



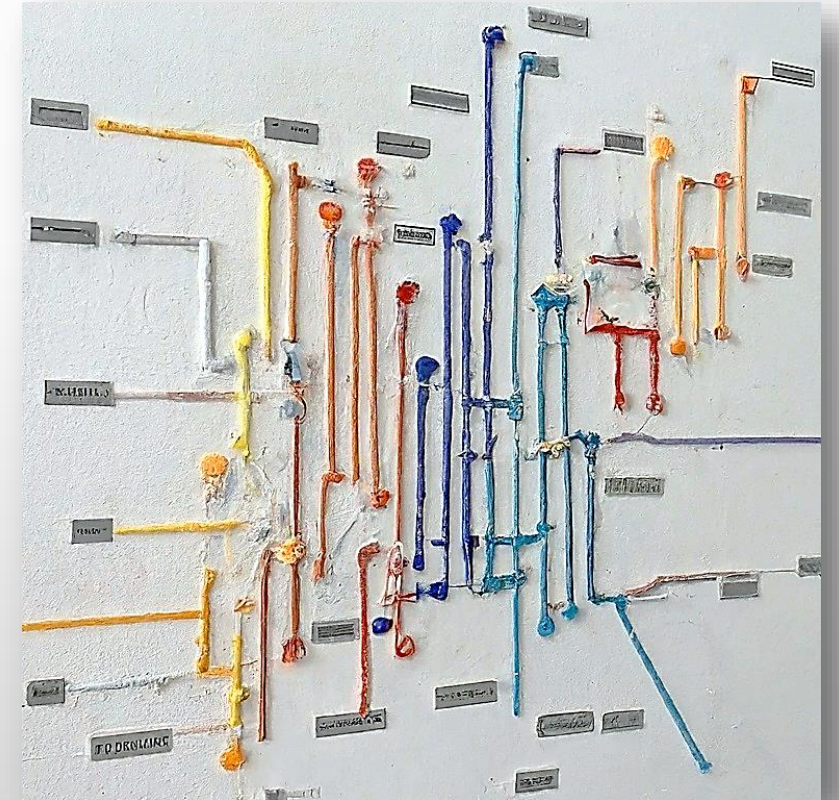
Bölüm 4: Çizge Algoritmaları

Algoritmalar



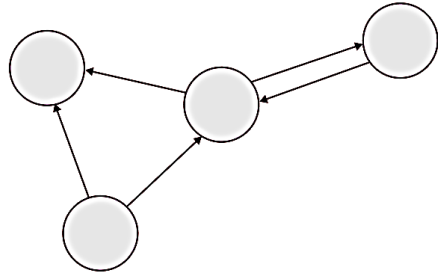
Çizge Algoritmaları

- Dünya aslında bir ağ gibidir.
 - Şehirler yollarla,
 - İnsanlar ilişkilerle,
 - Bilgisayarlar kablolarla birbirine bağlıdır.
- Çizge algoritmaları bu ağları inceler ve anlamlandırır.

