SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-IOT Including CS&BCT

COURSE NAME : **19CS307**- DATA STRUCTURES

II YEAR / III SEMESTER

Unit IV- **NON LINEAR DATA STRUCTURES -GRAPH**

TOPIC: DFS

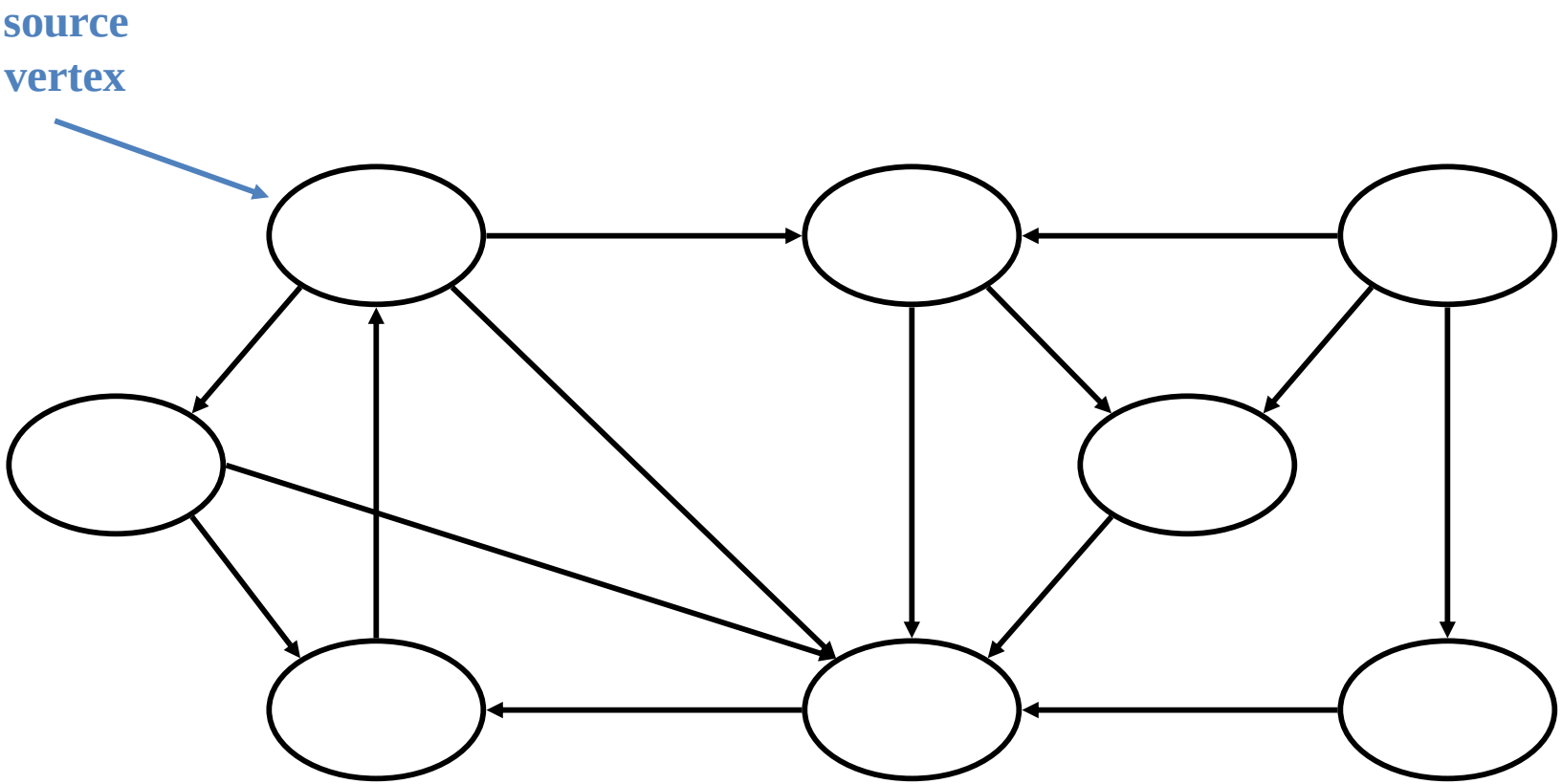
DFS

- **DFS** stands for **Depth First Search** is a edge based technique. It uses the Stack data structure, performs two stages, first visited vertices are pushed into stack and second if there is no vertices then visited vertices are popped.

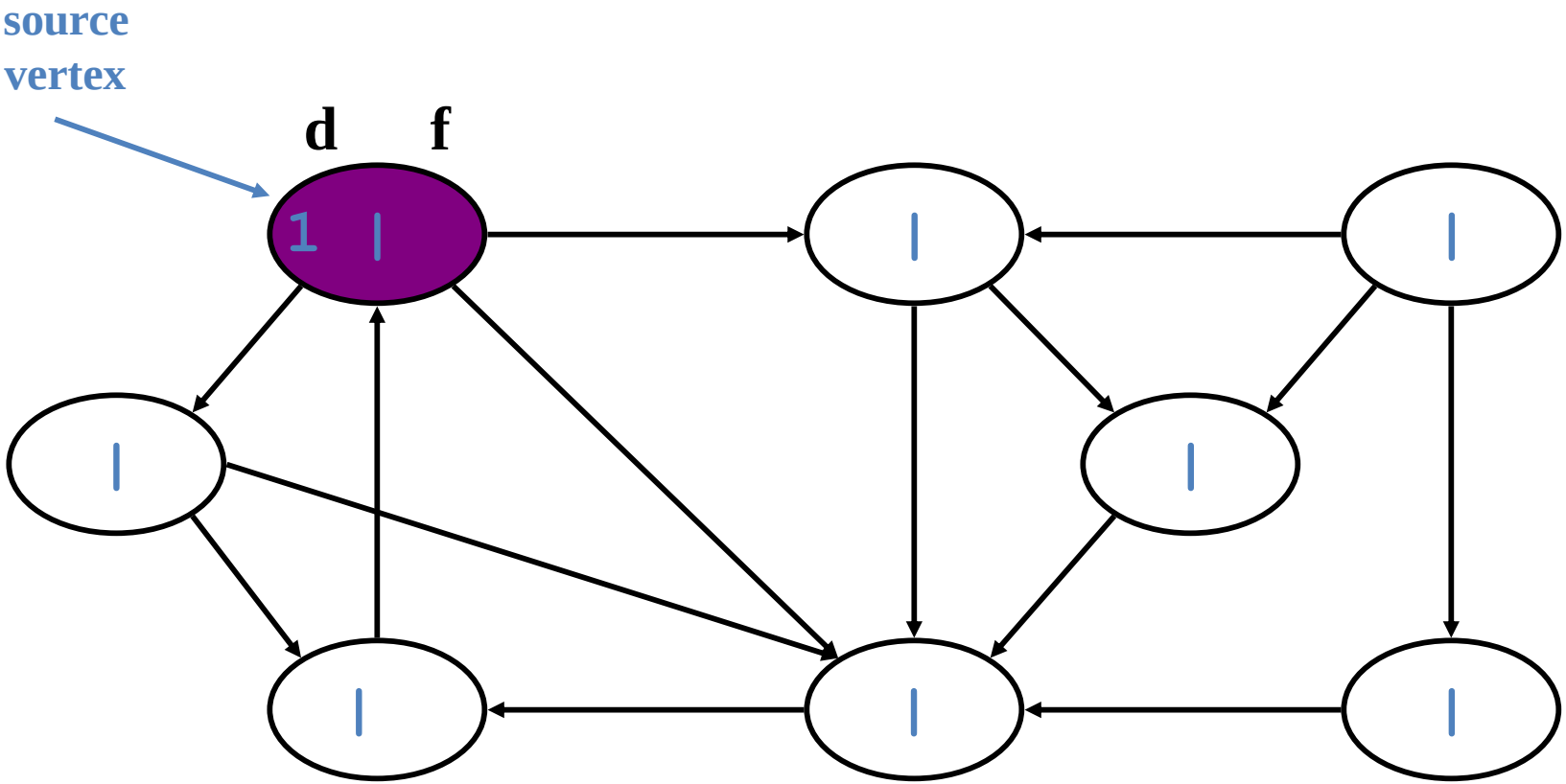
Depth-First Search

- Vertices initially colored white
- Then colored gray when discovered
- Then black when finished

DFS Example



DFS Example



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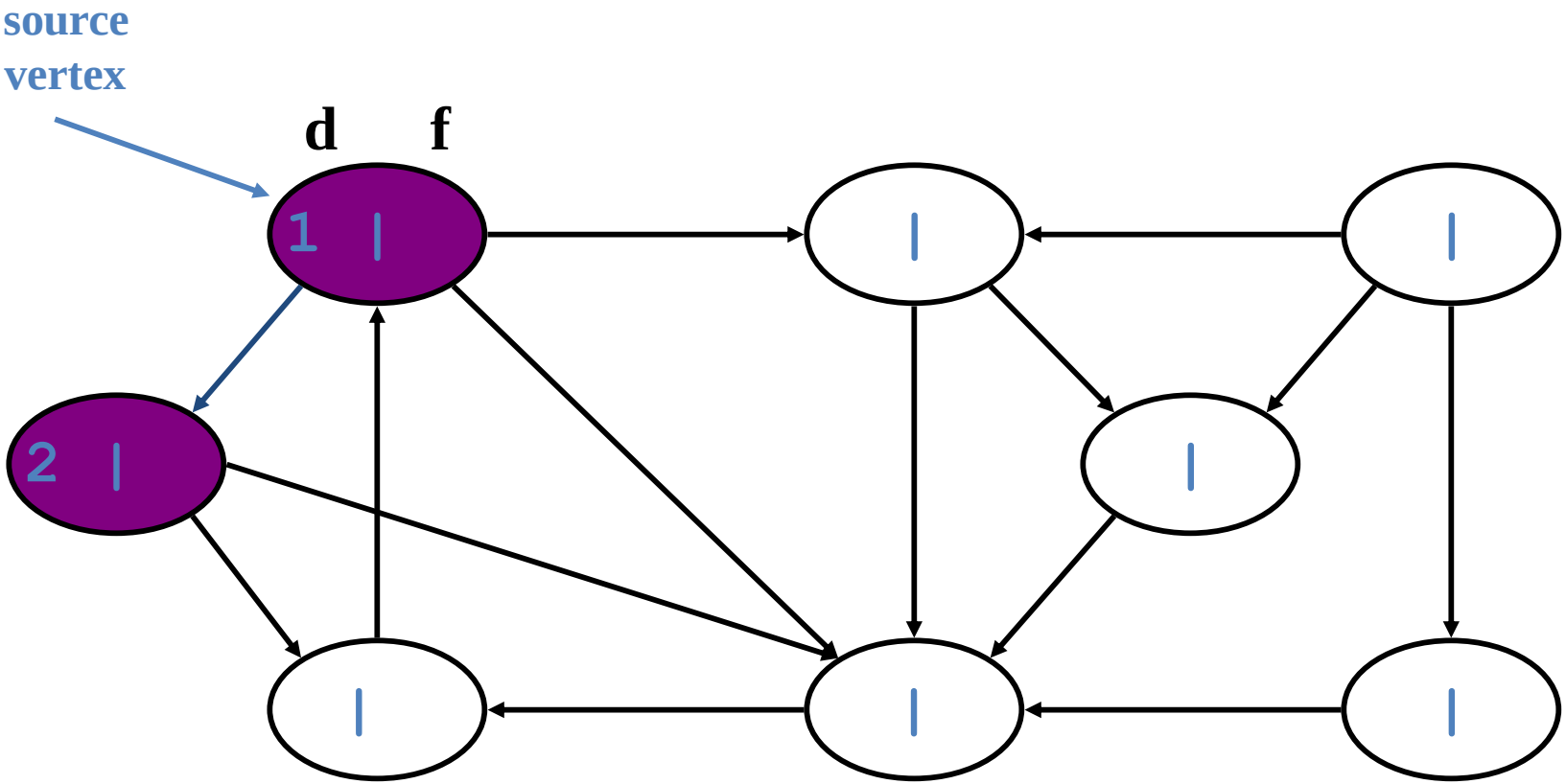

