Introduction to Artificial Intelligence

AI 102

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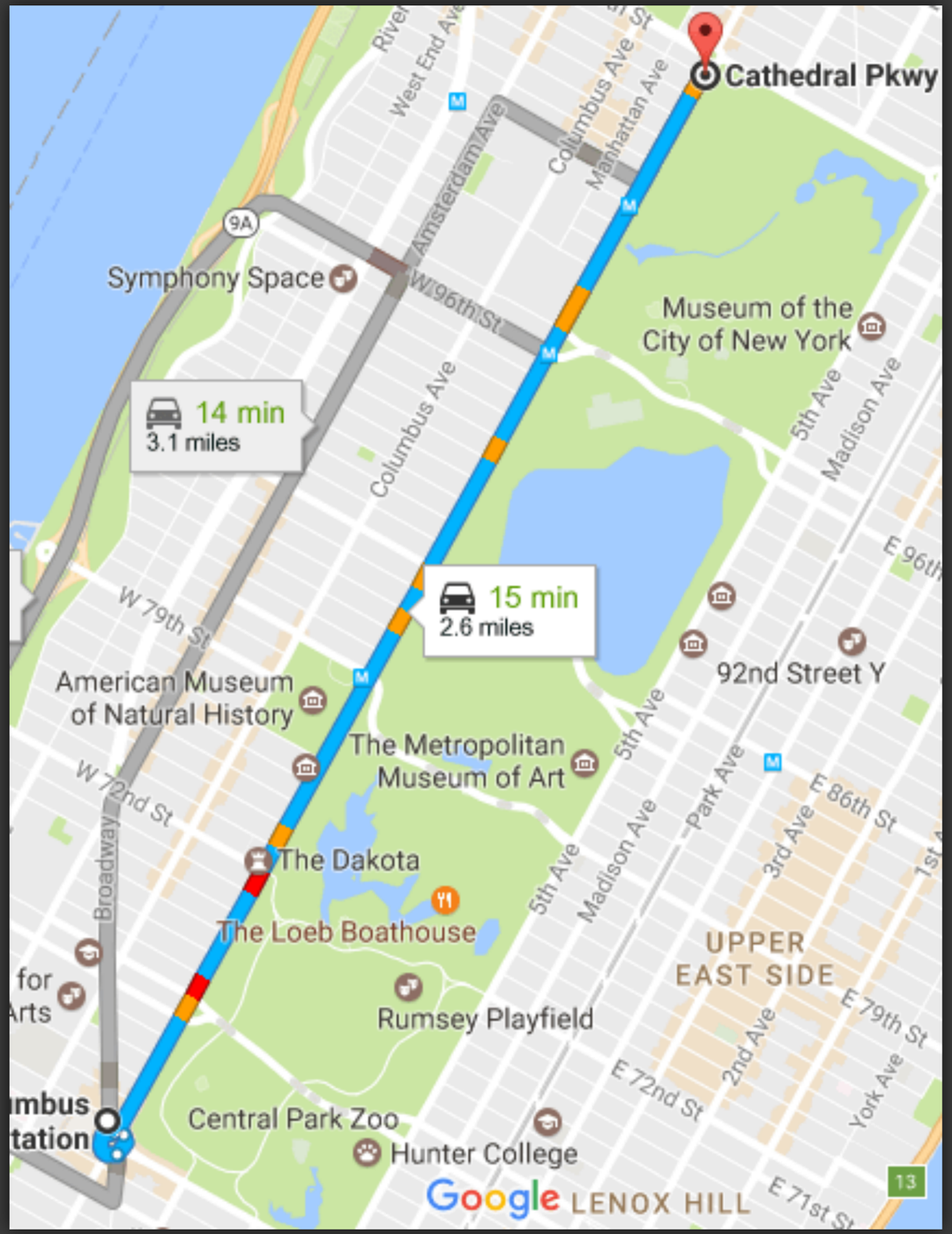


