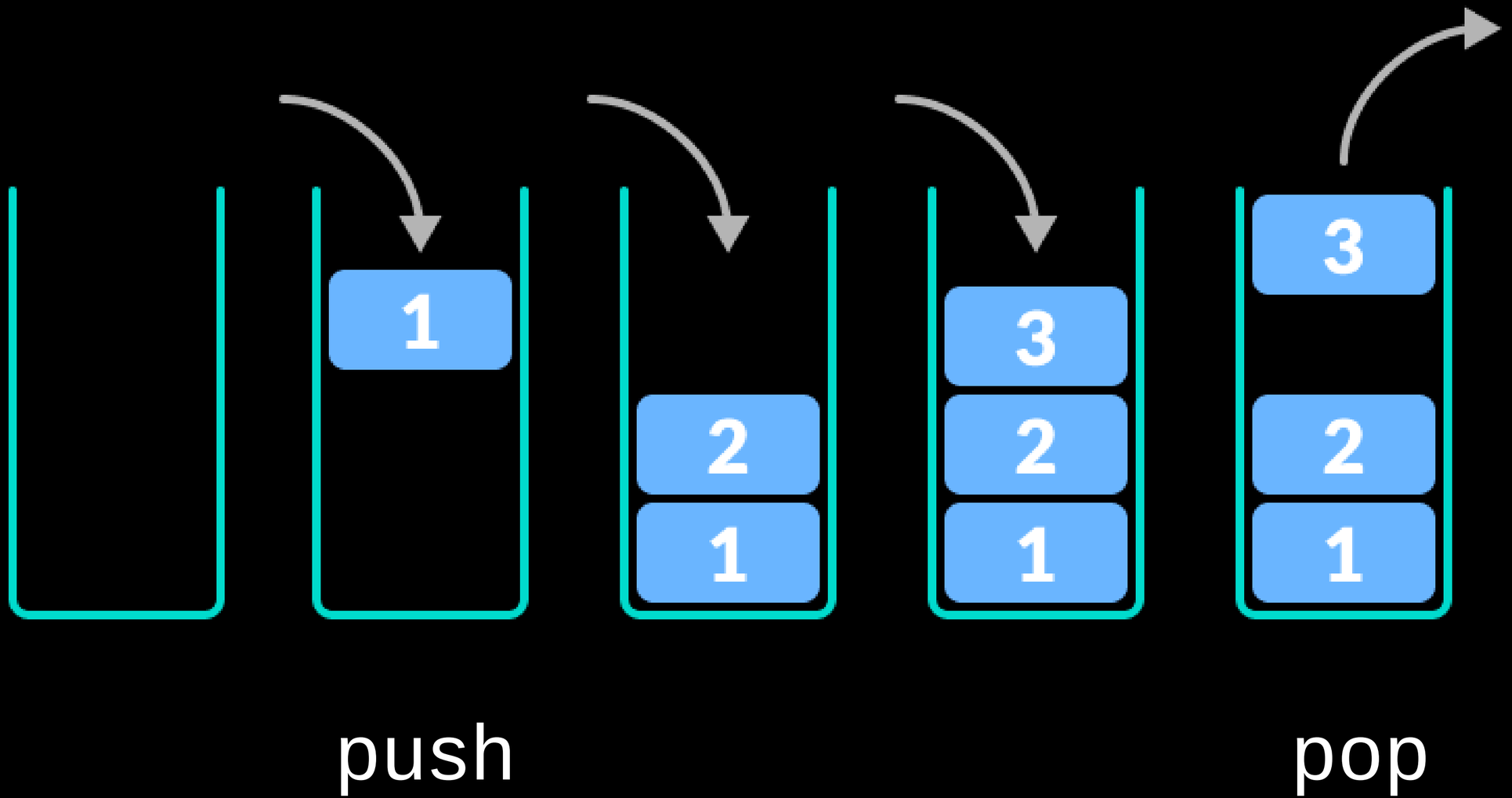
Search

Revised Approach

- Start with a **frontier** that contains the initial state.
- Start with an empty **explored set**.
- Repeat:
  - If the frontier is empty, then no solution.
  - Remove a node from the frontier.
  - If node contains goal state, return the solution.
  - Add the node to the explored set.
  - **Expand** node, add resulting nodes to the frontier if they aren't already in the frontier or the explored set.

stack

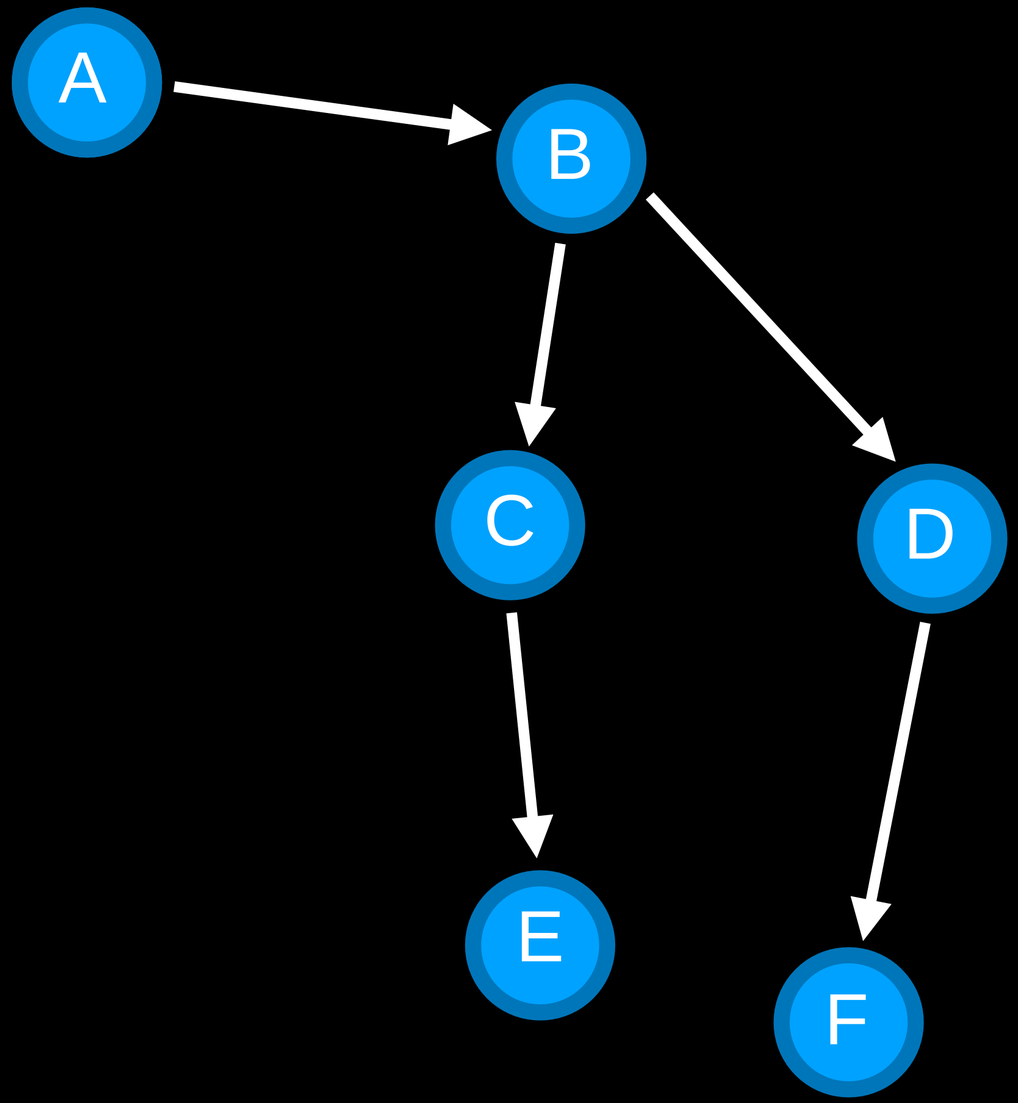
last-in first-out data type


1
2
1
3
2
1
3
2
1
push
pop

Find a path from A to E.

Frontier

Explored Set

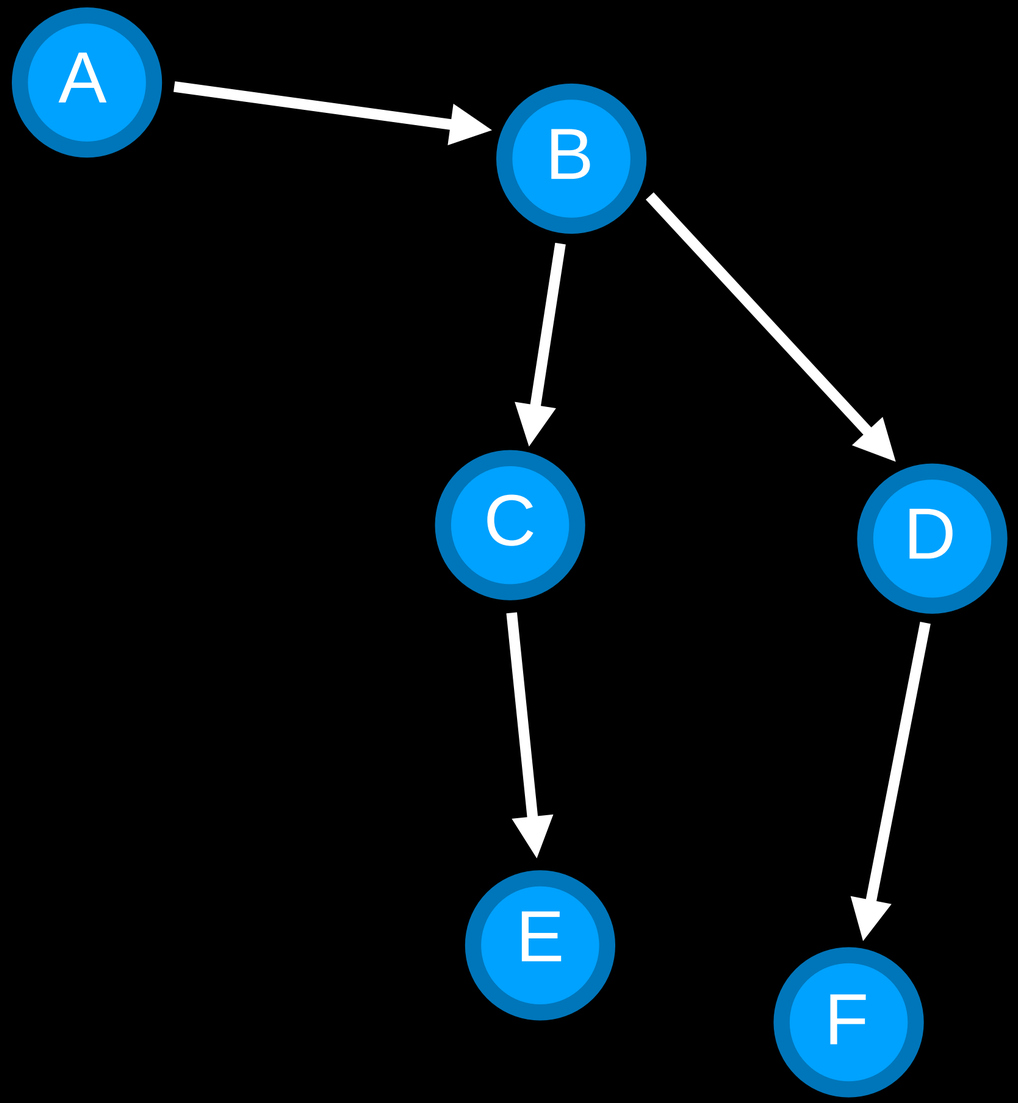


Find a path from A to E.