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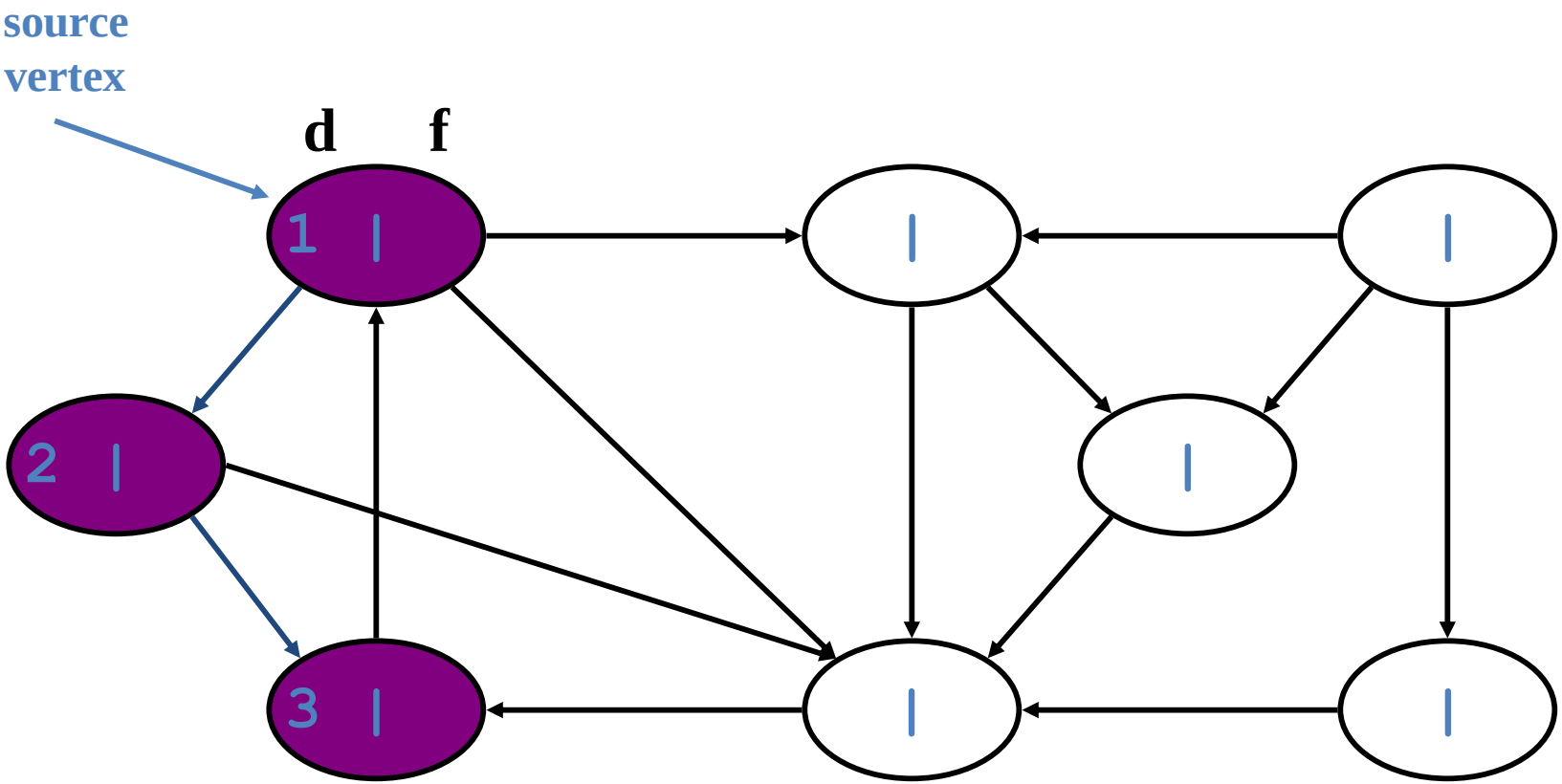

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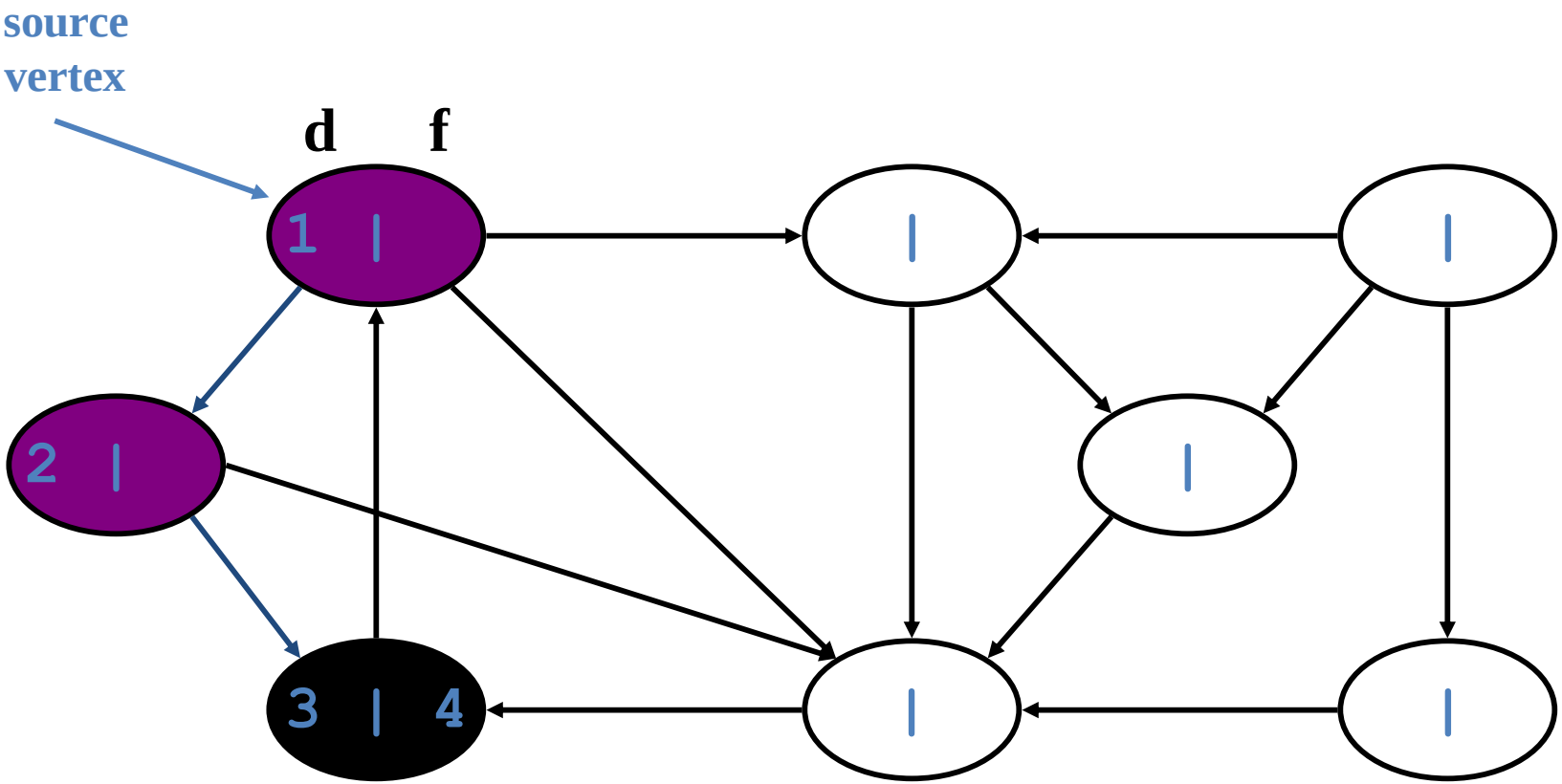