Blind Search Algorithms

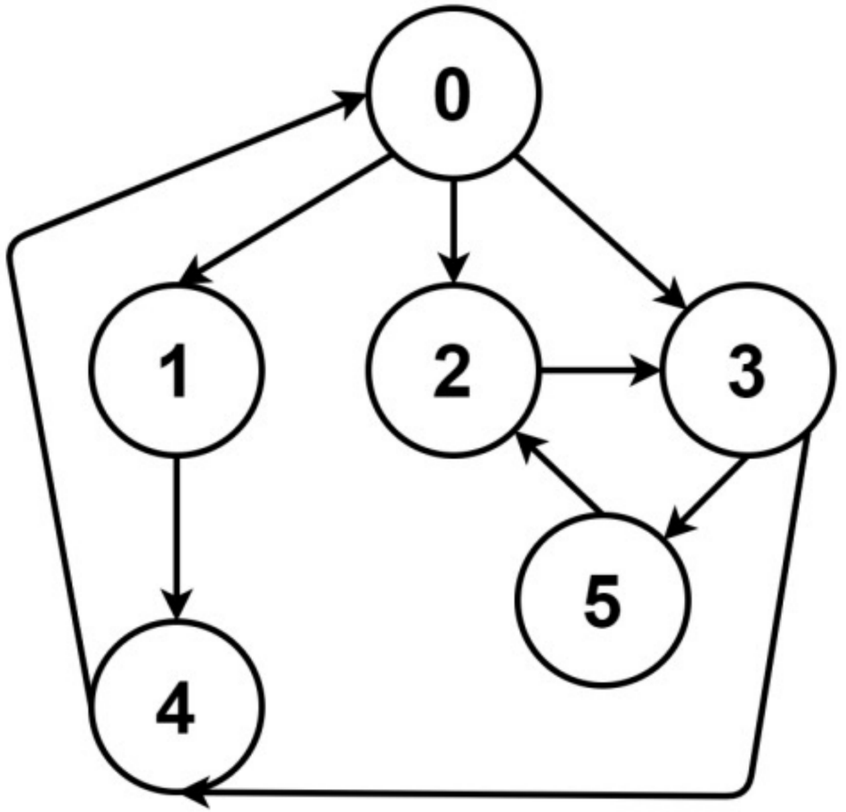
uninformed search

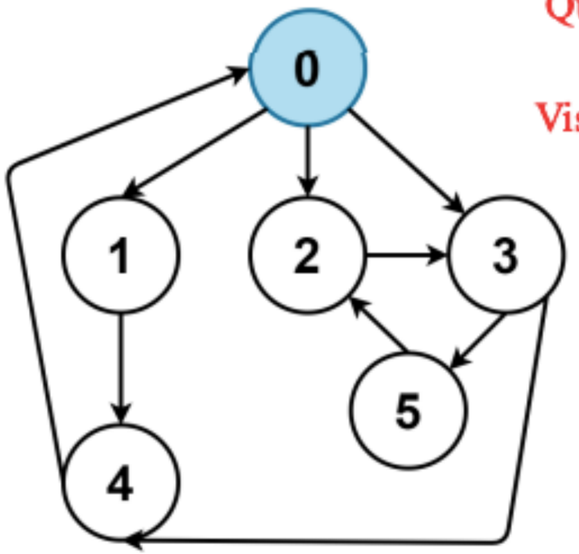
Graph traversal (Graph search) refers to the process of visiting each vertex in a graph.

Breadth First Search (BFS) is an algorithm traverses a graph using a **queue**.

Depth First Search (DFS) is an algorithm traverses a graph using a **stack**.