Frontier

A

Explored Set

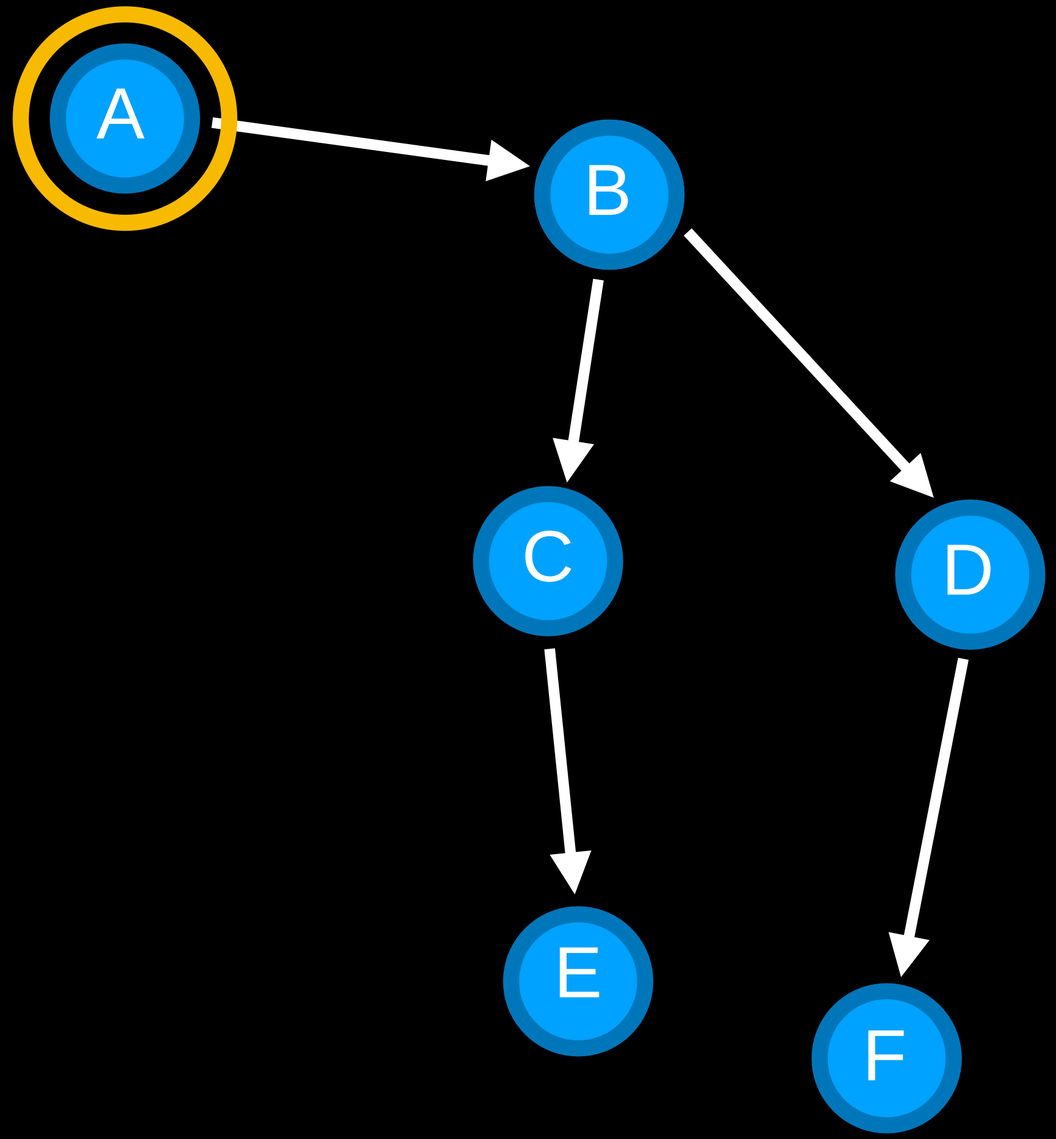


Find a path from A to E.

Frontier

Explored Set

A



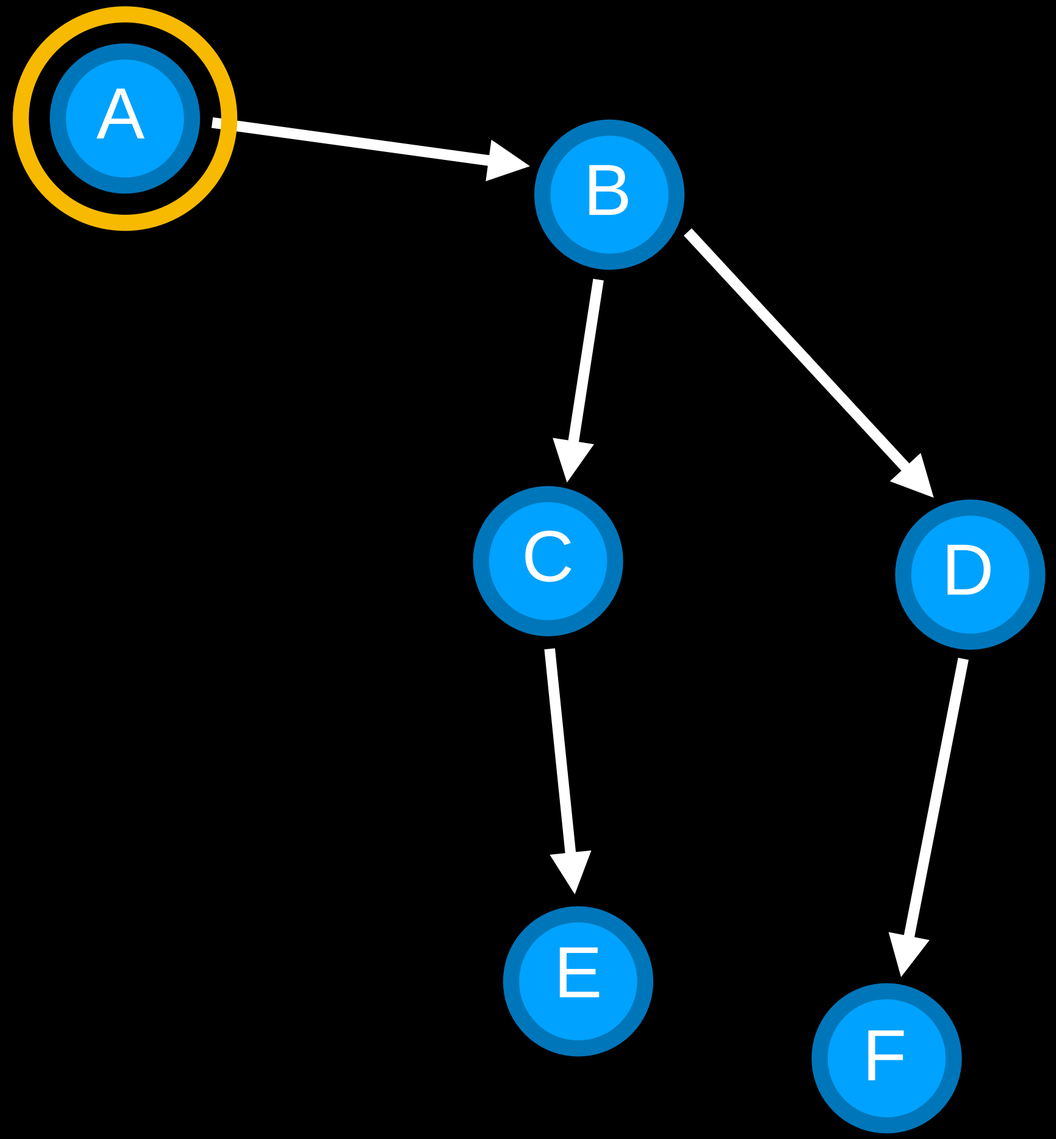
Find a path from A to E.

Frontier

B

Explored Set

A

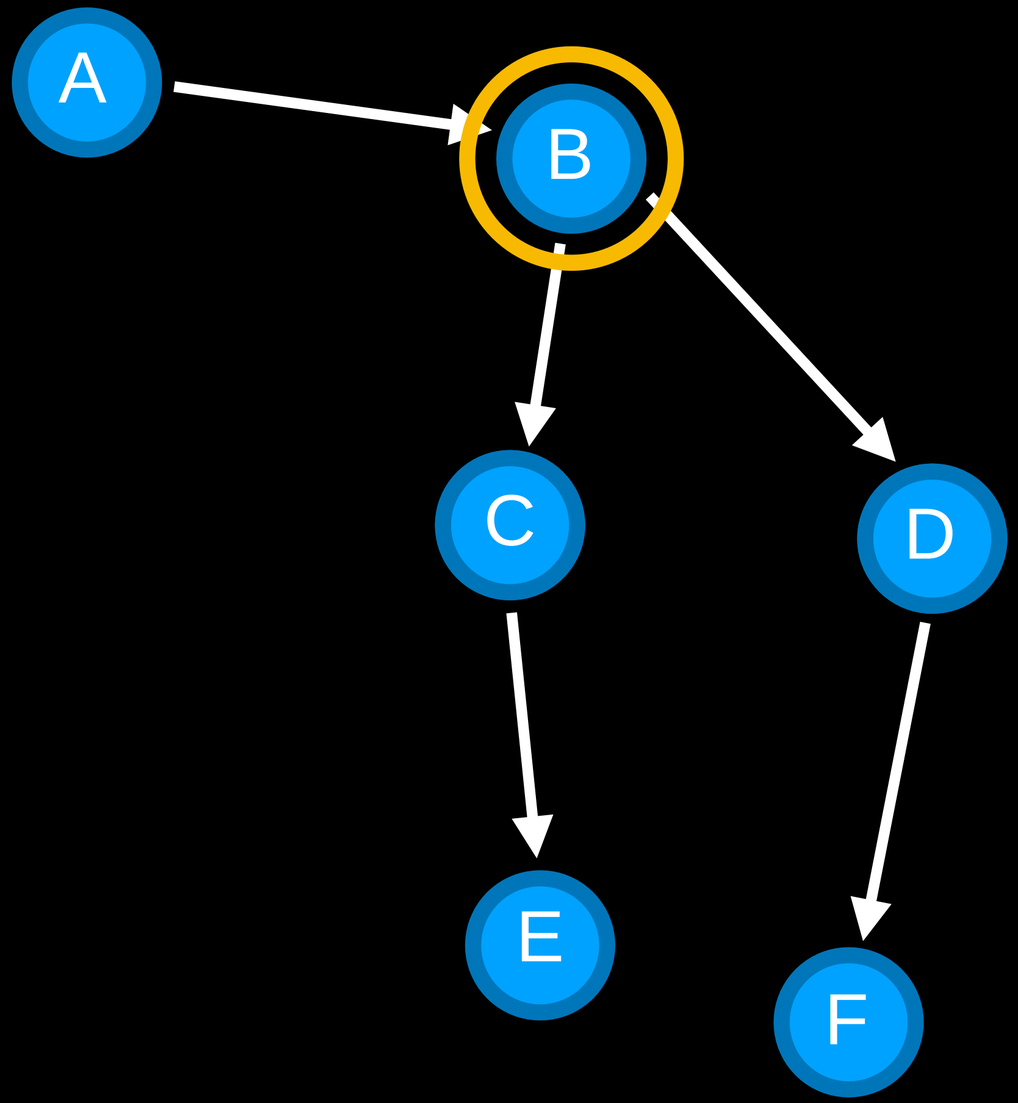


Find a path from A to E.