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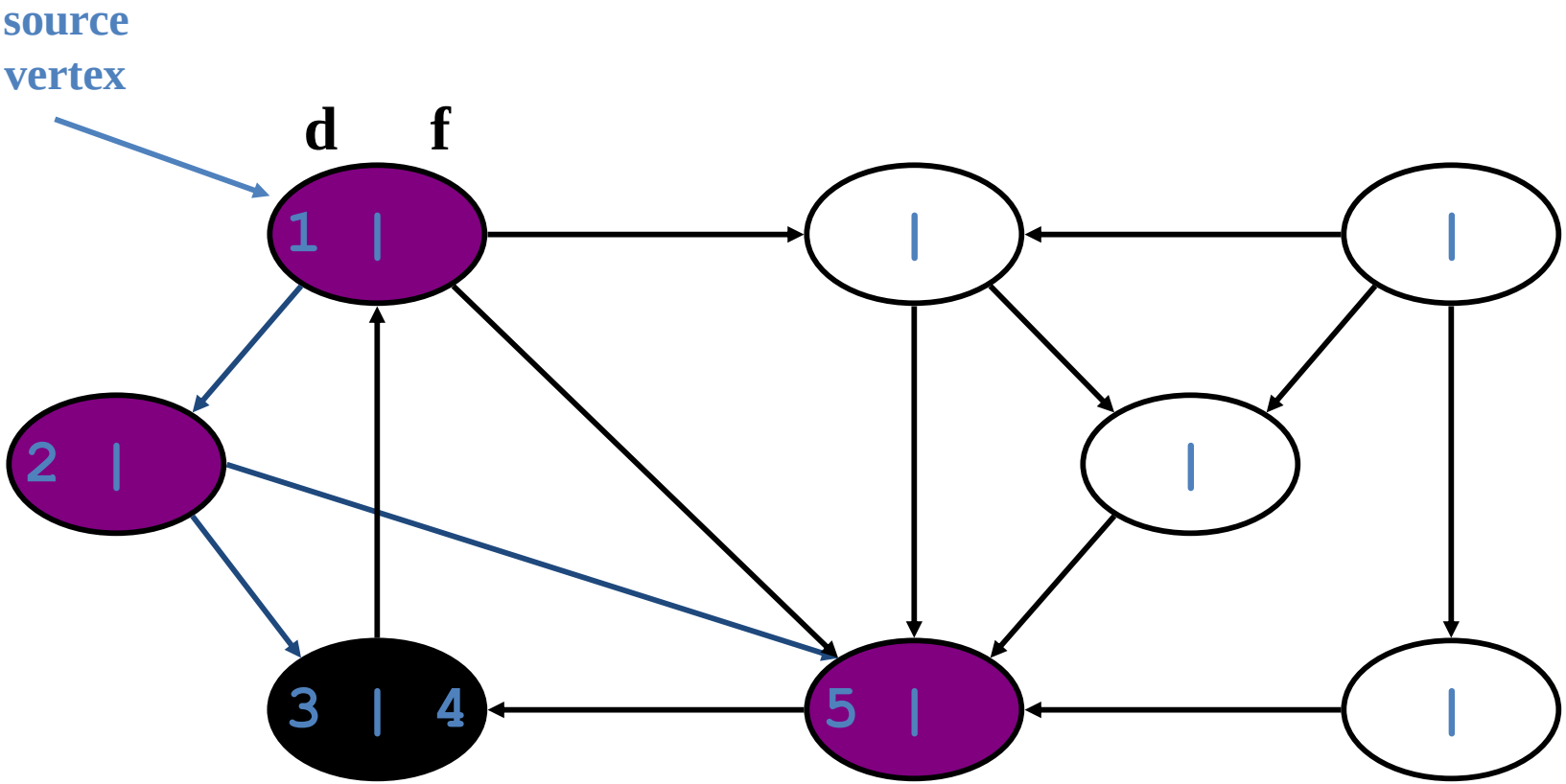

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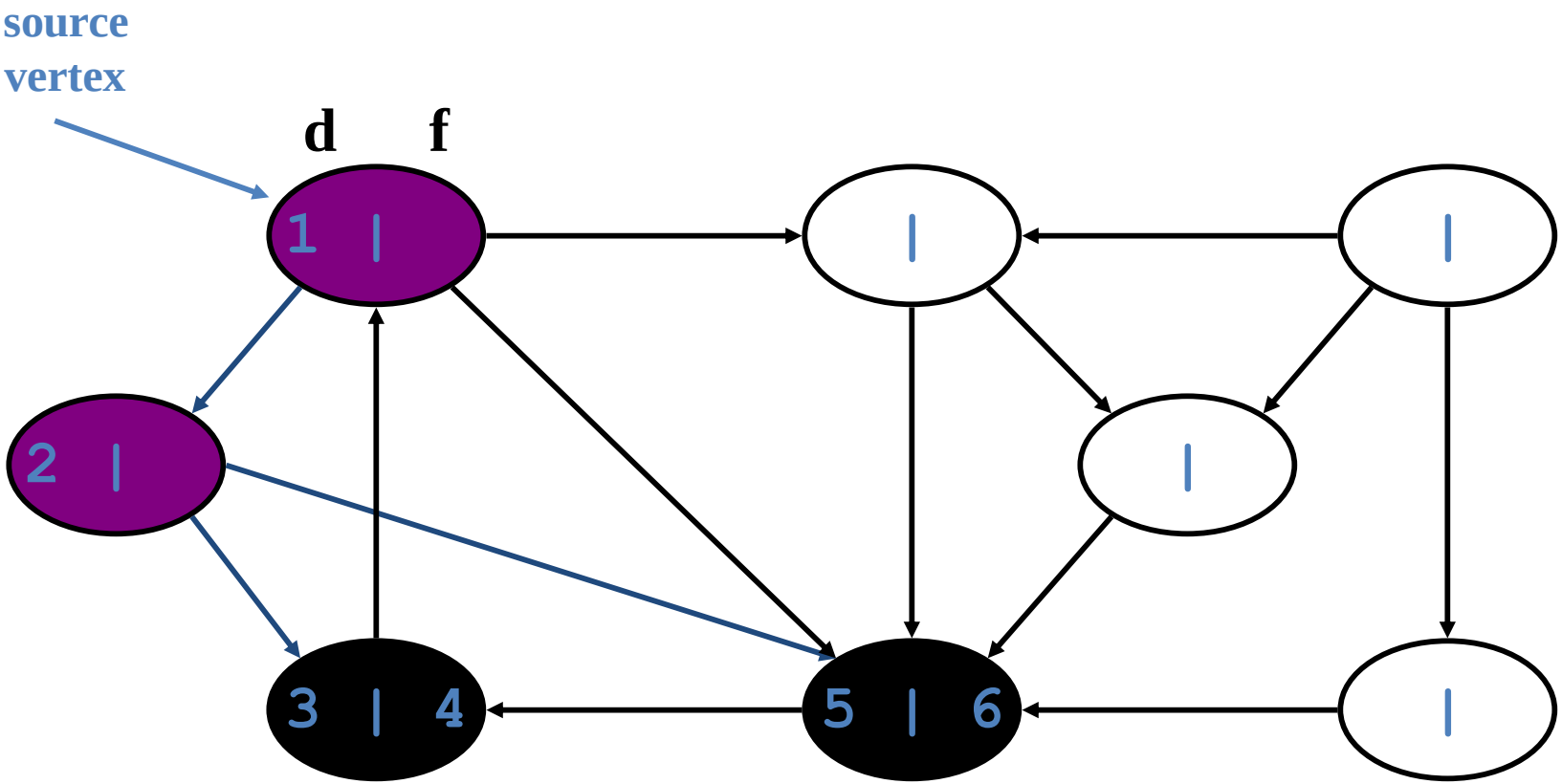

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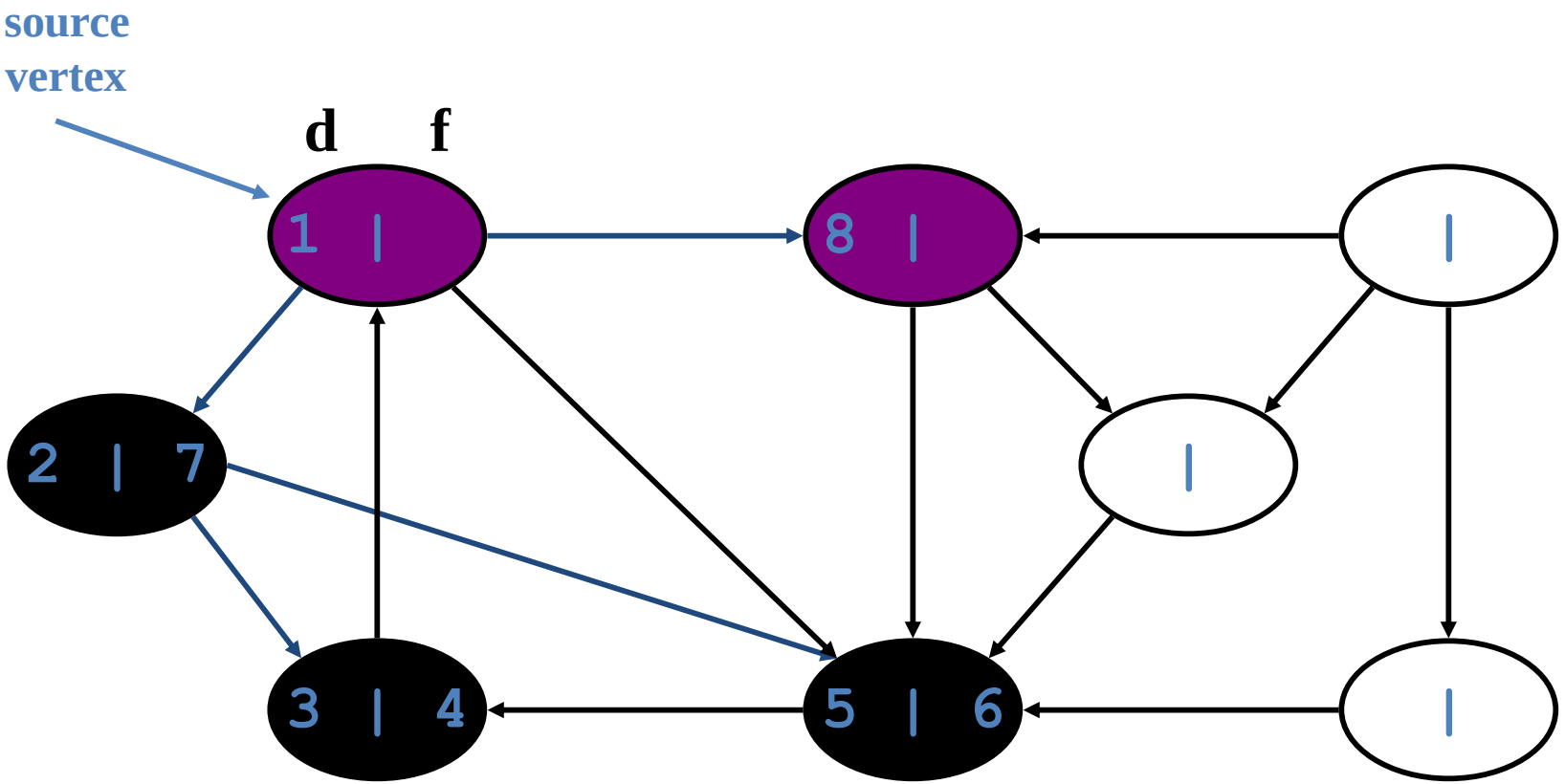