Directed Graph



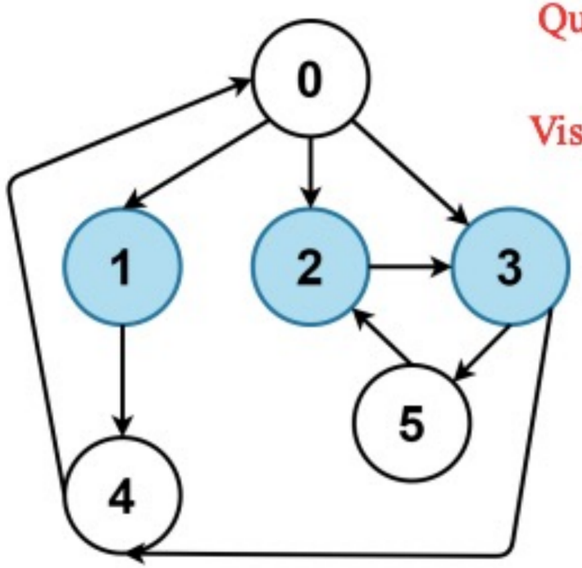


Queue

0									

Visited

0									



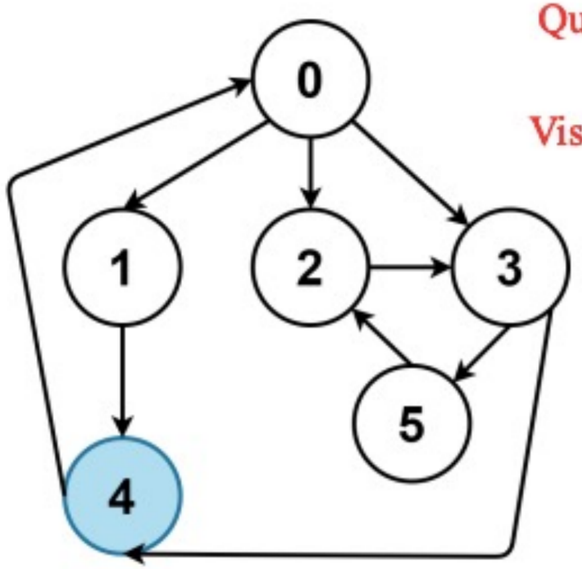
Queue

1	2	3							

Visited

0	1	2	3						

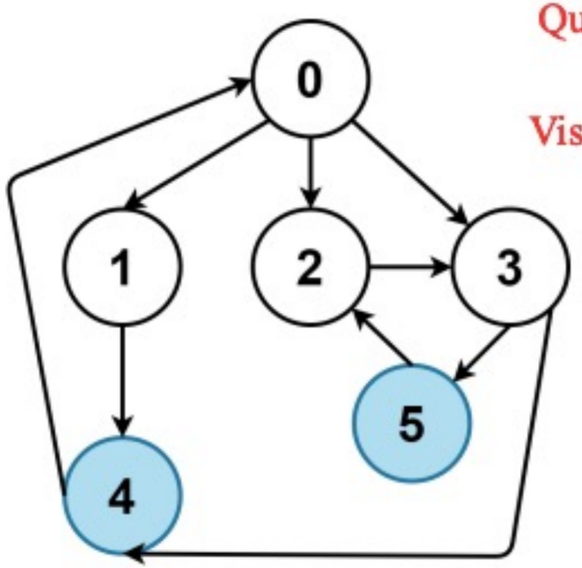
```
Printed: 0
```



Queue	2	3	4							

Visited	0	1	2	3	4					

```
Printed: 0, 1
```



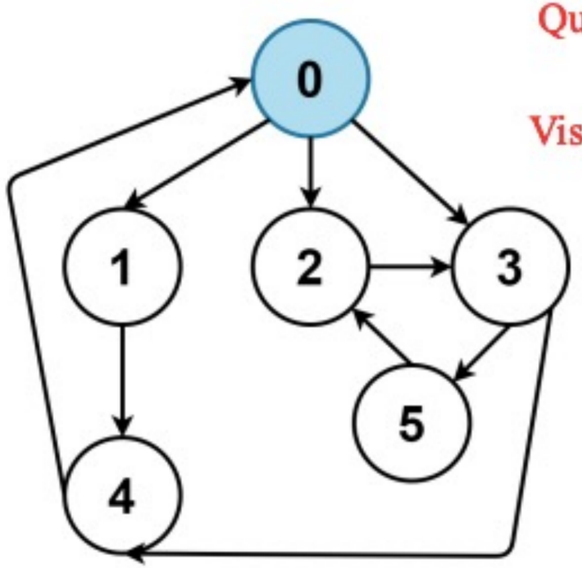
Queue

4	5								

Visited

0	1	2	3	4	5				

```
Printed: 0, 1, 2, 3
```



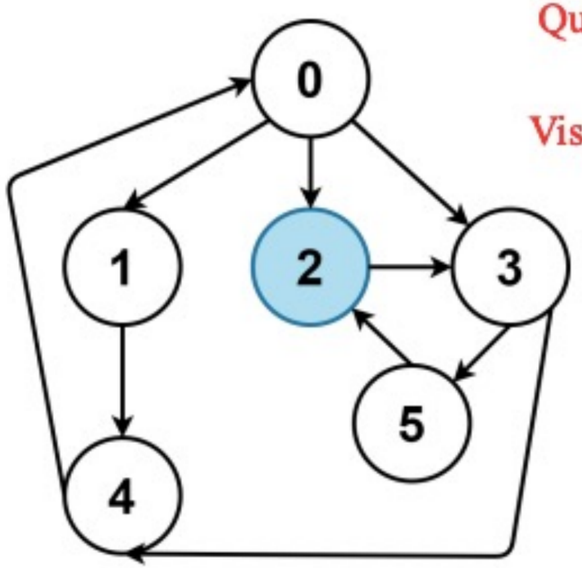
Queue

5									

Visited

0	1	2	3	4	5				

```
Printed: 0, 1, 2, 3, 4
```



Queue

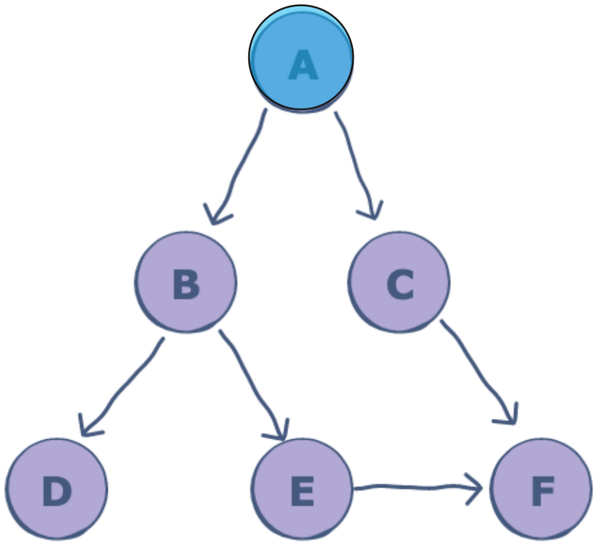
Visited

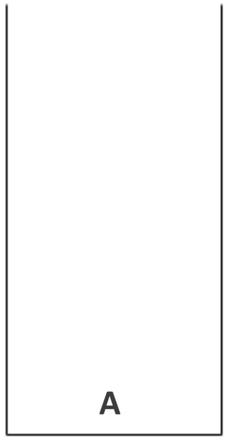
0	1	2	3	4	5				

```
Printed: 0, 1, 2, 3, 4, 5
```

```
'C' : ['F', 'G'],
'D' : [],
'E' : [],
'F' : [],
'G' : []
}
visited = []
queue = []
goal = 'F'

def bfs (visited, graph,node):
    visited.append(node)
    queue.append(node)
    
    while queue:
        s = queue.pop(0)
        print(s, end=" ")
        for neighbour in graph[s]:
            if neighbour not in visited:
                visited.append(neighbour)
                queue.append(neighbour)
            if goal in visited:
                break
bfs(visited, graph, 'A')
```