Frontier

Explored Set

A B



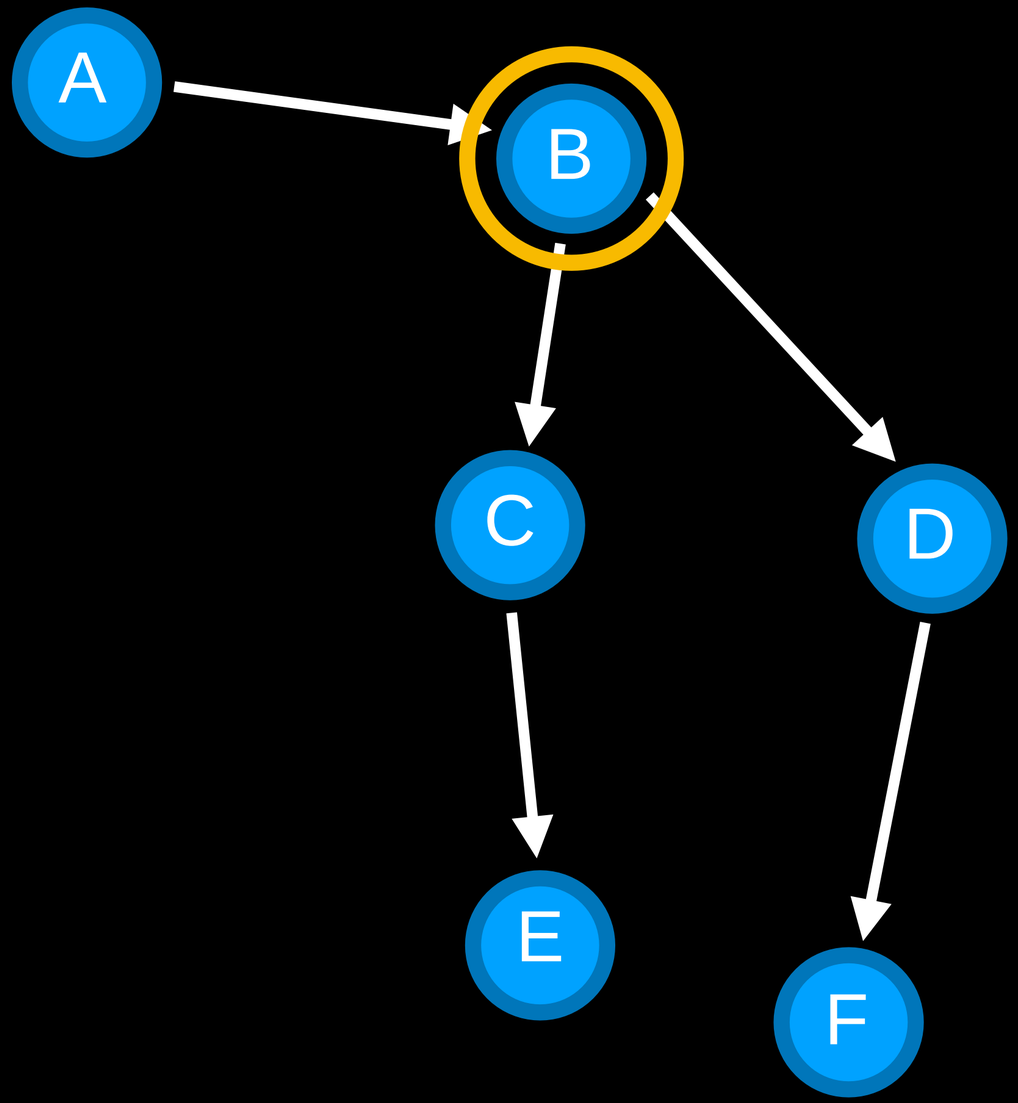
Find a path from A to E.

Frontier

C D

Explored Set

A B



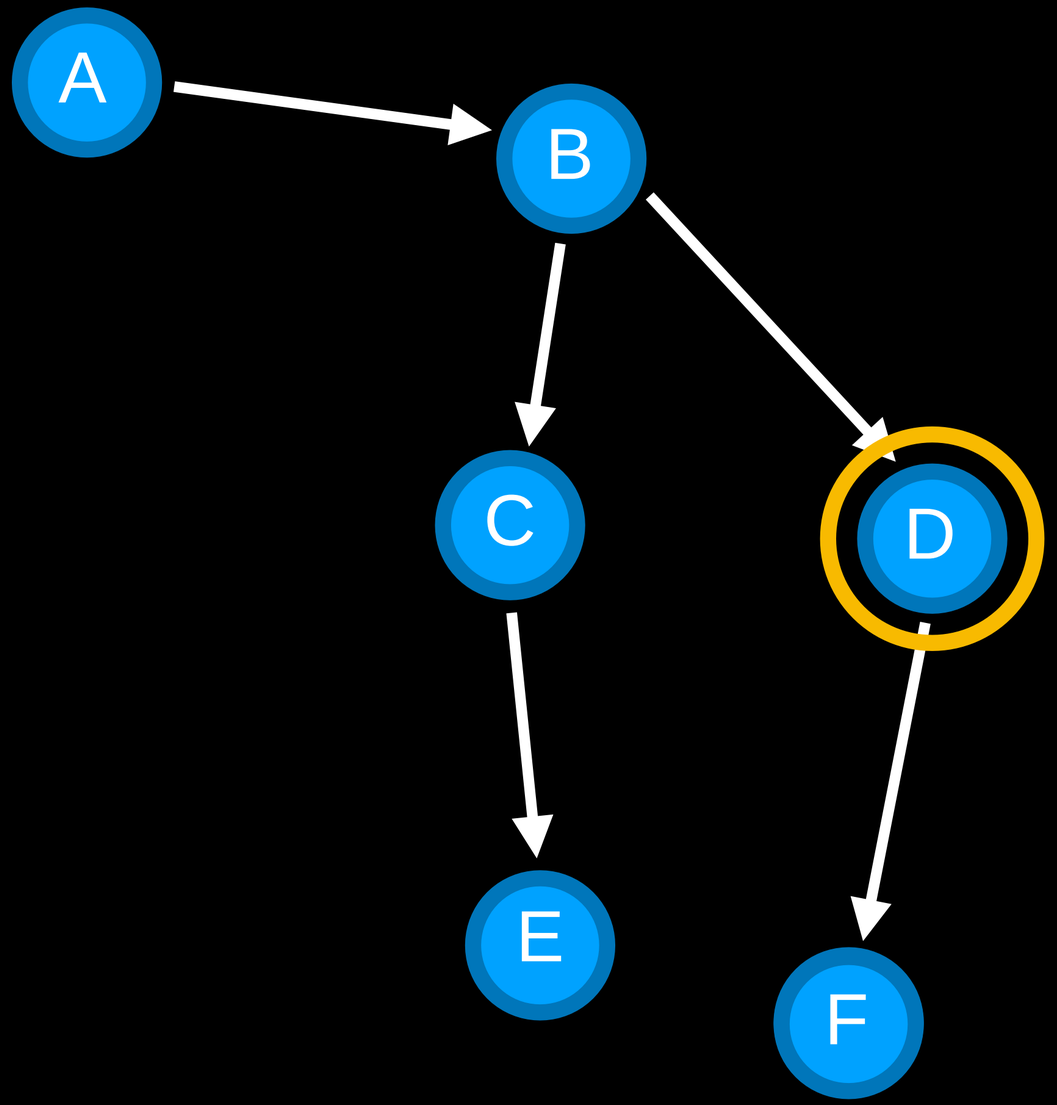
Find a path from A to E.

Frontier

C

Explored Set

A B D



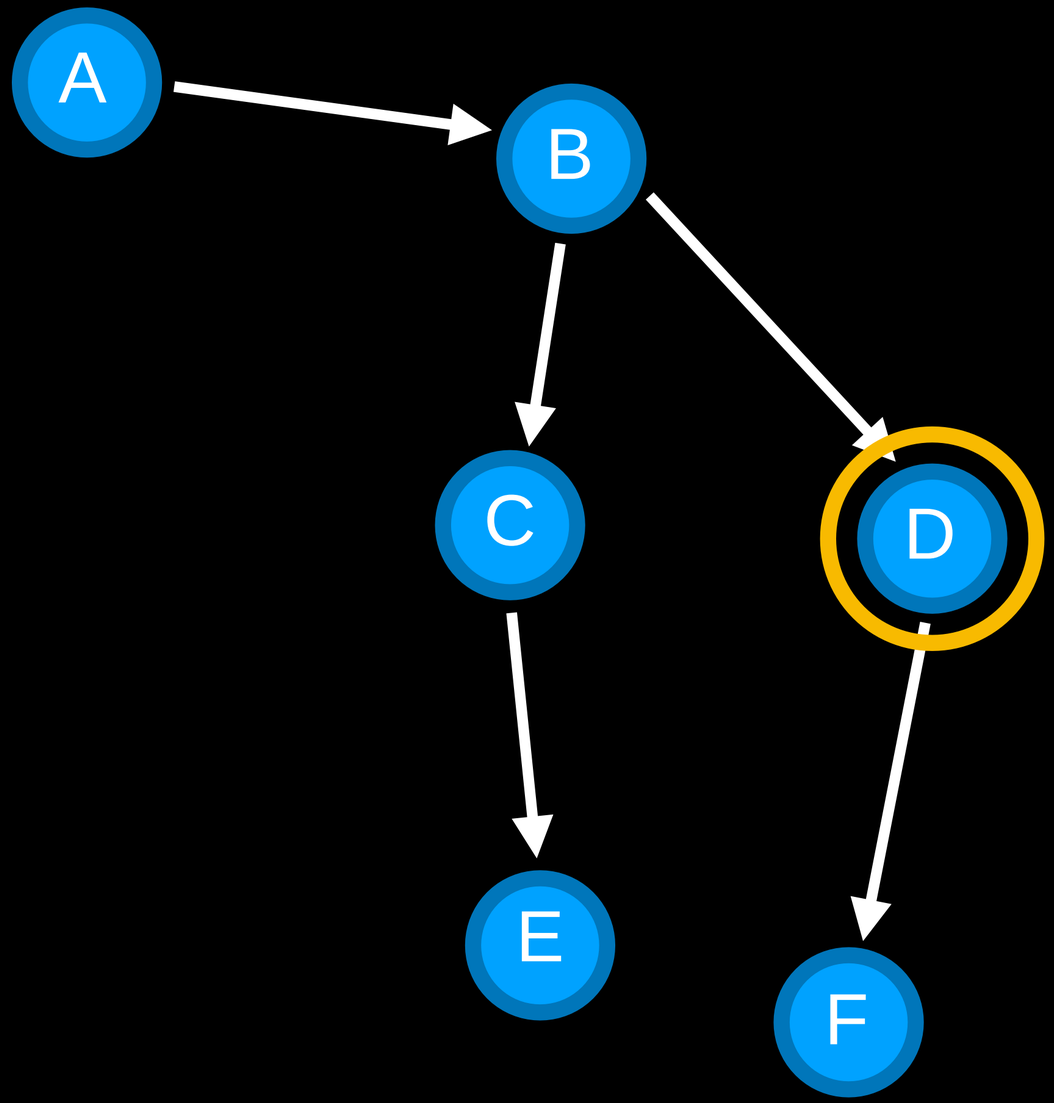
Find a path from A to E.