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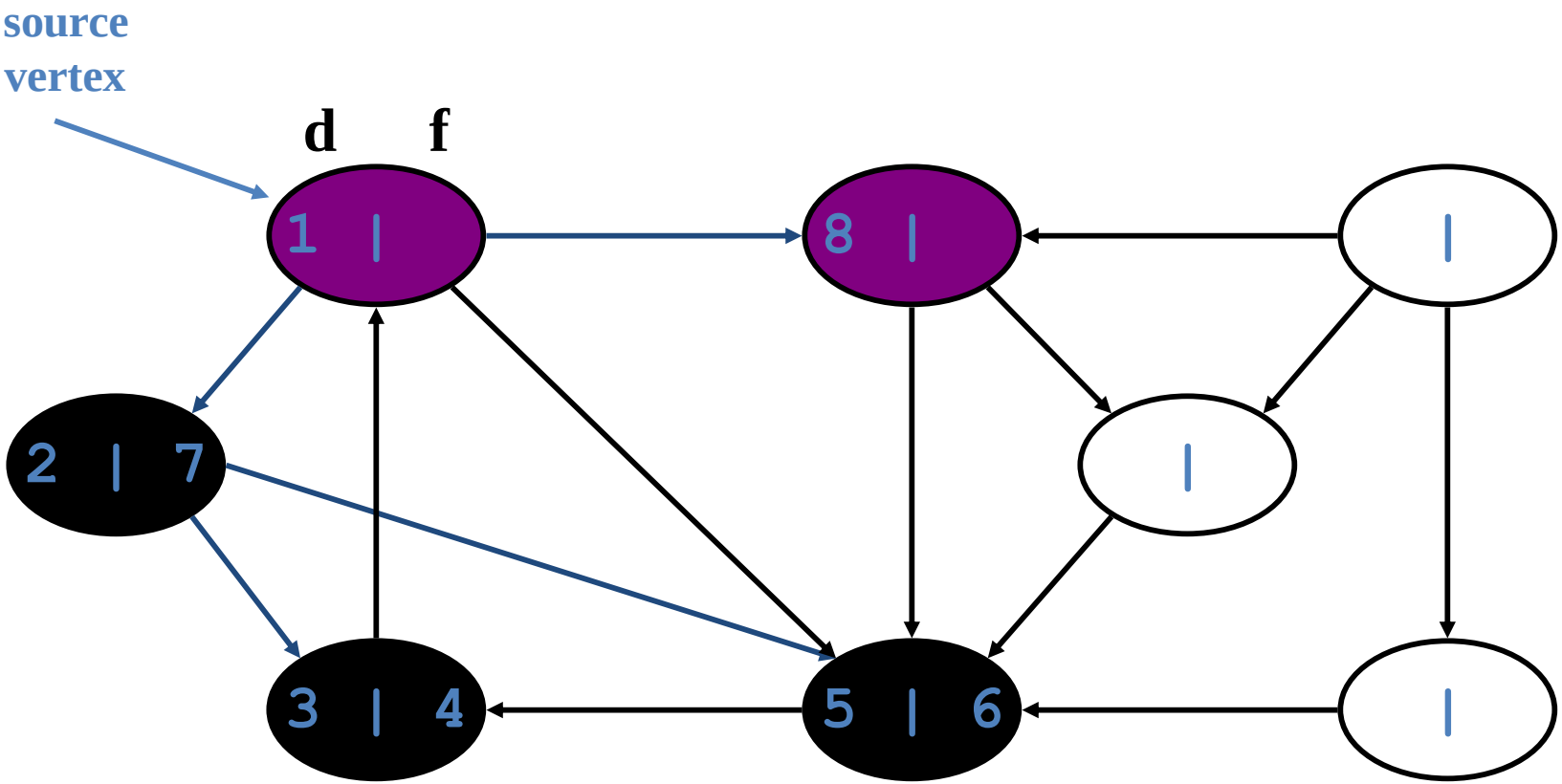

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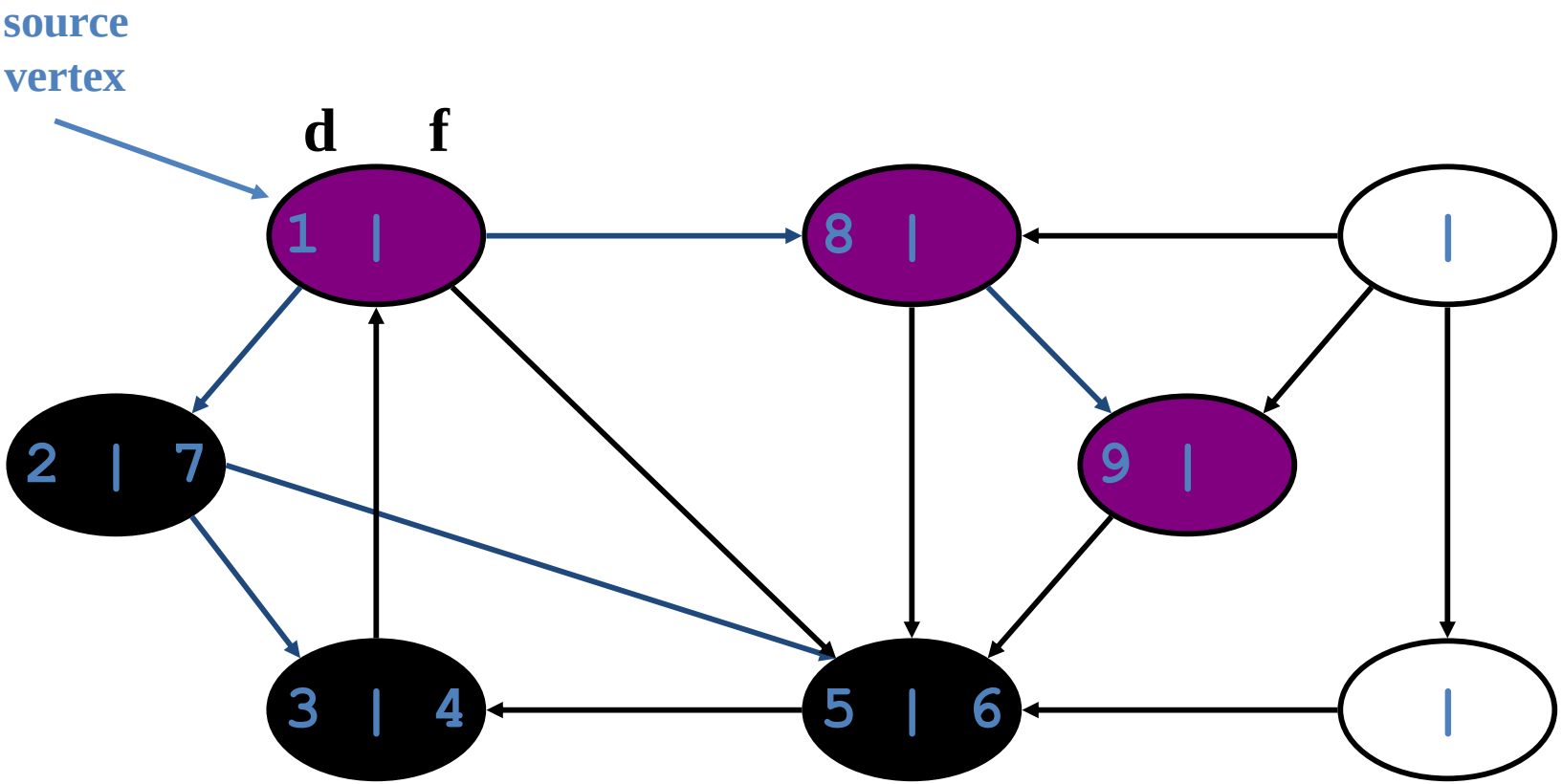
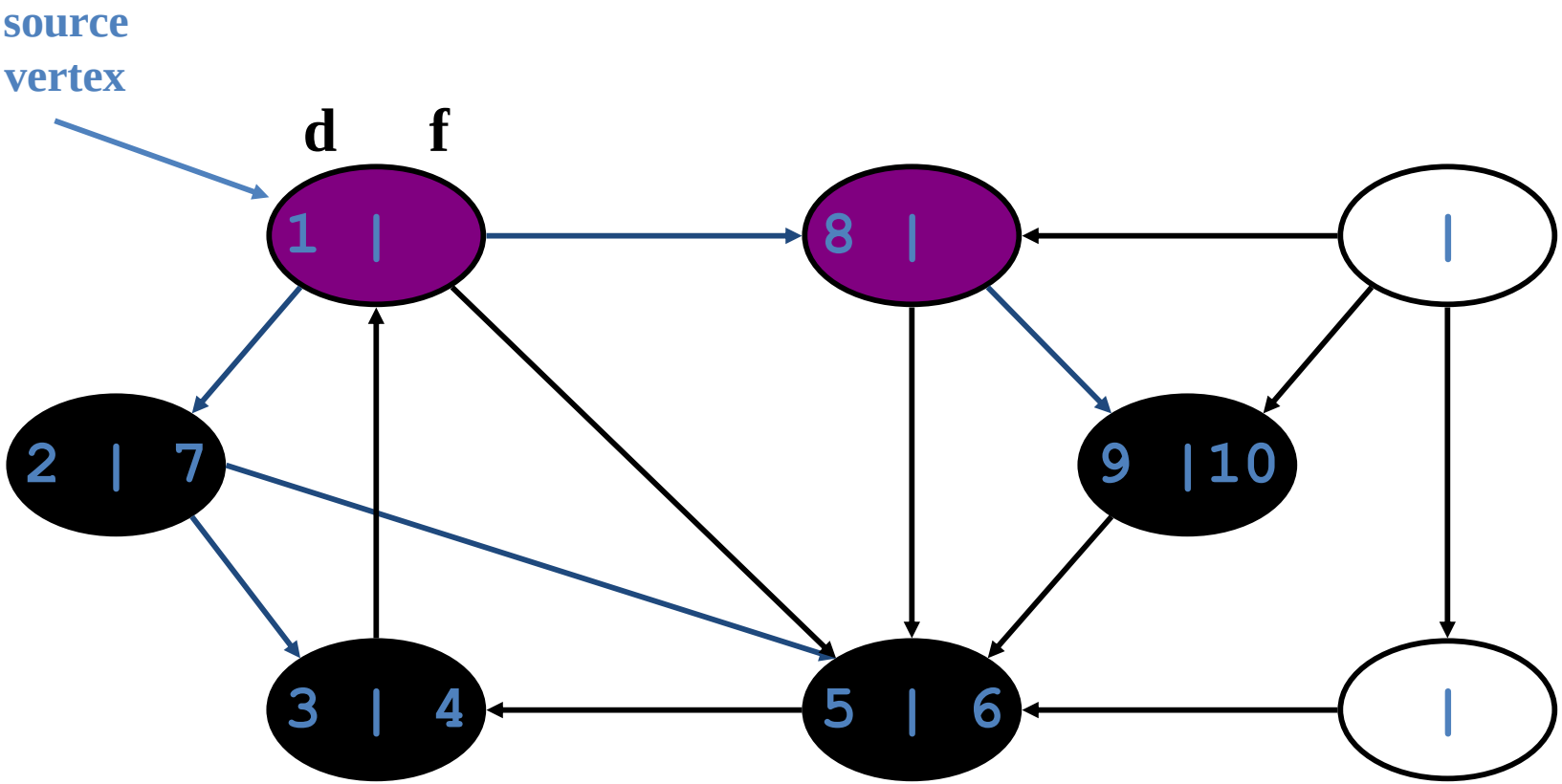