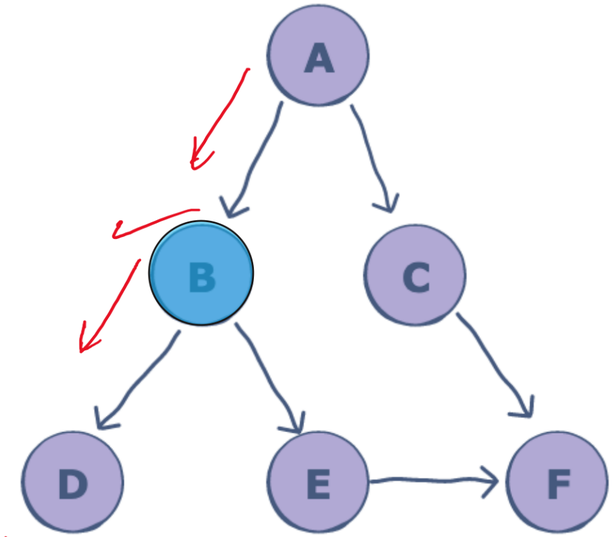


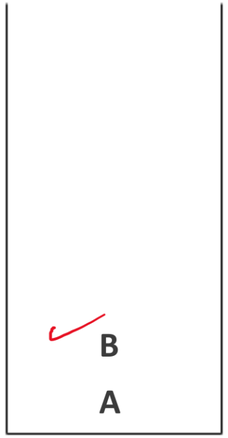


Visited

A									

Printed: A ,

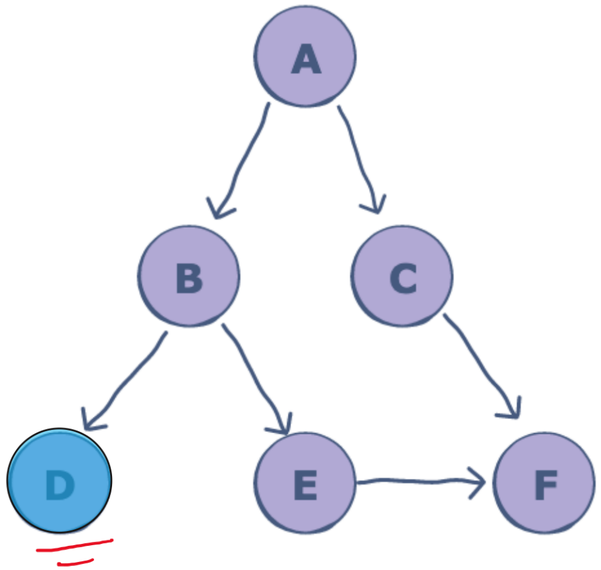


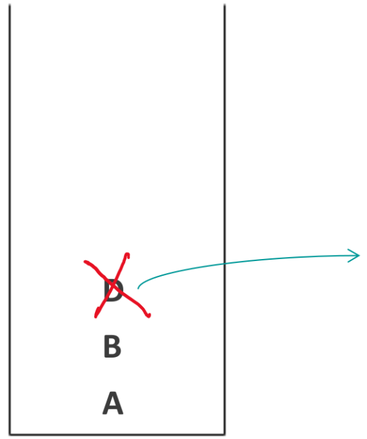


Visited

A	B								

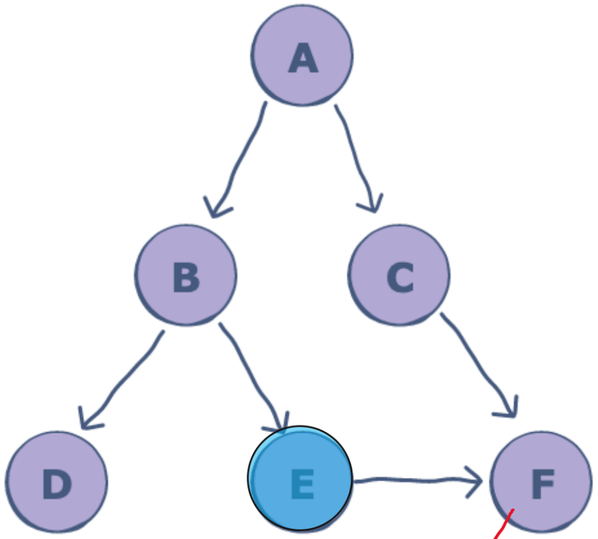
Printed: A , B

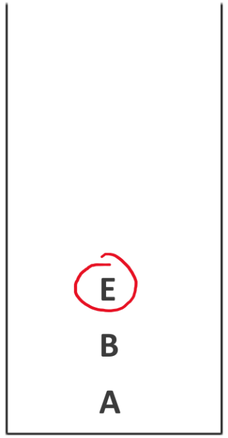




Visited	A	B	D							

Printed: A , B , D

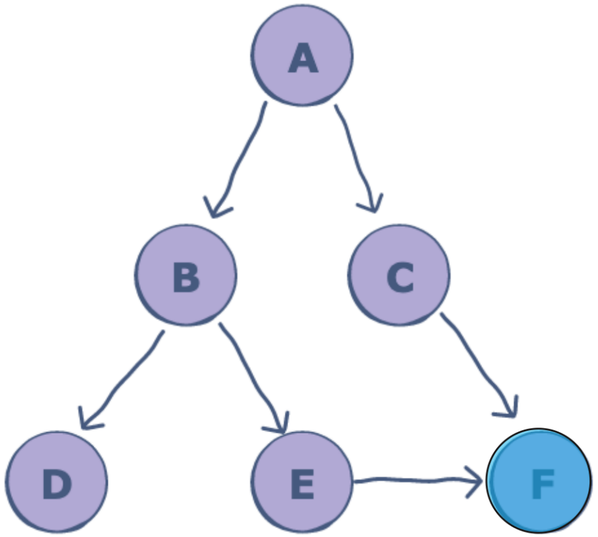


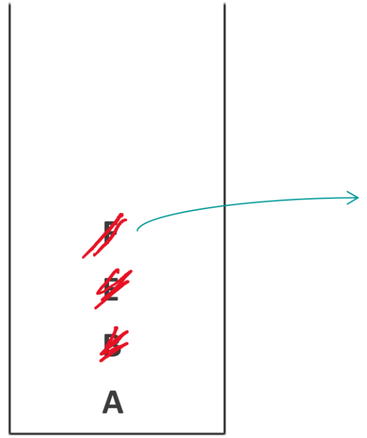


Visited

A	B	D	E						