Frontier

C F

Explored Set

A B D



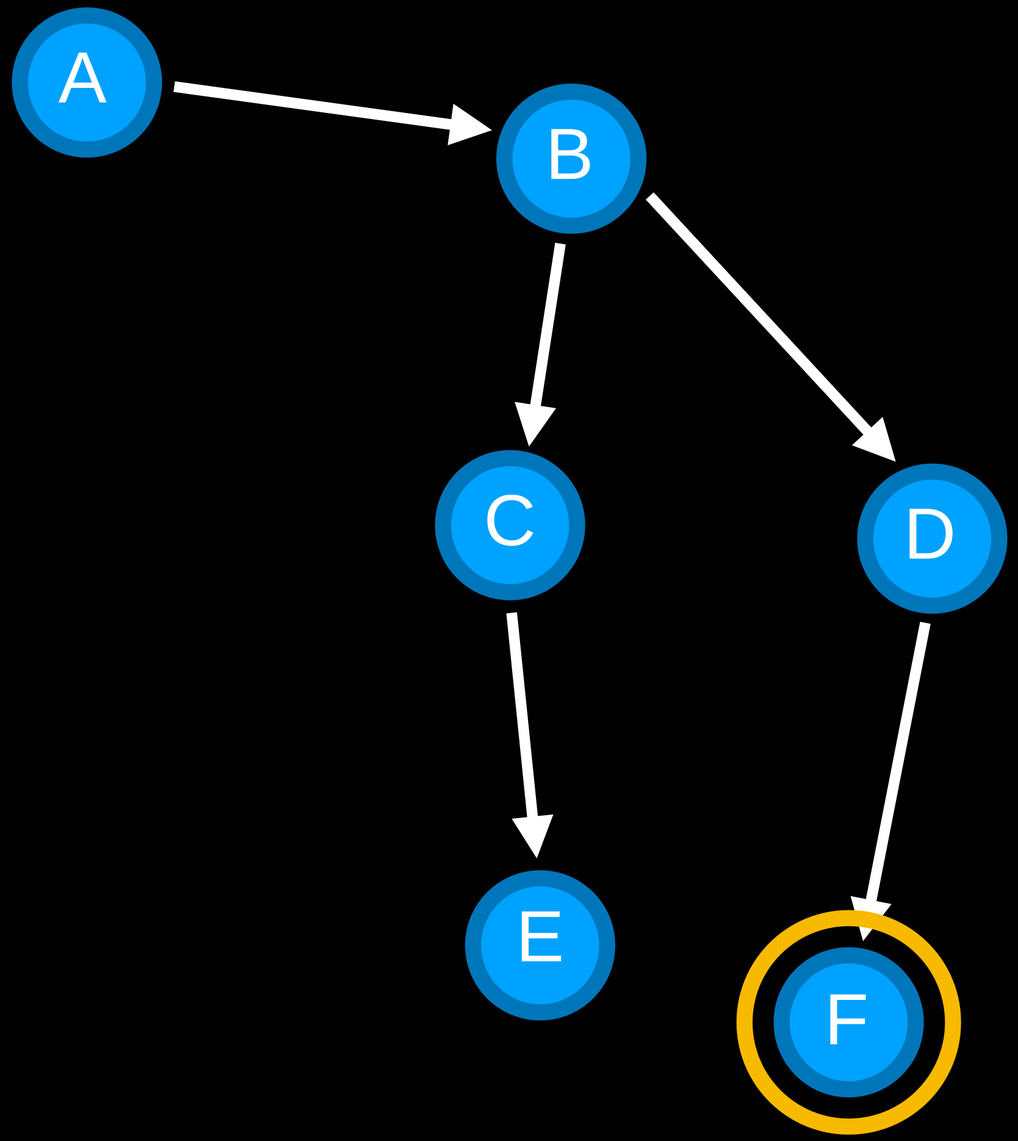
Find a path from A to E.

Frontier

C

Explored Set

A B D F

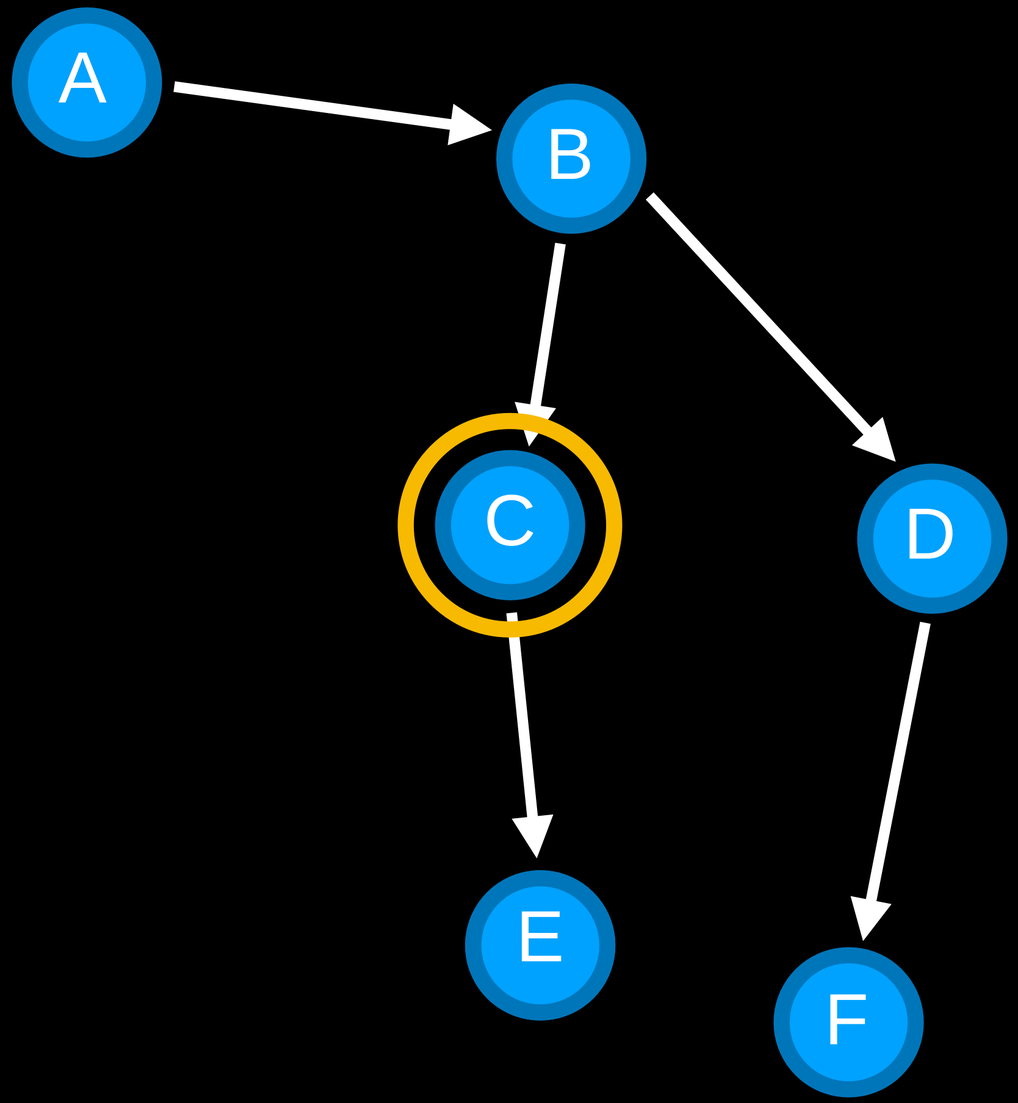


Find a path from A to E.

Frontier

Explored Set

A B D F C



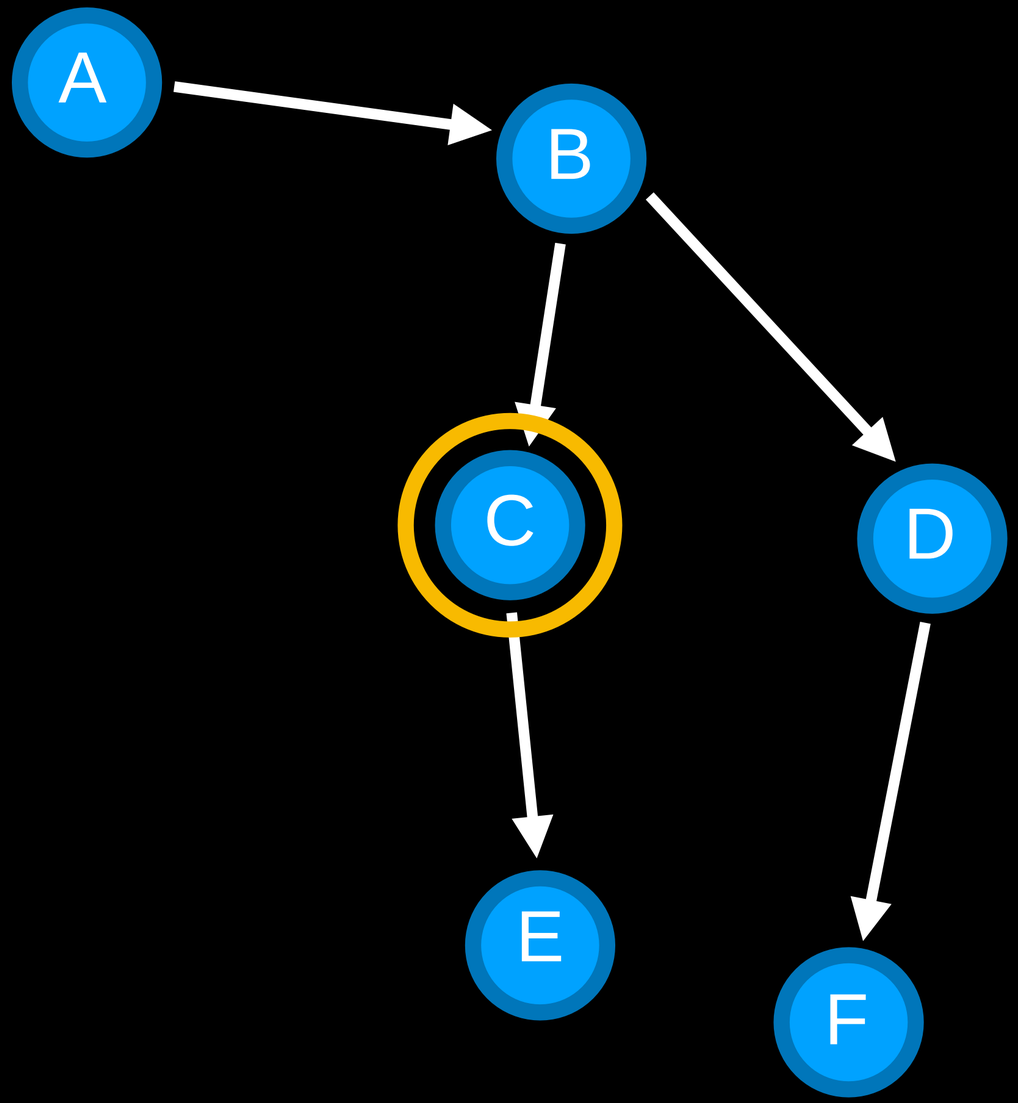
Find a path from A to E.