What is the structure of the grey vertices?
What do they represent?

DFS Example



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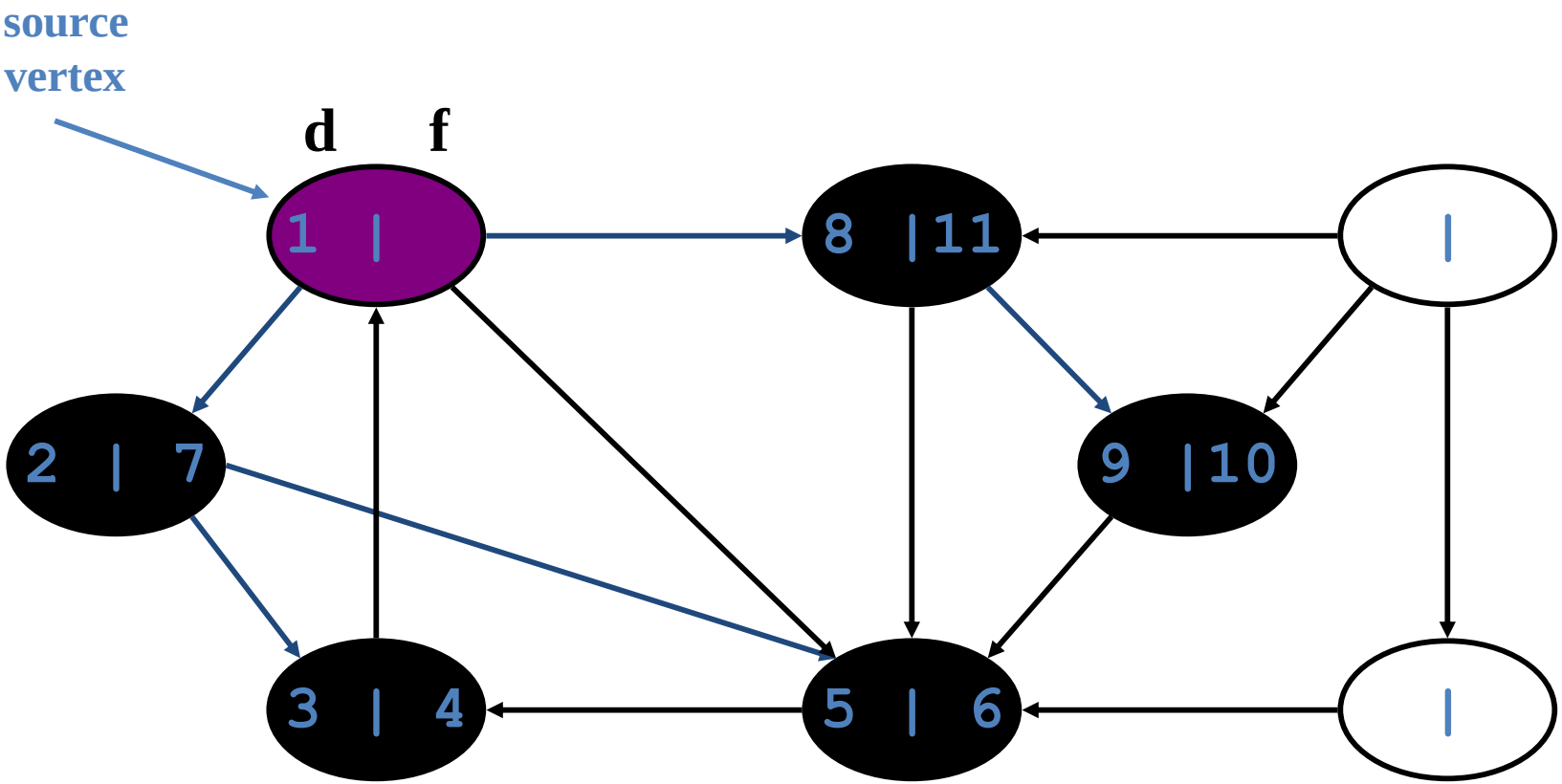

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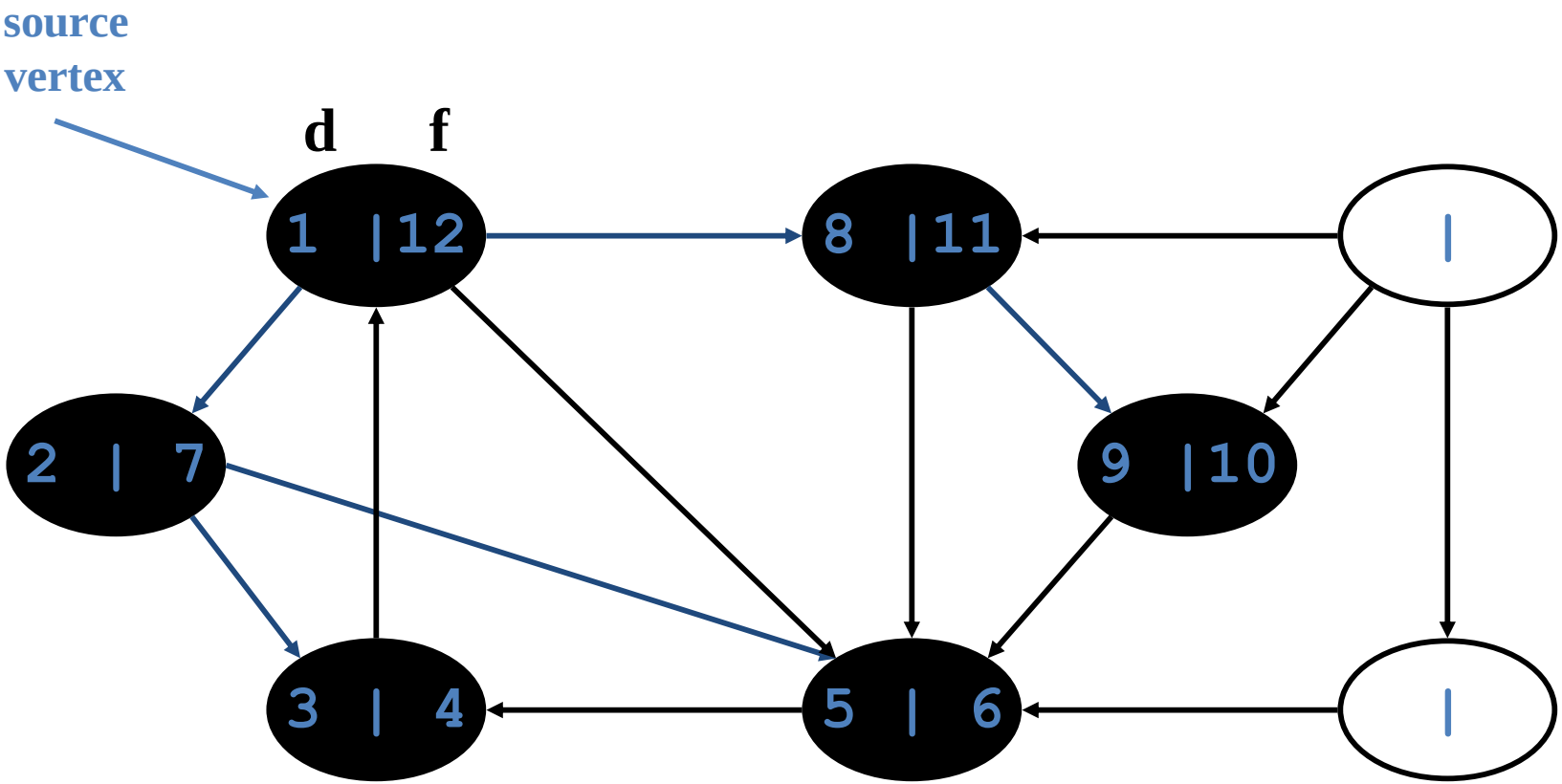