Printed: A , B , D , E ,

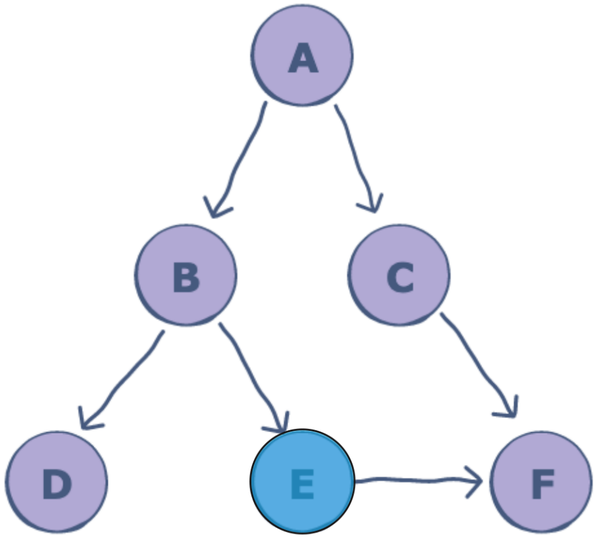


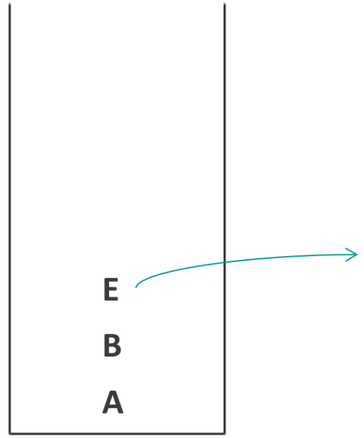


Visited

A	B	D	E	F					

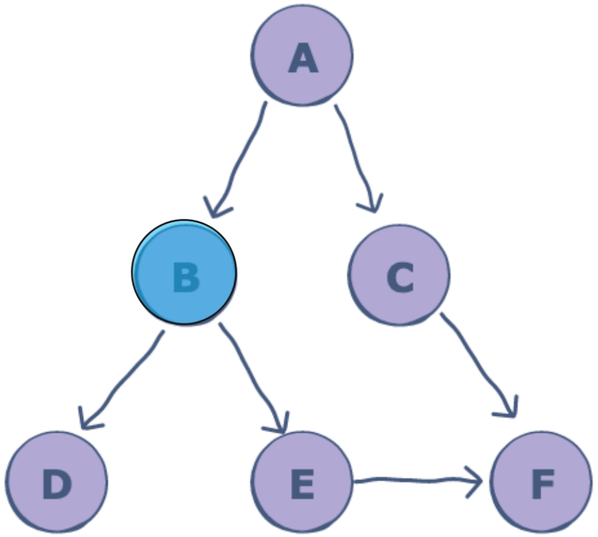
Printed: A , B , D , E , F ,

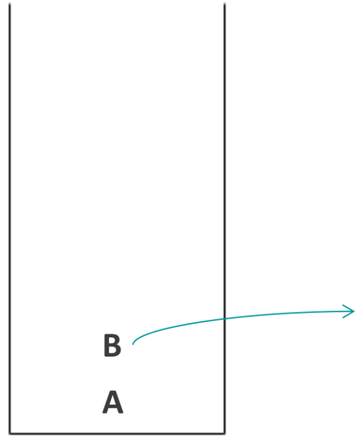




Visited	A	B	D	E	F					

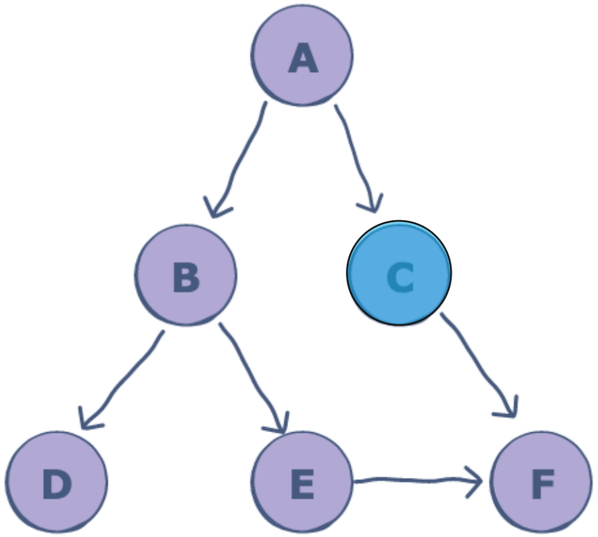
Printed: A , B , D , E , F ,

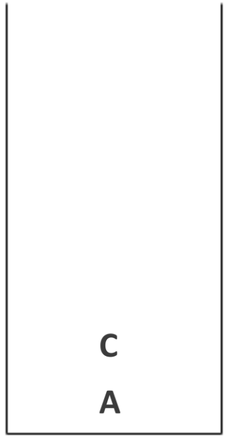




Visited	A	B	D	E	F					

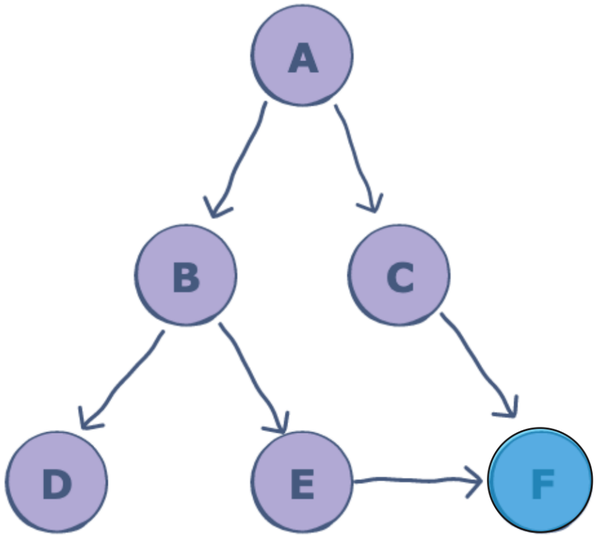
Printed: A , B , D , E , F ,