Frontier

E

Explored Set

A B D F C

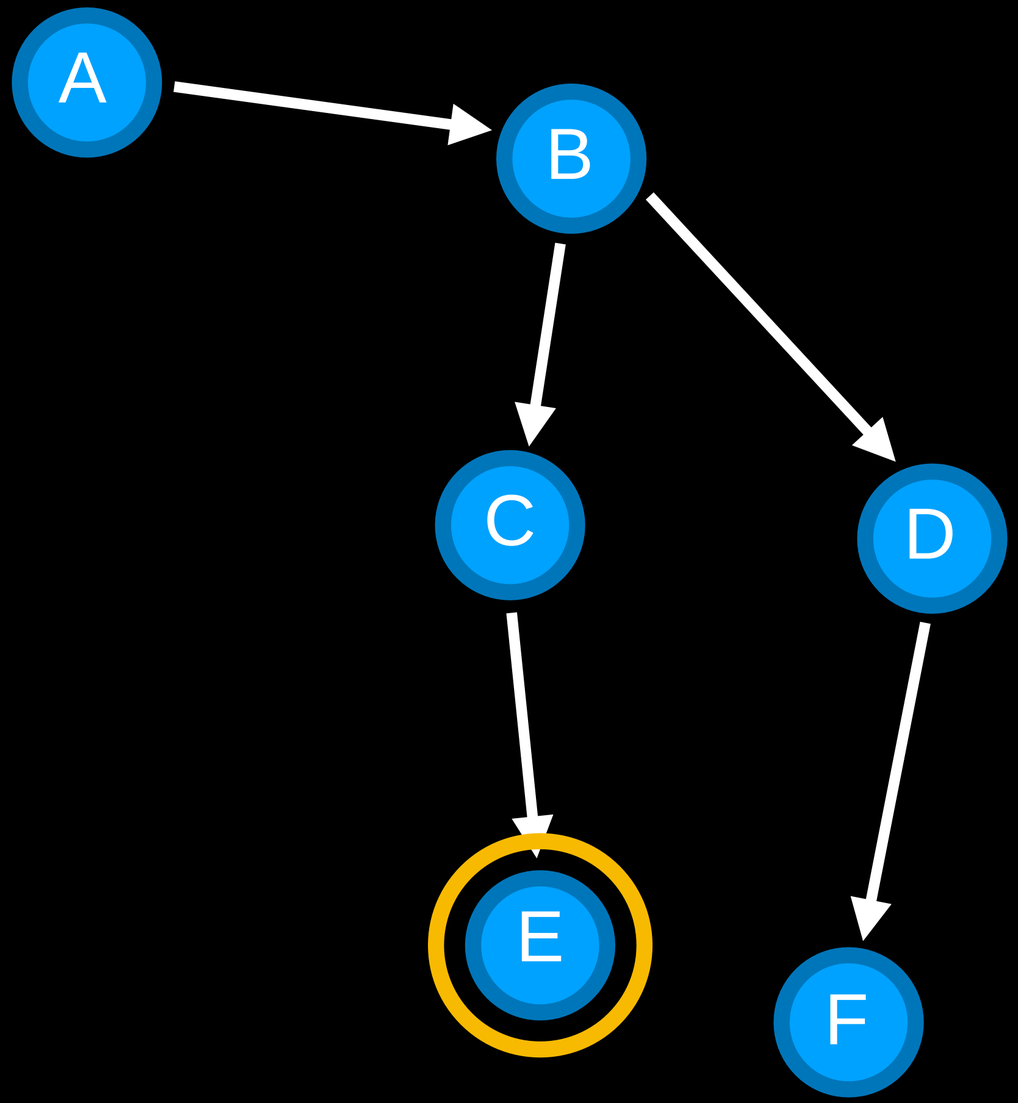


Find a path from A to E.

Frontier

Explored Set

A B D F C



Depth-First Search

depth-first search

search algorithm that always expands the deepest node in the frontier

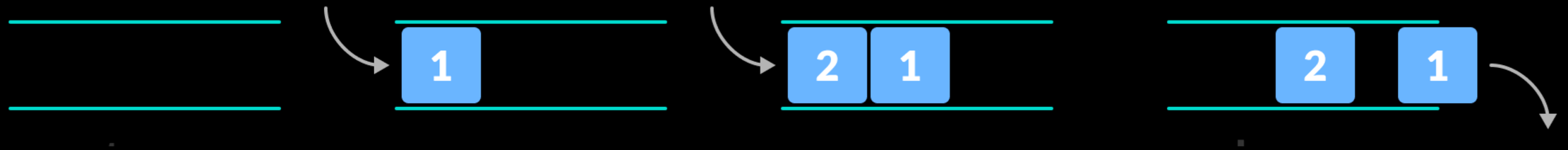
Breadth-First Search

breadth-first search

search algorithm that always expands the shallowest node in the frontier

queue

first-in first-out data type



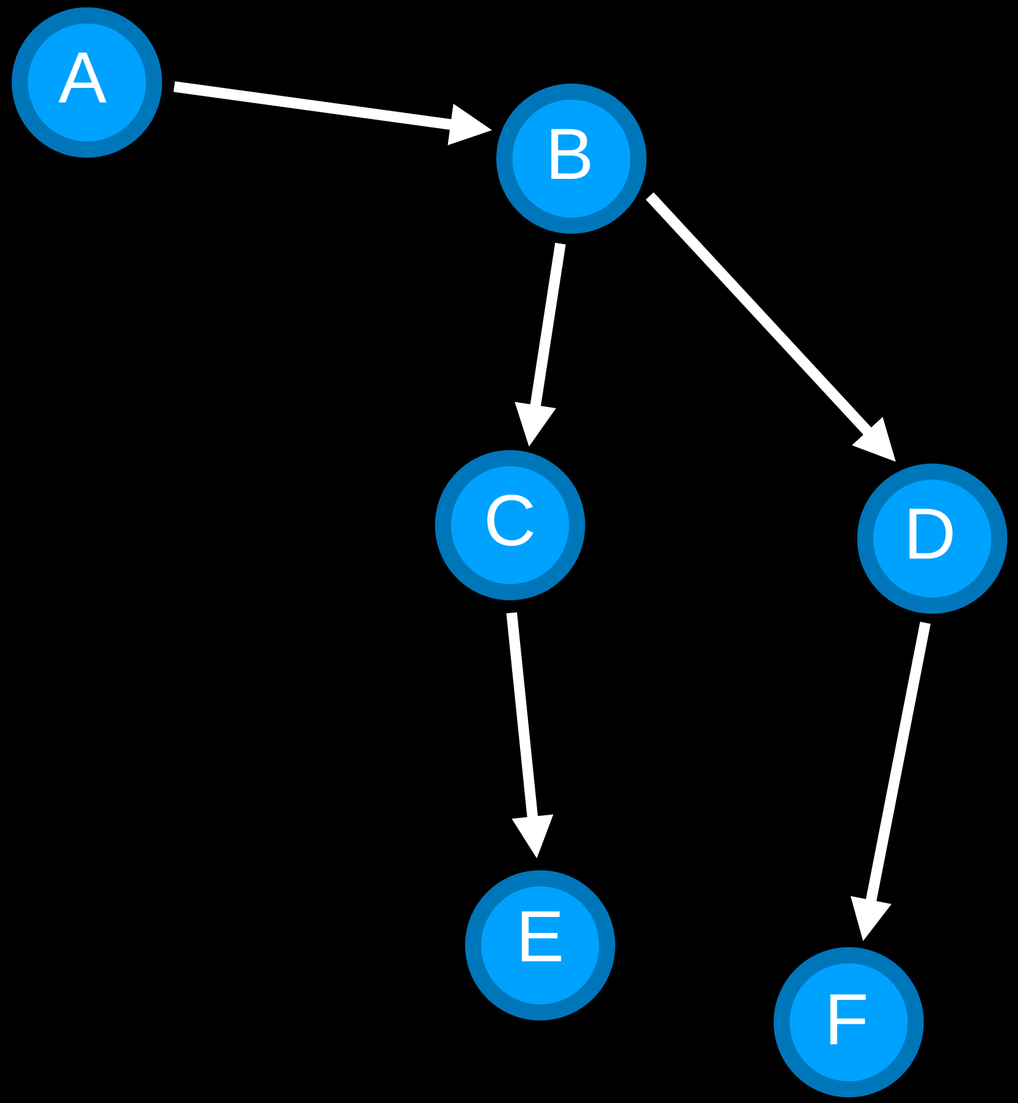
enqueue

dequeue

Find a path from A to E.

Frontier

Explored Set

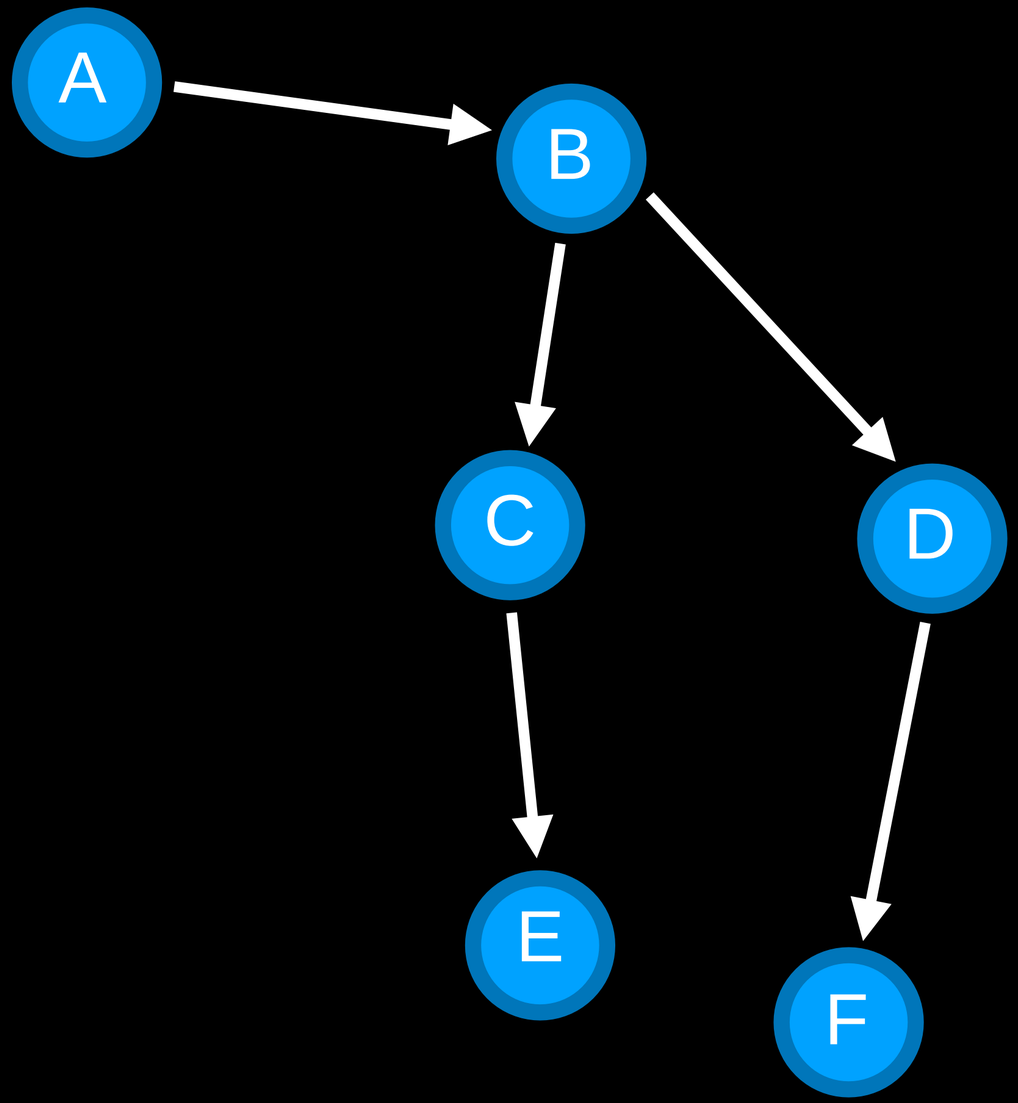


Find a path from A to E.