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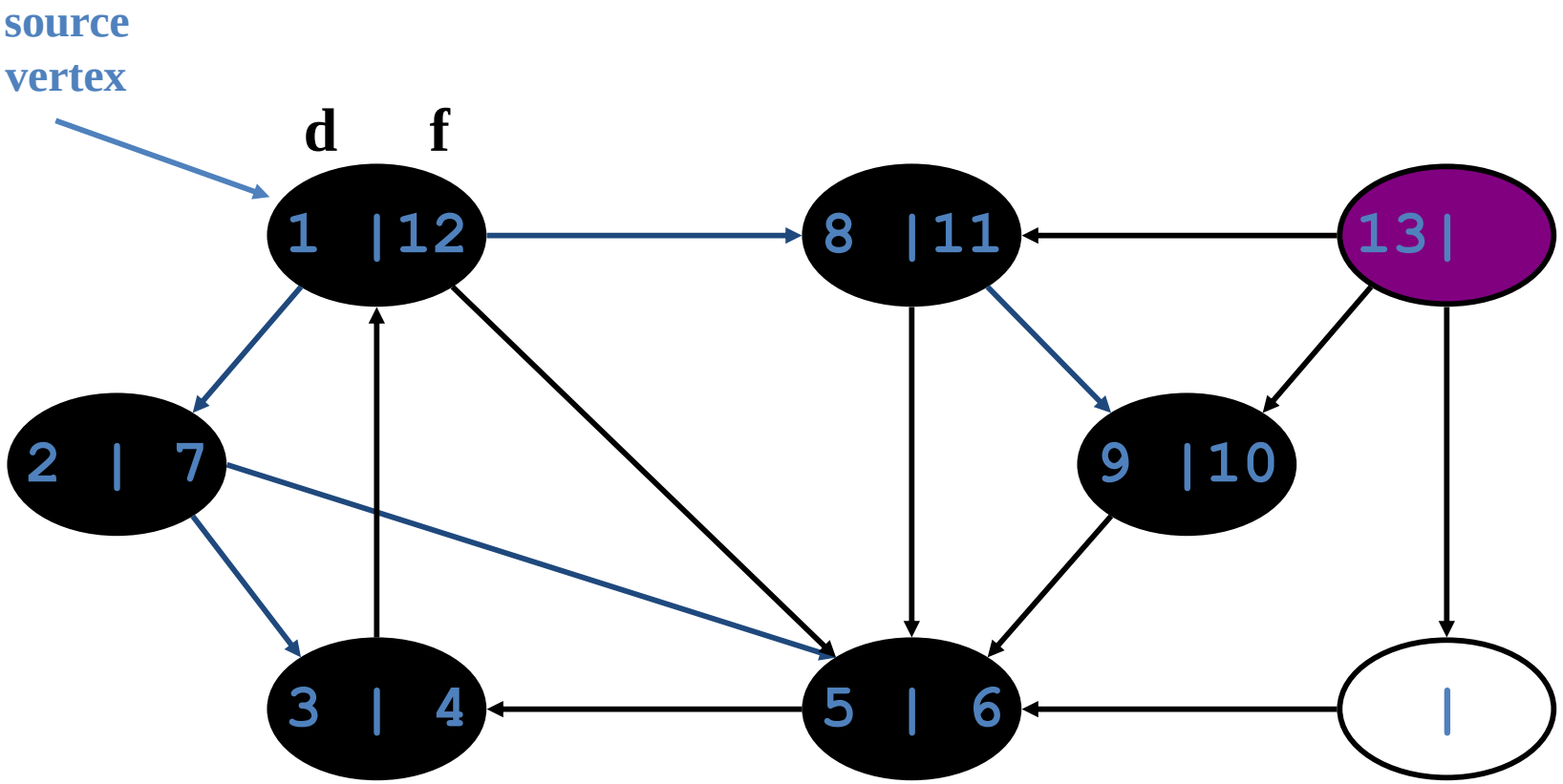

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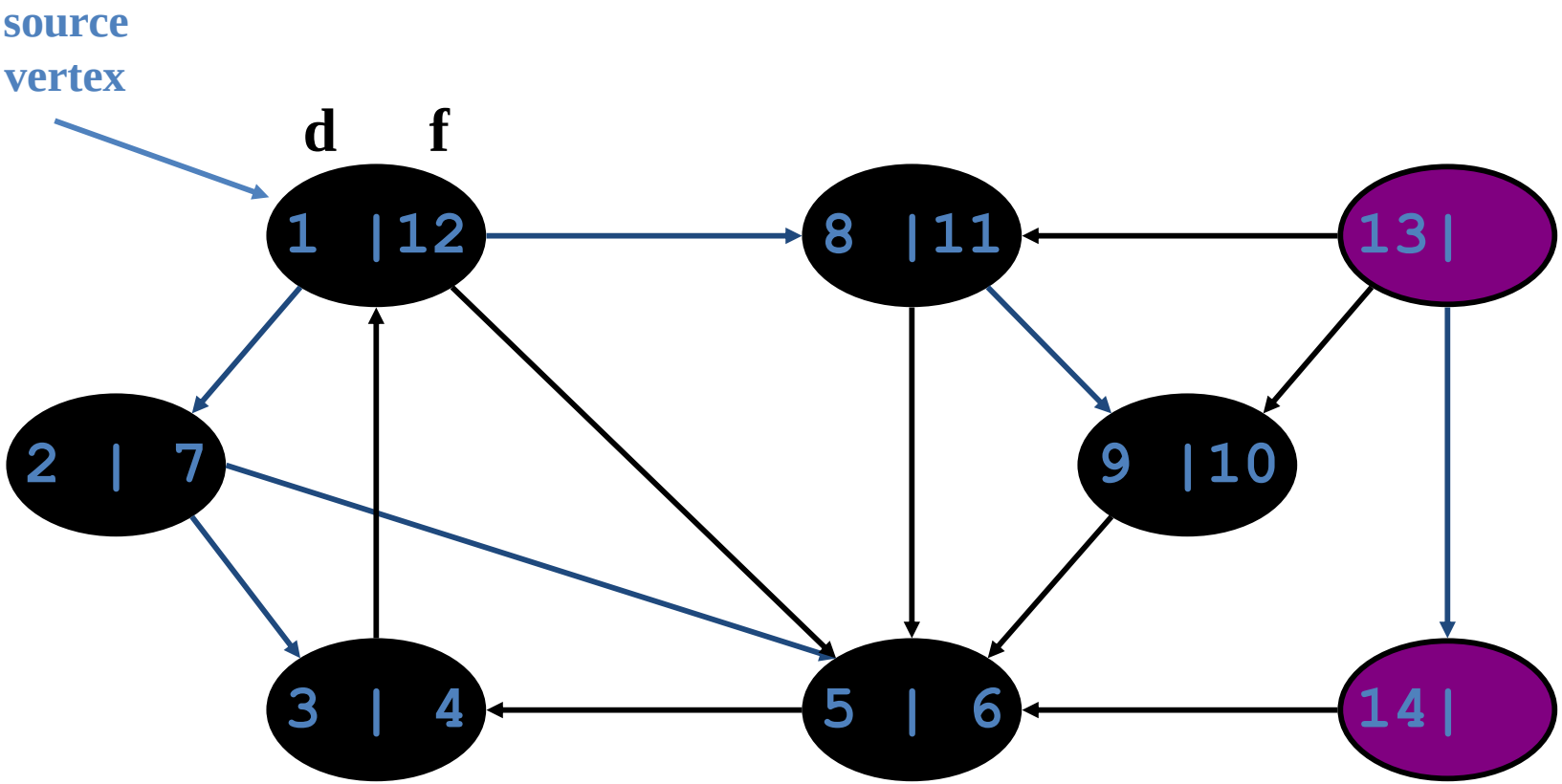

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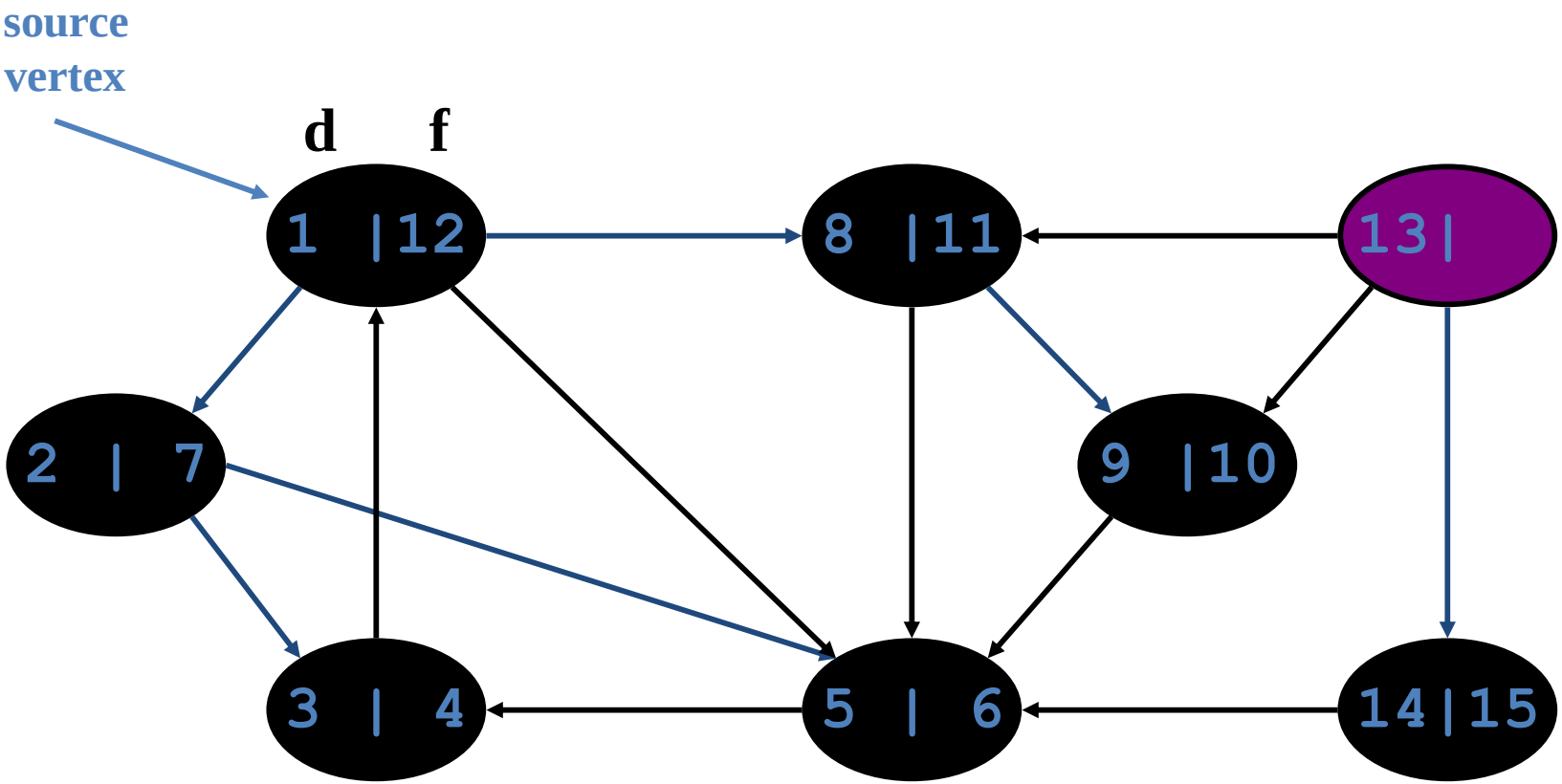