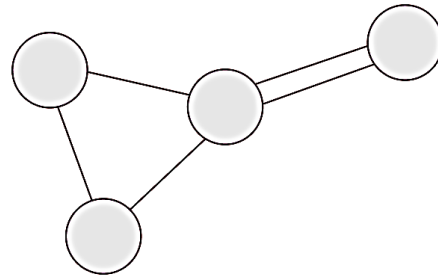




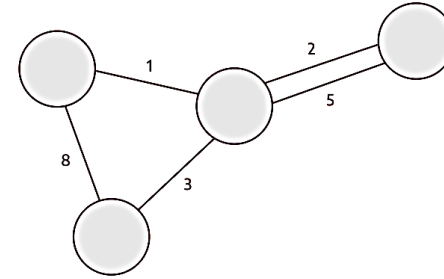
Çizge Türleri



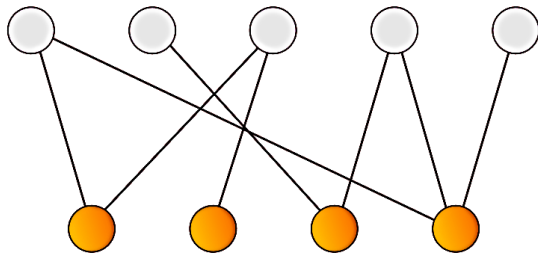
Directed graph



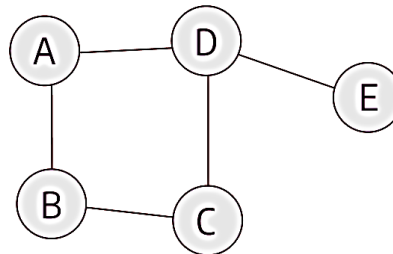
Undirected



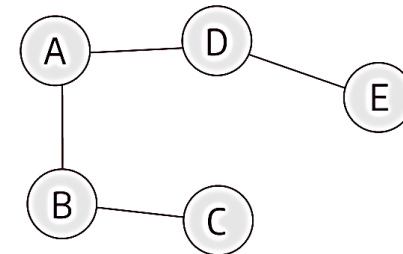
Weighted



Bipartite graph



Cyclic graph



Acyclic graph



Çizge Algoritmaları

- Birbirine bağlı noktalar (düğüm) ve bu noktaları birleştiren çizgiler (kenar) ile temsil edilen ağ yapılarını inceler.
- Ağlarda en kısa yolu hesaplama, gruplama gibi işlemleri gerçekleştirir.
- Sosyal ağlar, harita uygulamaları, navigasyon gibi birçok alanda kullanılır.



Çizge Algoritmalarının Çeşitleri

- Farklı çizge algoritmaları, farklı işlemler için kullanılır.
- Derinlik Öncelikli Arama (DFS):
 - Bir düğümden başlar, dallanarak tüm ağı gezer.
- Genişlik Öncelikli Arama (BFS):
 - Bir düğümden başlar, katman katman tüm ağı gezer.
- Dijkstra Algoritması:
 - Başlangıç düğümünden diğer düğümlere en kısa yolları bulur.
- Kruskal Algoritması:
 - Bir ağı minimum maliyetle birbirine bağlayan kenarları seçer.



Çizge Algoritmaları

- DFS bir labirentten çıkış yolu ararken kullanılabilir.
- BFS bir haberin tüm şehire yayılma sürecini modelleyebilir.
- Dijkstra en kısa sürede teslimat yapmak için kullanılabilir.





Çizge Algoritmaları

- Çizge gezinme algoritmaları (*Graph traversal*)
- En kısa yol algoritmaları (*Shortest path*)
- Minimum yayılan ağaç algoritmaları (*Minimum spanning tree*)
- Ağ akış algoritmaları (*Network flow*)