Frontier

A

Explored Set

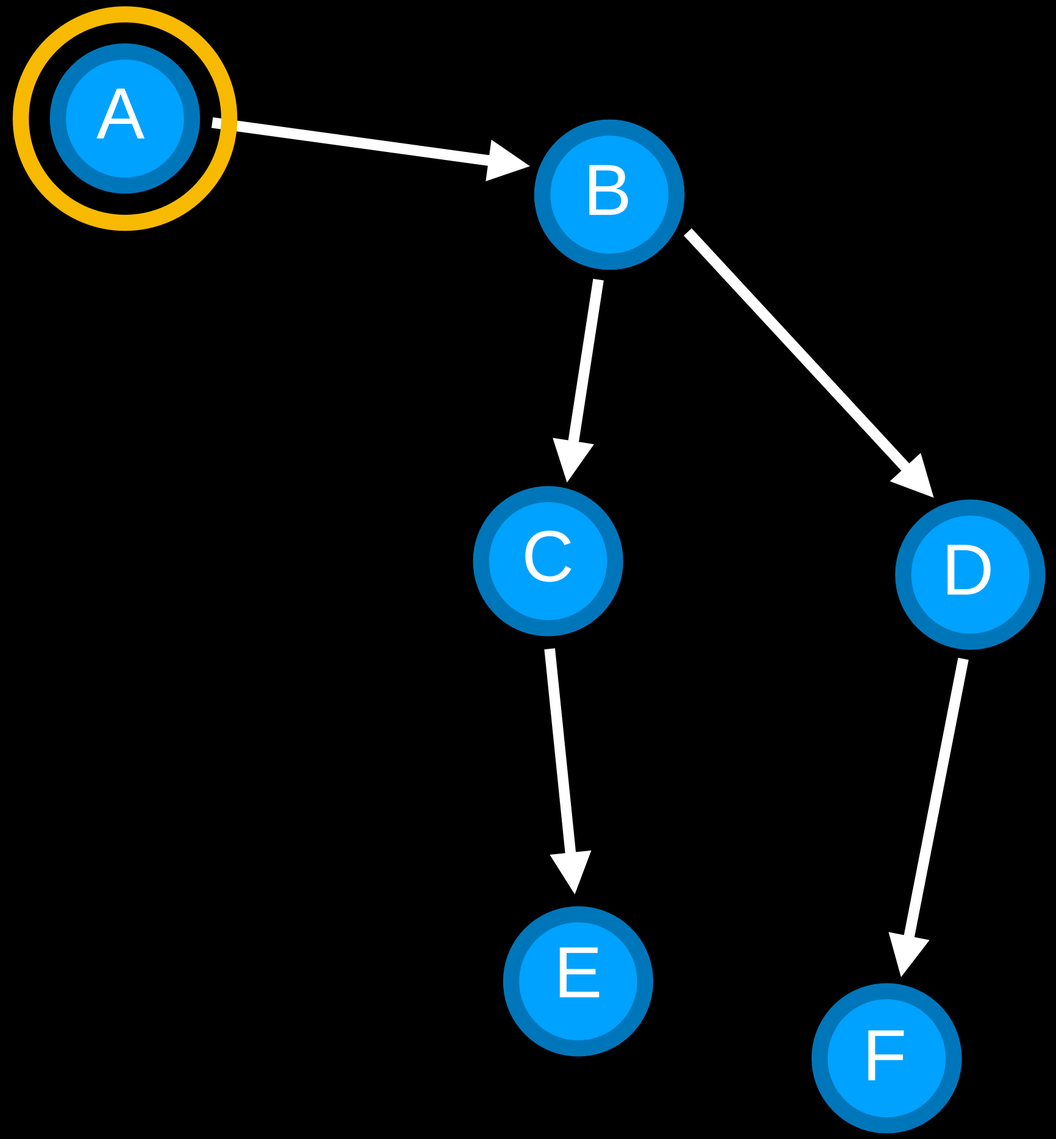


Find a path from A to E.

Frontier

Explored Set

A



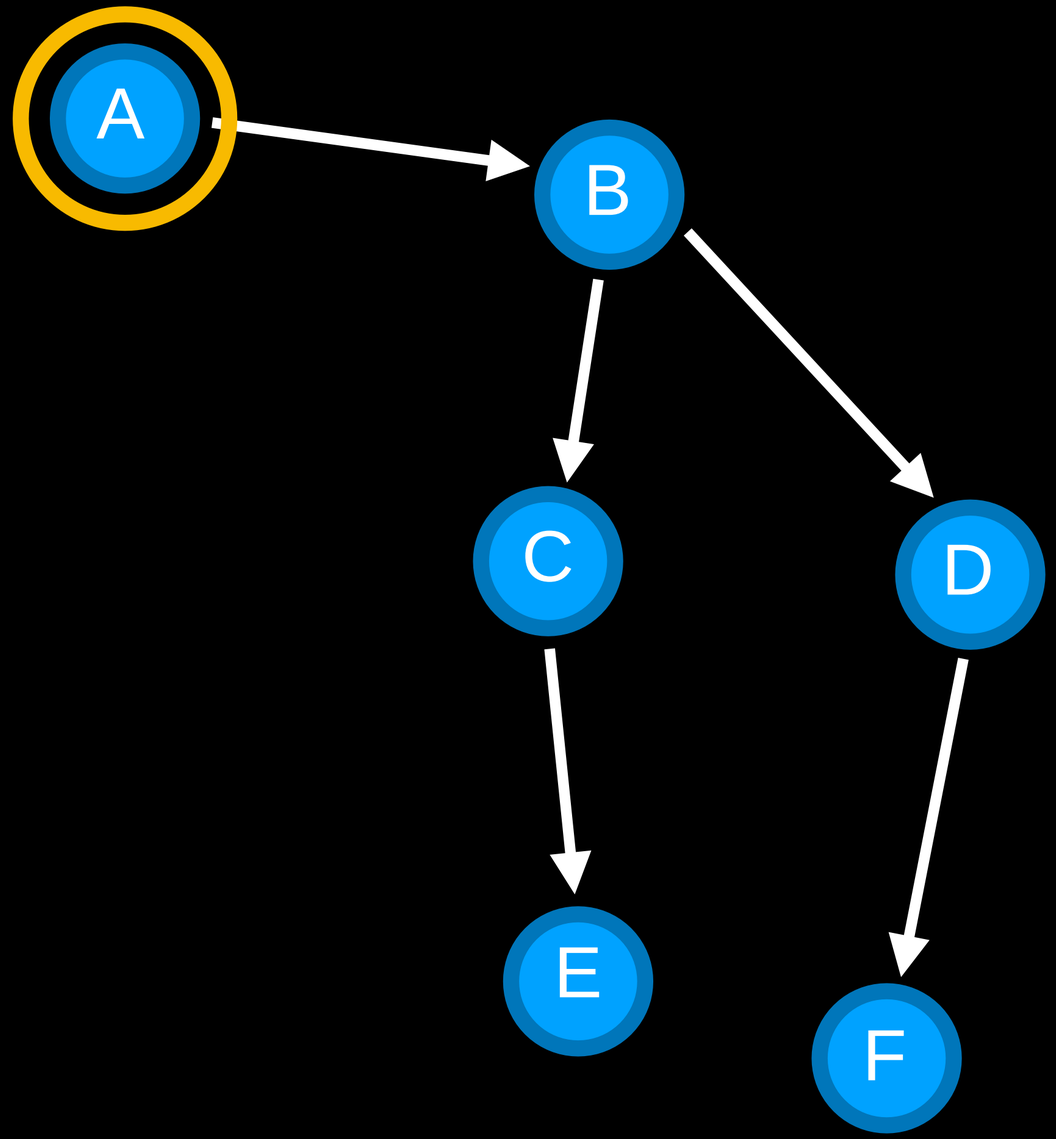
Find a path from A to E.

Frontier

B

Explored Set

A

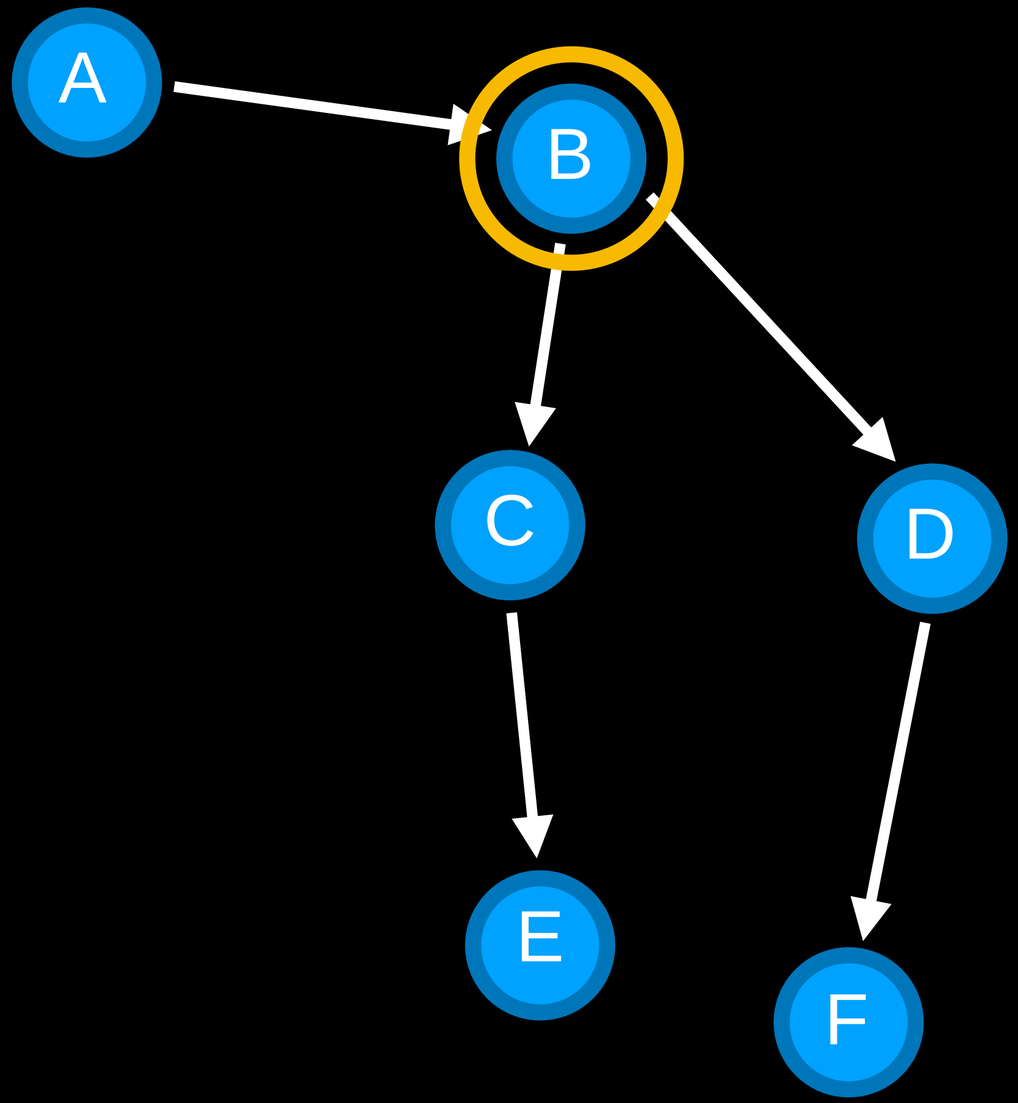


Find a path from A to E.