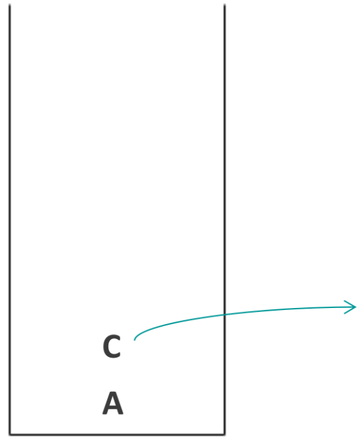




Visited	A	B	D	E	F	C				

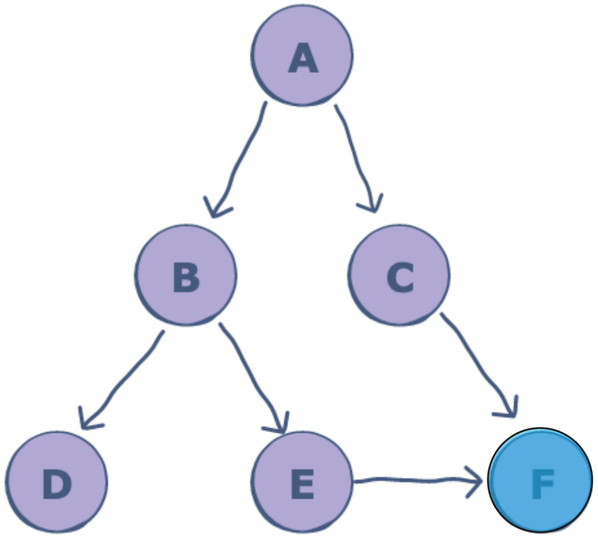
Printed: A , B , D , E , F , C

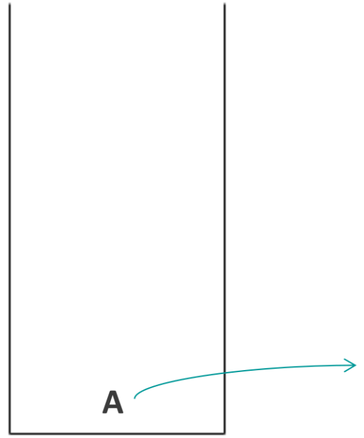




Visited	A	B	D	E	F	C				

Printed: A , B , D , E , F , C



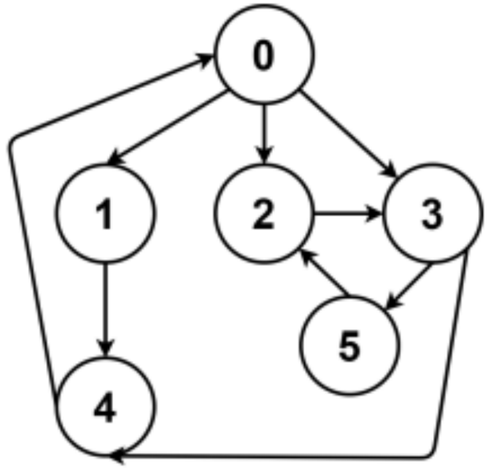


Visited	A	B	D	E	F	C				

Printed: A , B , D , E , F , C

A graph is represented in python using dictionary and list.

Graph Visualization



Graph Representation in Python

```
{
    0: [1, 2, 3],
    1: [4],
    2: [3],
    3: [4, 5],
    4: [0],
    5: [2]
}
```

```
graph = {
'A' : ['B','C'],
'B' : ['D', 'E'],
'C' : ['F', 'G'],
'D' : [],
'E' : [],
'F' : [],
'G' : []
}
goal = 'F'
visited = set()
def dfs (visited, graph, node):
    if node not in visited:
        print(node)
        visited.add(node)
    for neighbour in graph[node]:
        if goal in visited:
            break
        else:
            dfs(visited, graph, neighbour)

dfs(visited, graph, 'A')
```