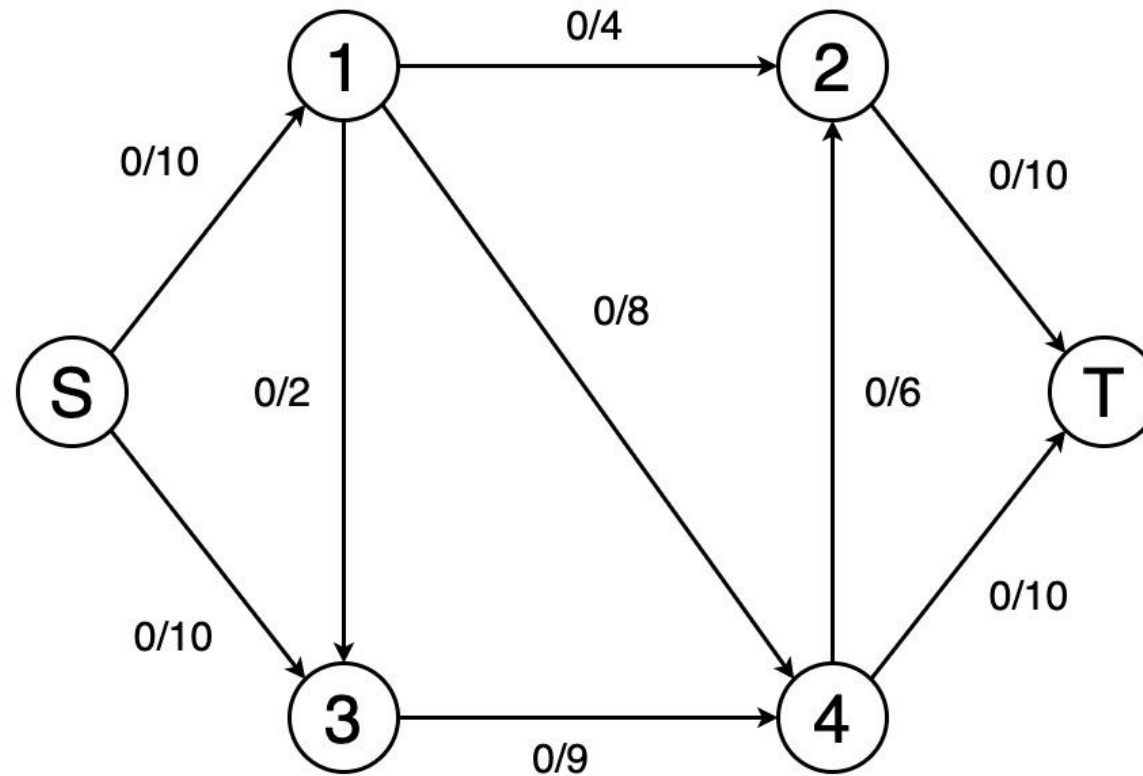


Ağ Akış Algoritmaları (Network Flow)

- Ağ üzerinde kaynak noktadan hedef noktaya belirli kısıtlamalar altında akışın nasıl optimize edileceğini modeller.
- Amaç, kısıtlamalar altında kaynak noktadan hedef noktaya mümkün olan en fazla akışı sağlamaktır.
- *Ford-Fulkerson*, en basit ve anlaşılır algoritmalarından biridir, ancak çalışma süresi diğer algoritmalara göre daha uzun olabilir.
- *Edmonds-Karp*, *Ford-Fulkerson* algoritmasını geliştirerek çalışma süresini azaltır.
- *Dinic's*, *Edmonds-Karp* algoritmasından daha hızlı ve bazı durumlarda daha verimlidir.