Frontier

Explored Set

A B



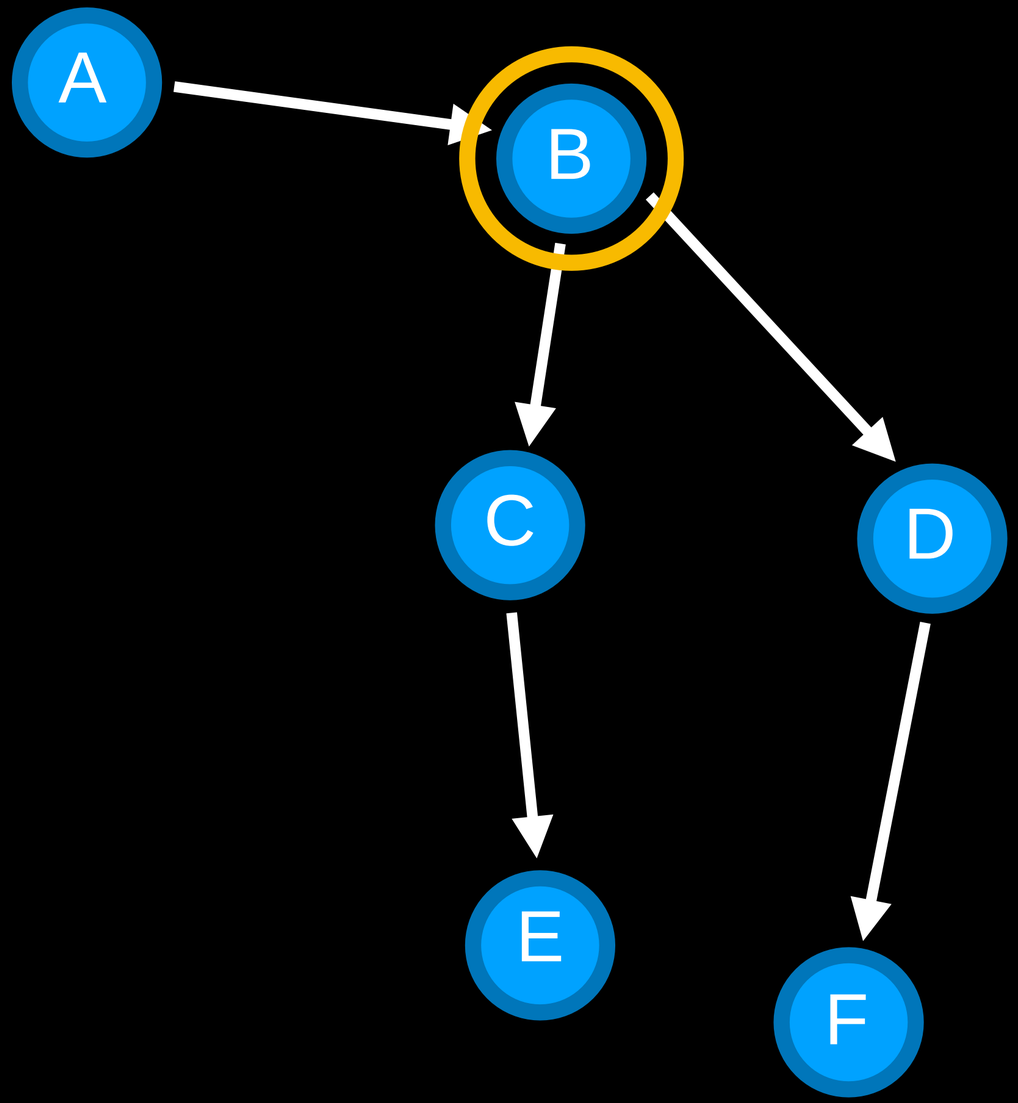
Find a path from A to E.

Frontier

C D

Explored Set

A B



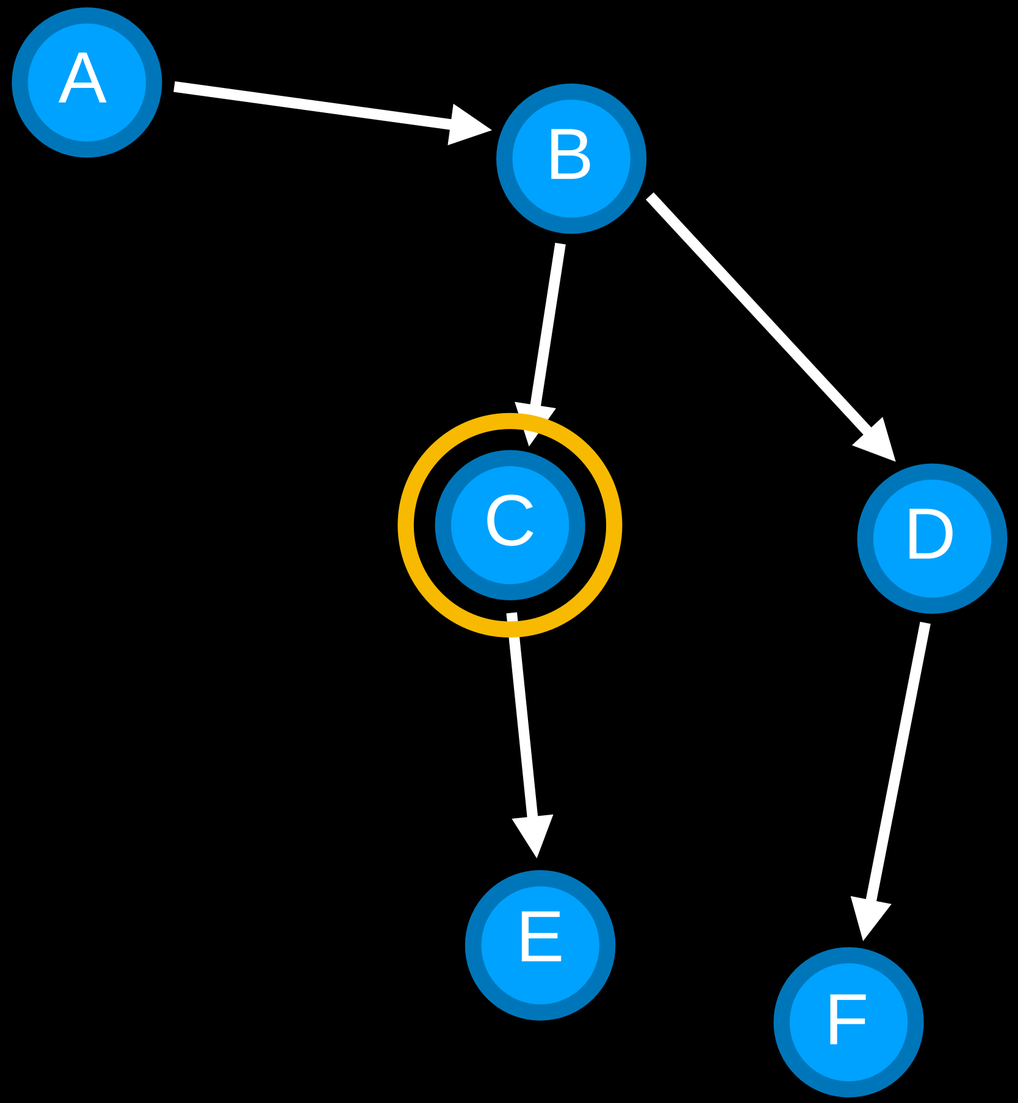
Find a path from A to E.

Frontier

D

Explored Set

A B C



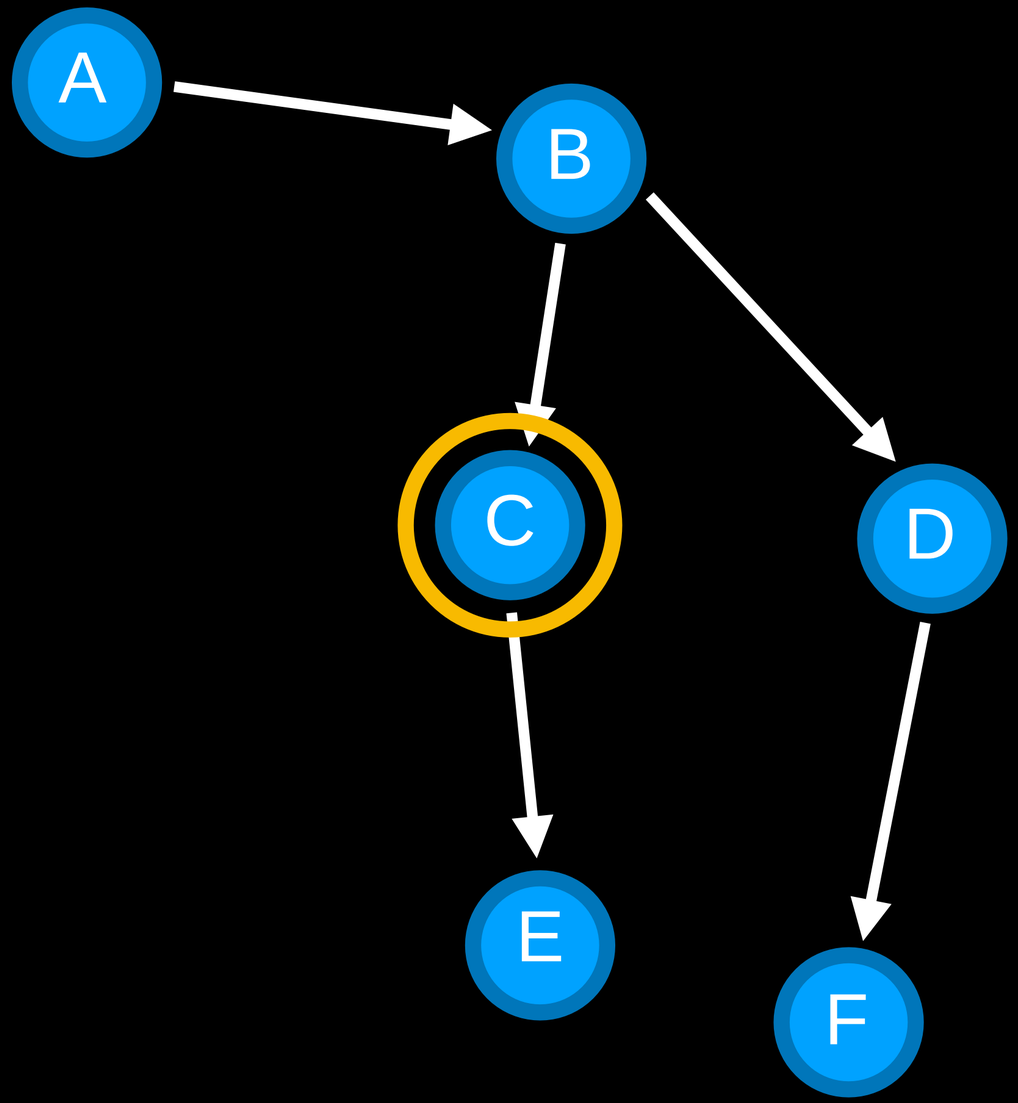
Find a path from A to E.