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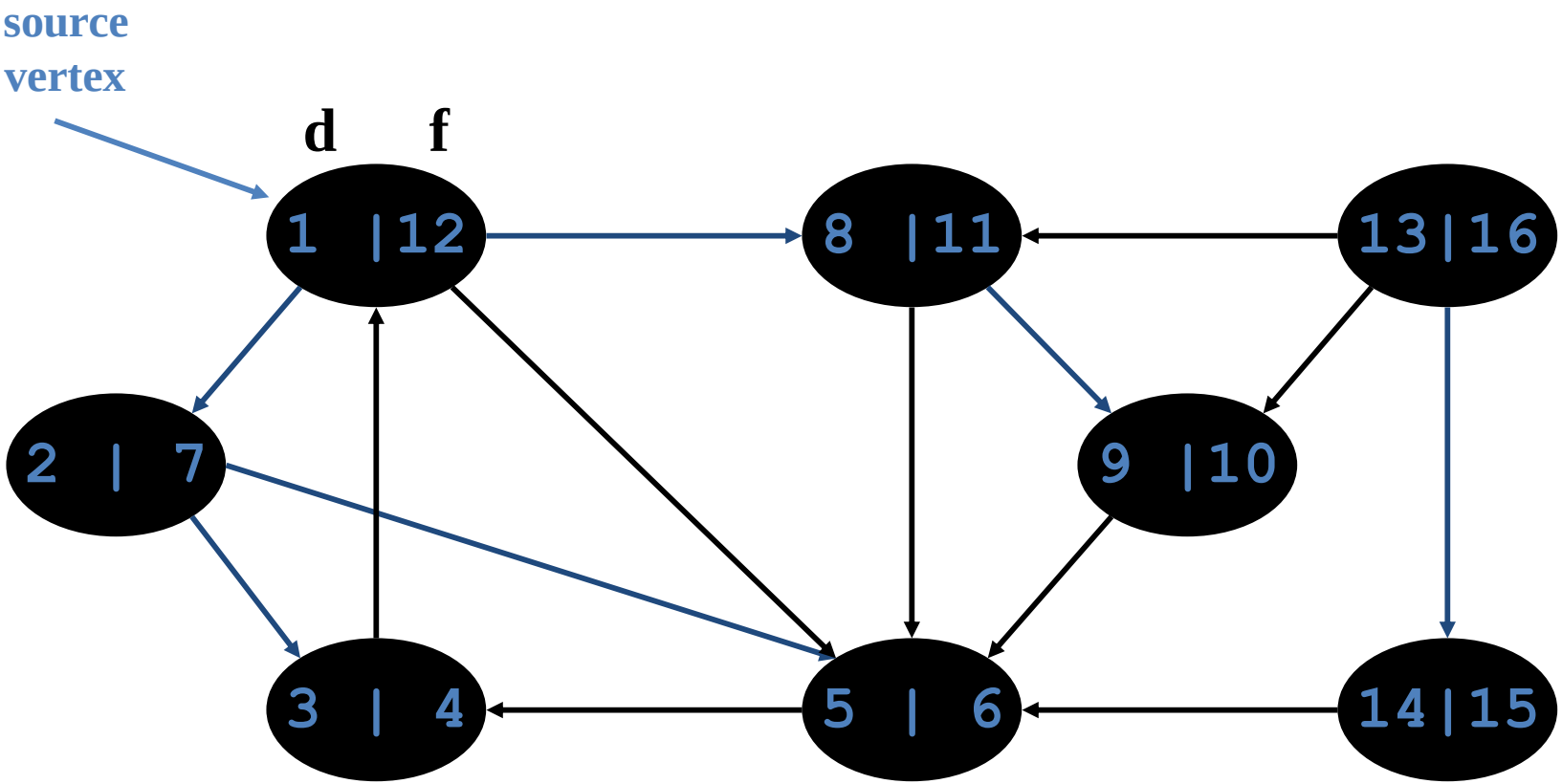

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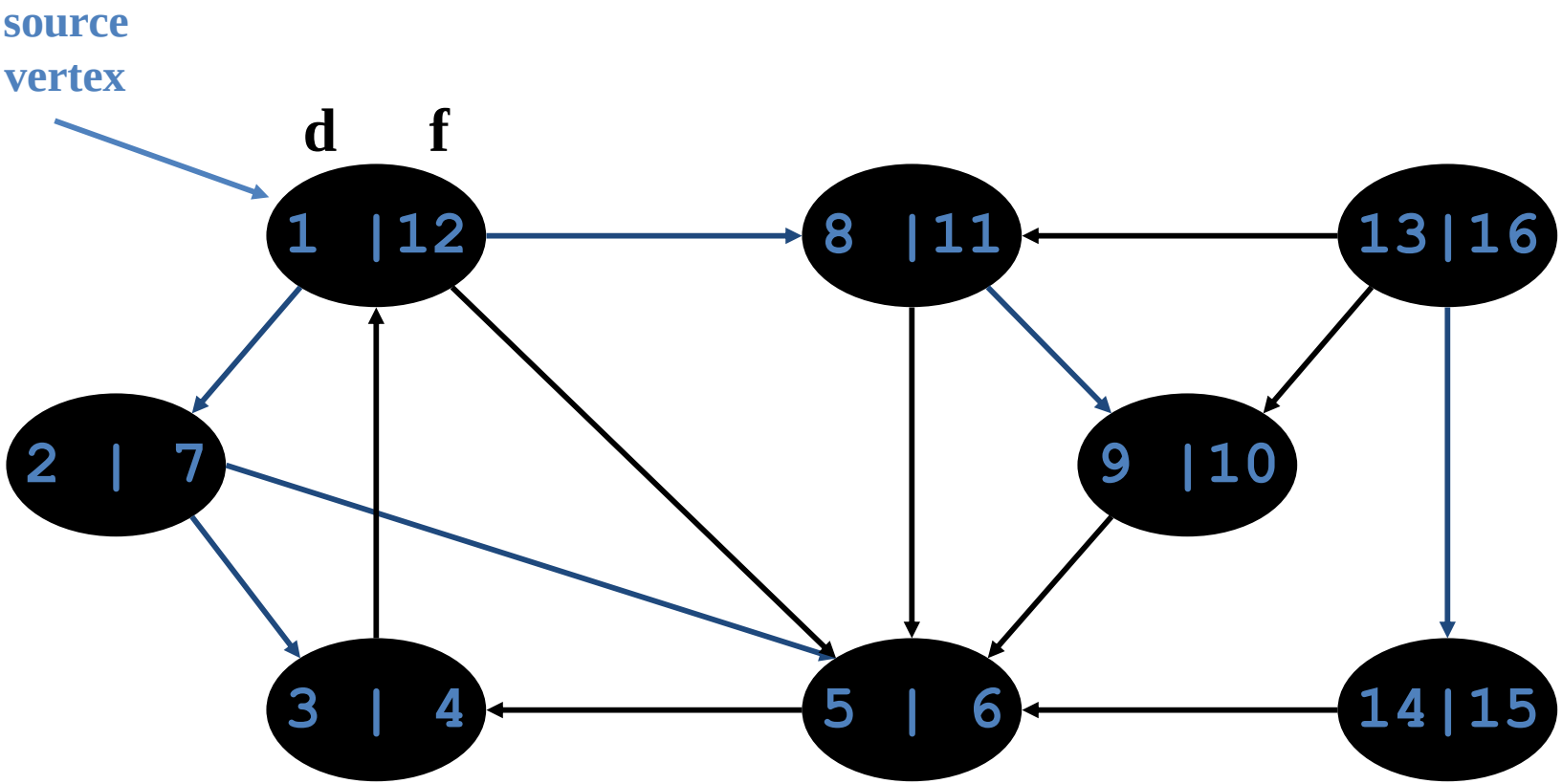
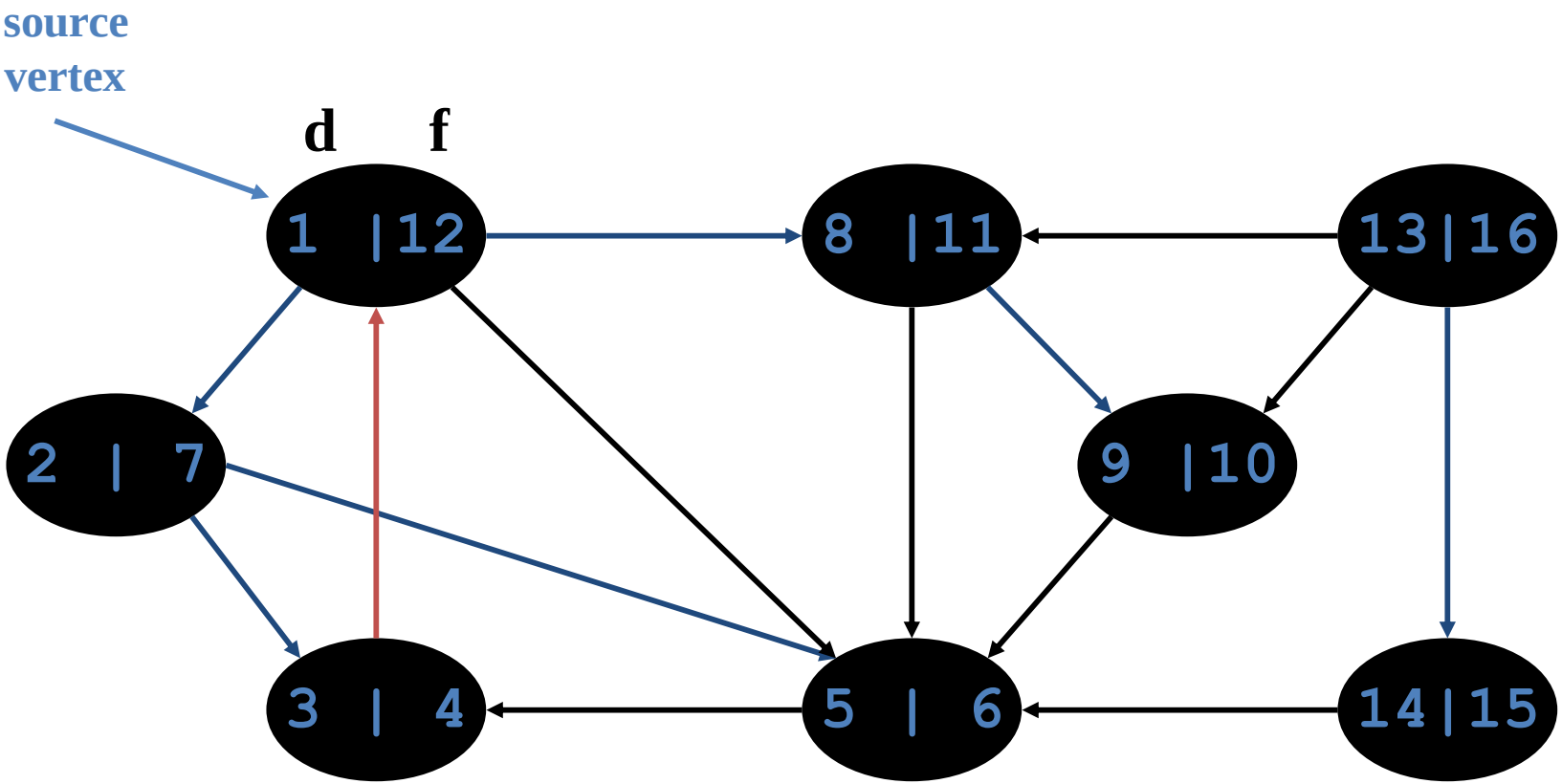