Frontier

D E

Explored Set

A B C



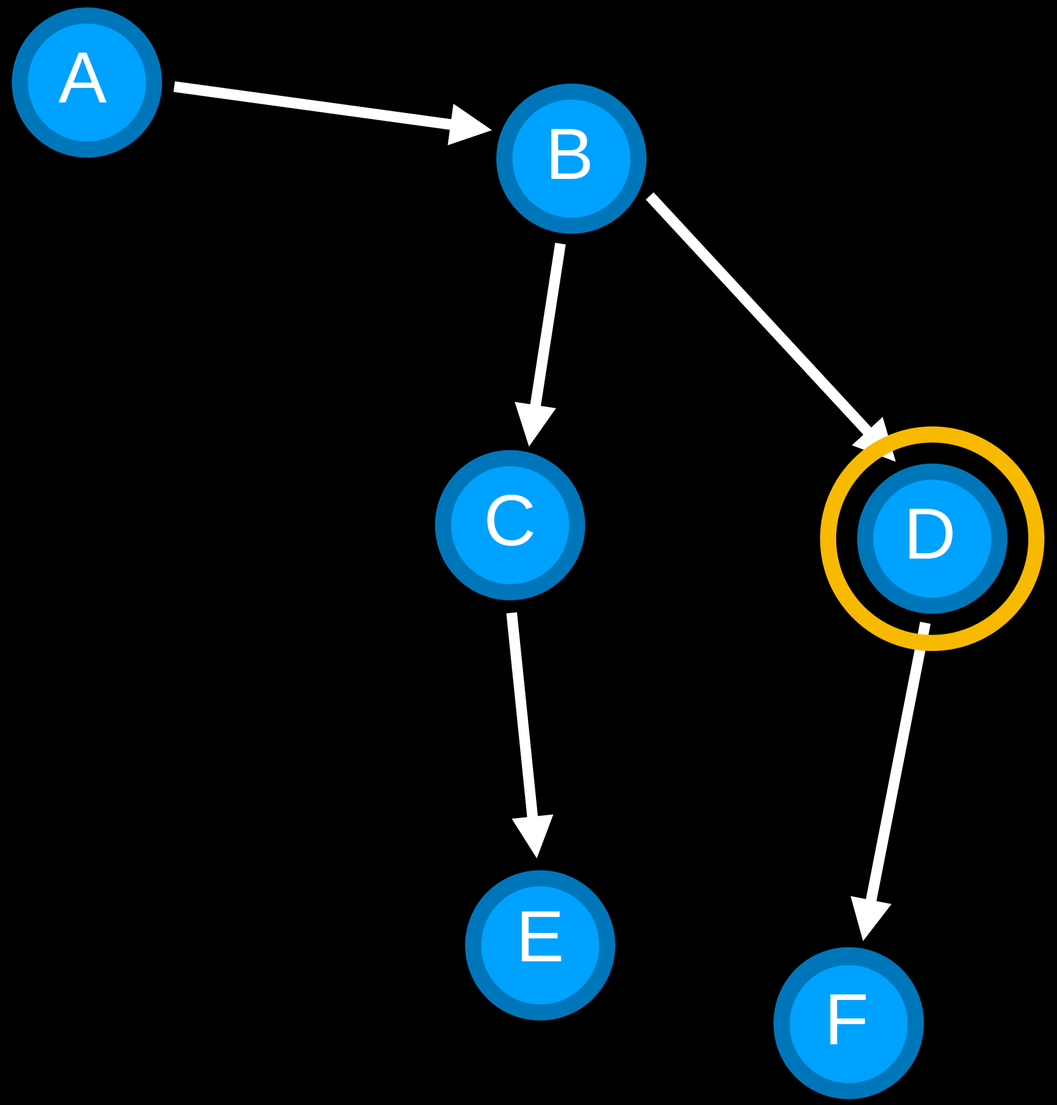
Find a path from A to E.

Frontier

E

Explored Set

A B C D



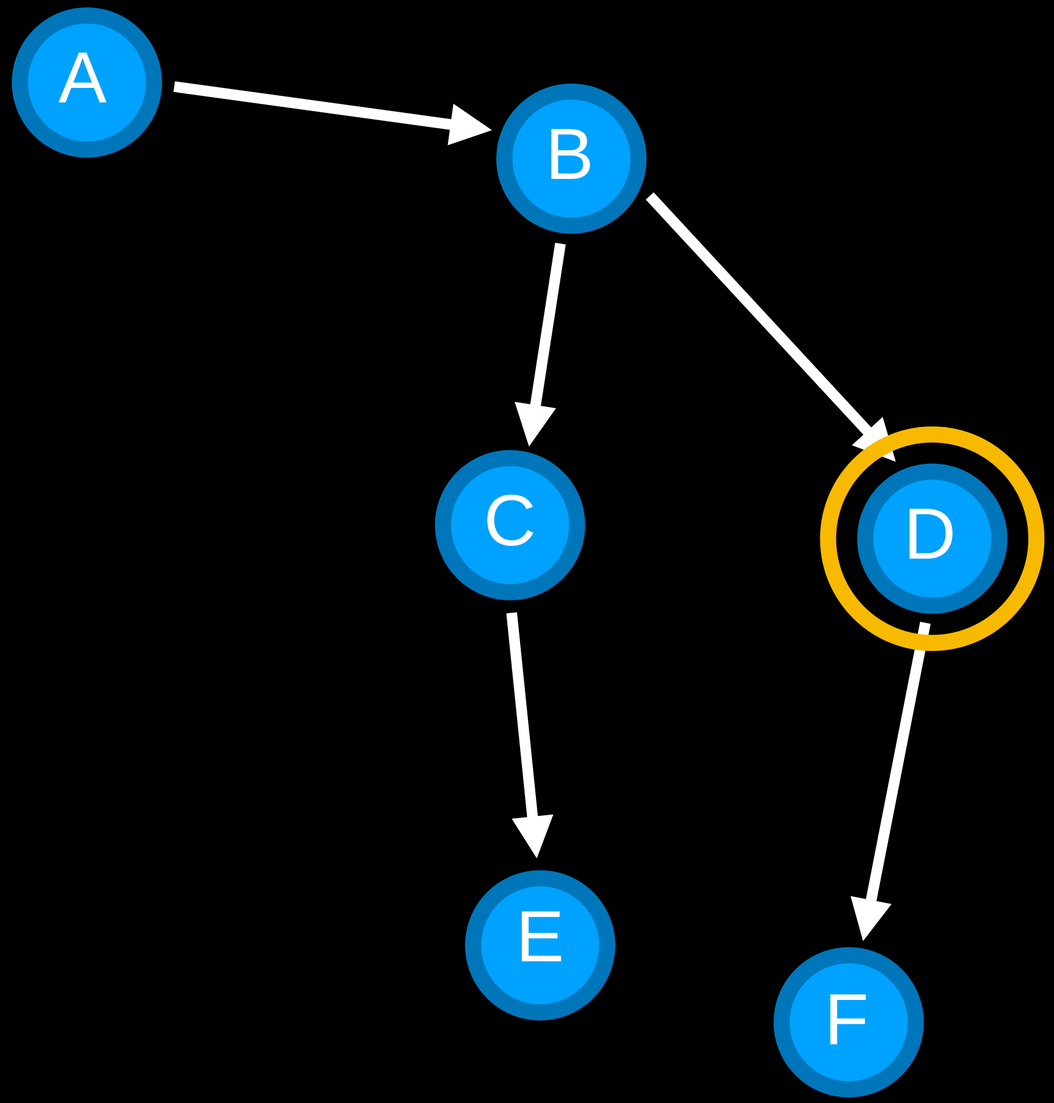
Find a path from A to E.

Frontier

E F

Explored Set

A B C D



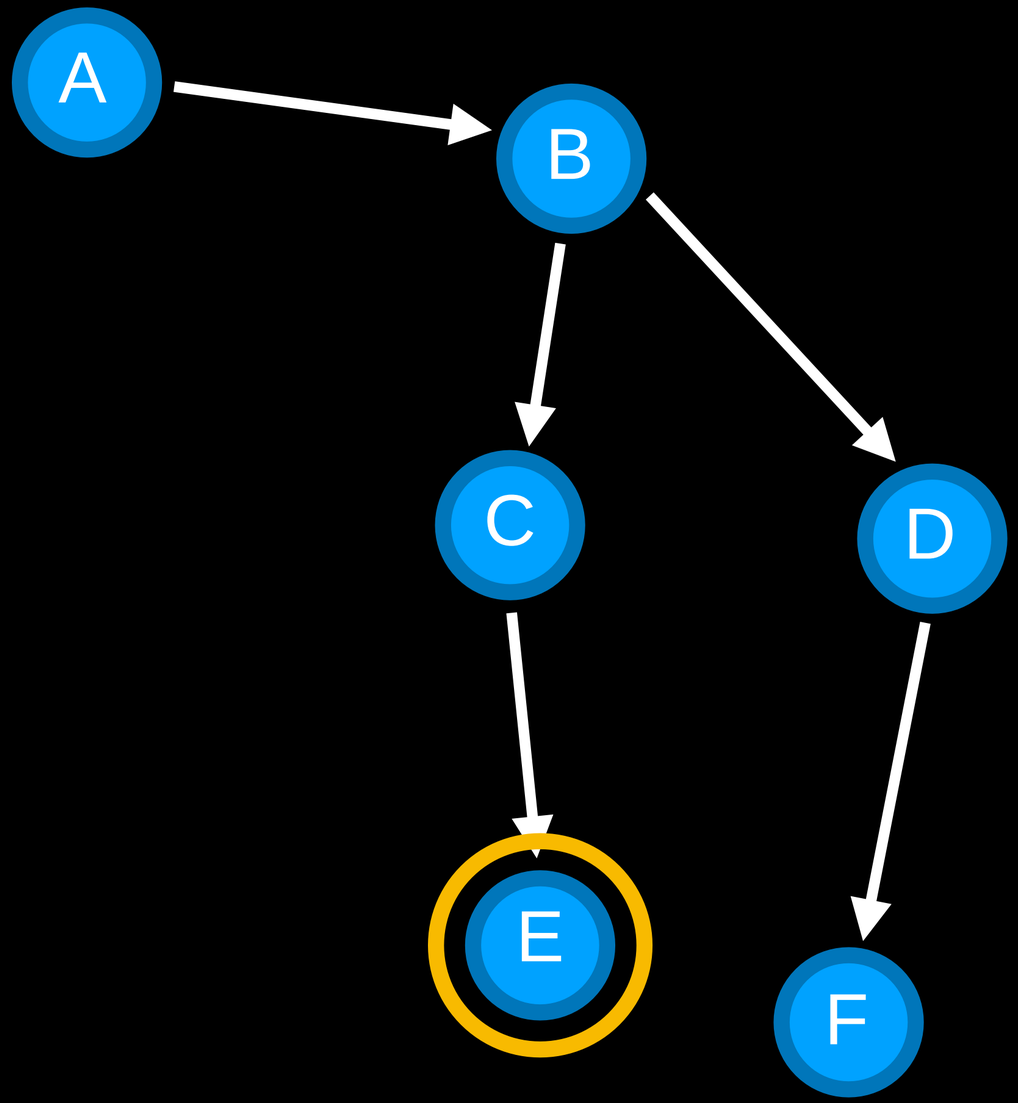
Find a path from A to E.

Frontier

F

Explored Set

A B C D



Search

python + AI

Introduction to Artificial Intelligence with Python