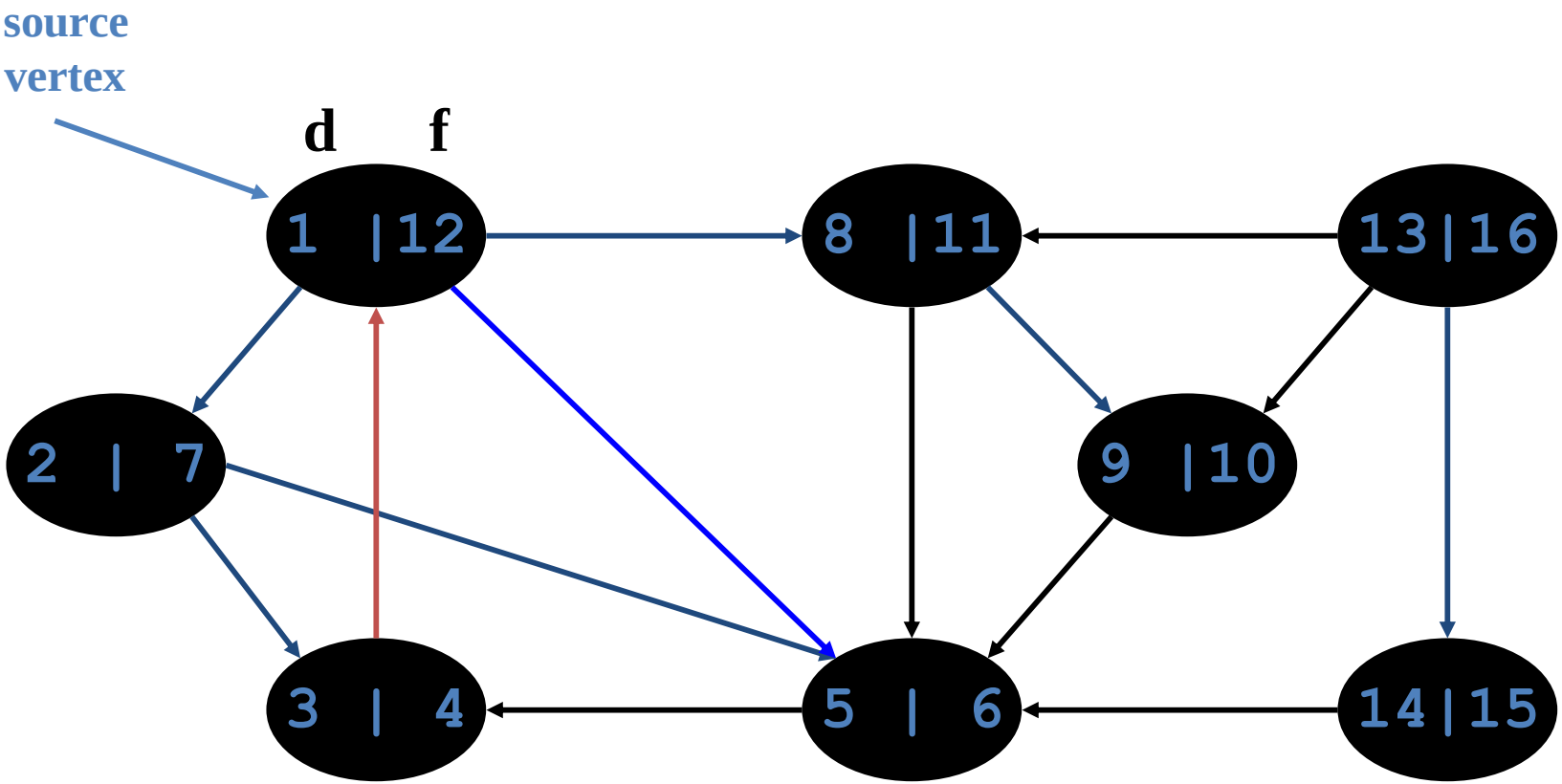
Tree edges

DFS Example



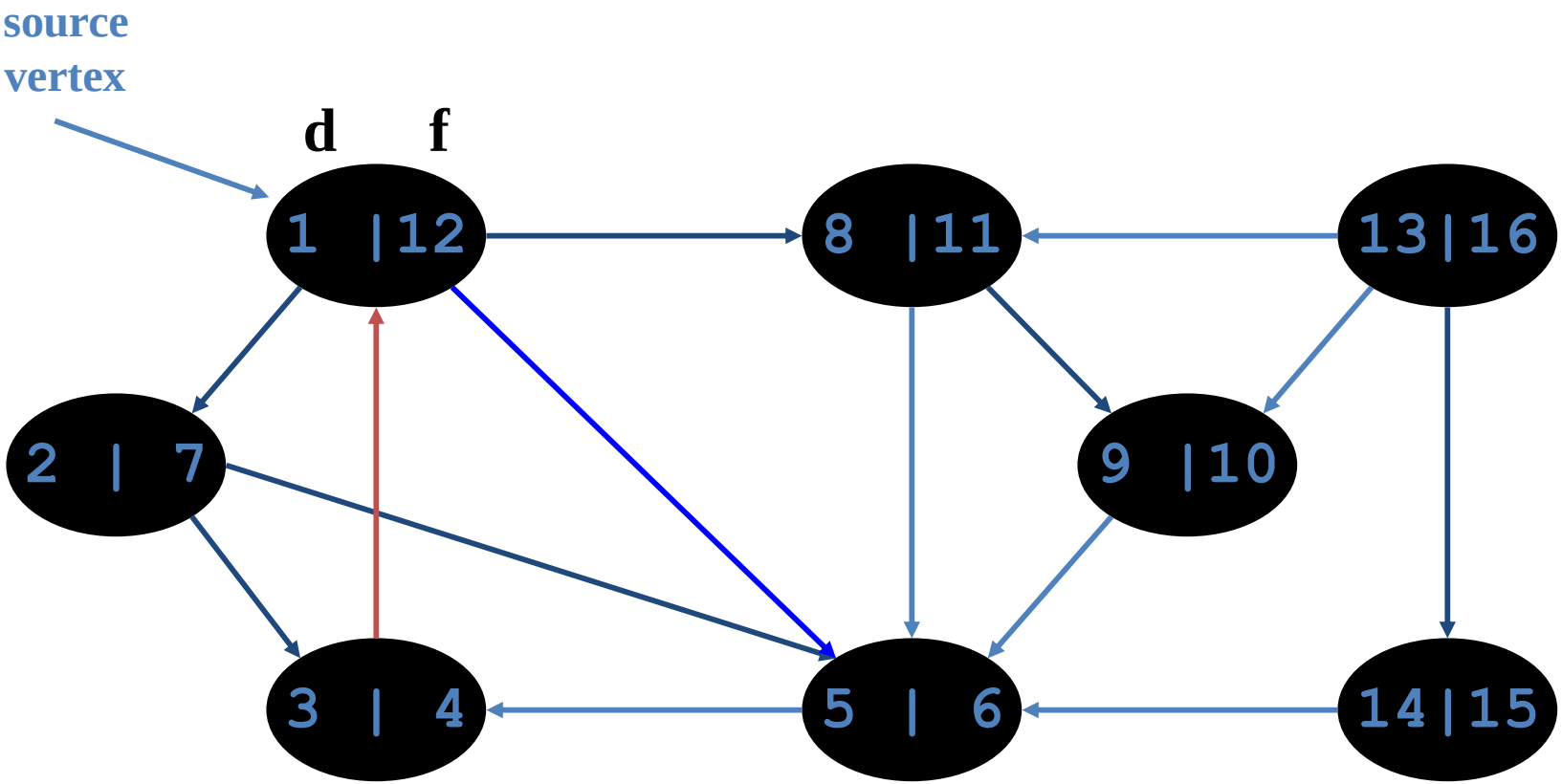
Tree edges **Back edges**

DFS Example



Tree edges **Back edges** **Forward edges**

DFS Example



Back edges **Forward edges** **Cross edges**

BFS Vs DFS

BASIS FOR COMPARISON	BFS	DFS
Basic	Vertex-based algorithm	Edge-based algorithm
Data structure used to store the nodes	Queue	Stack
Memory consumption	Inefficient	Efficient
Structure of the constructed tree	Wide and short	Narrow and long
Traversing fashion	Oldest unvisited vertices are explored at first.	Vertices along the edge are explored in the beginning.
Optimality	Optimal for finding the shortest distance, not in cost.	Not optimal
Application	Examines bipartite graph, connected component and shortest path present in a graph.	Examines two-edge connected graph, strongly connected graph, acyclic graph and topological order.

THANK YOU