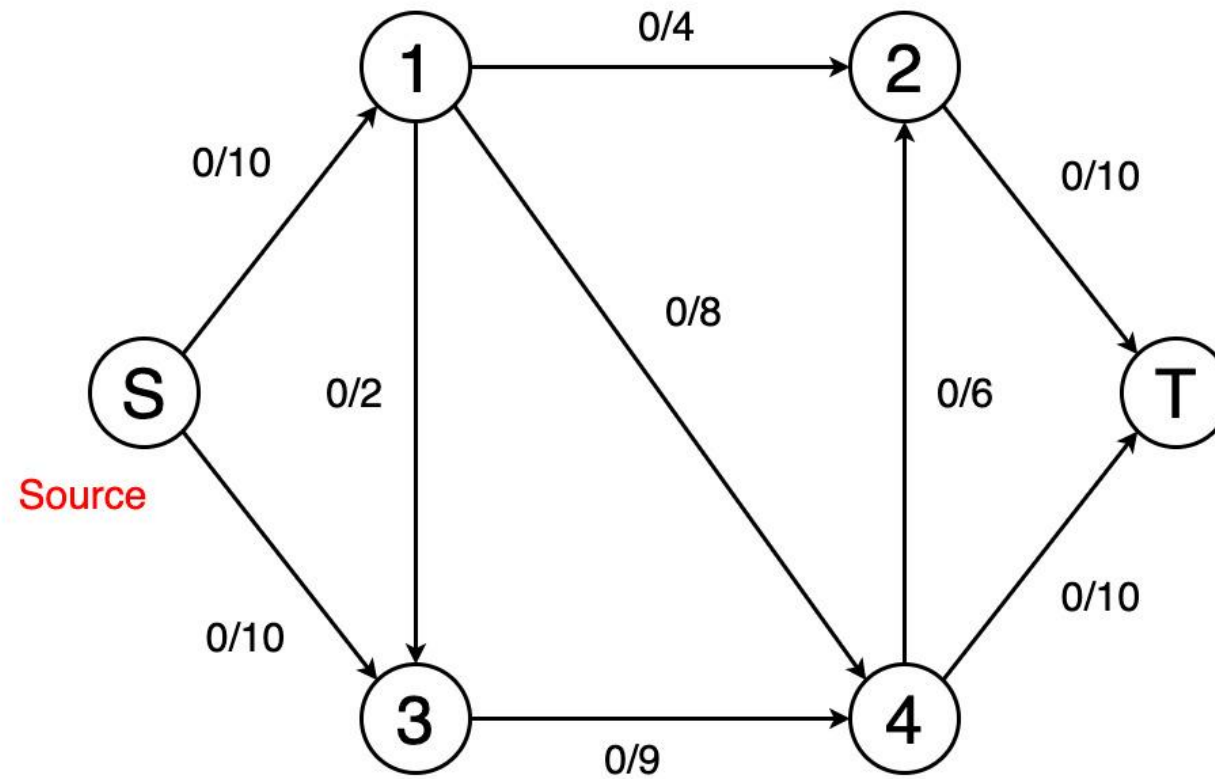


Ford Fulkerson



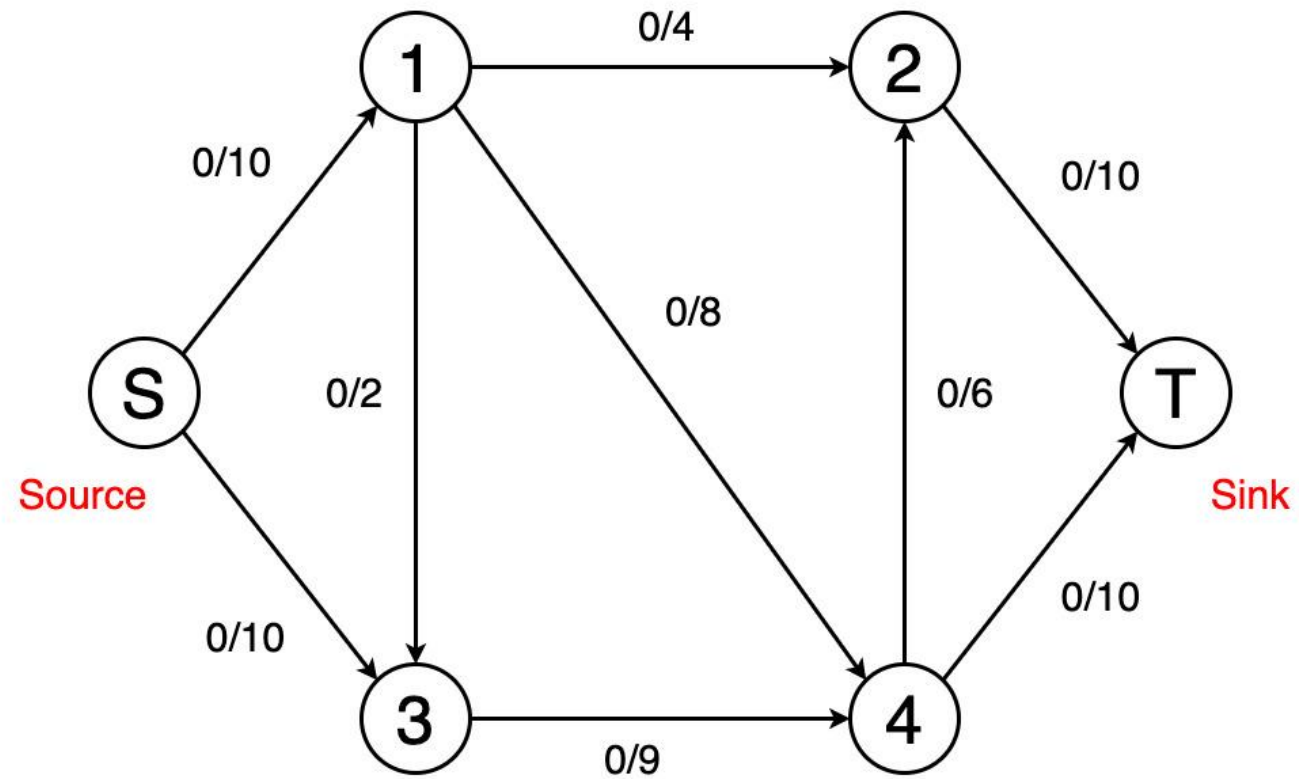


Ford Fulkerson



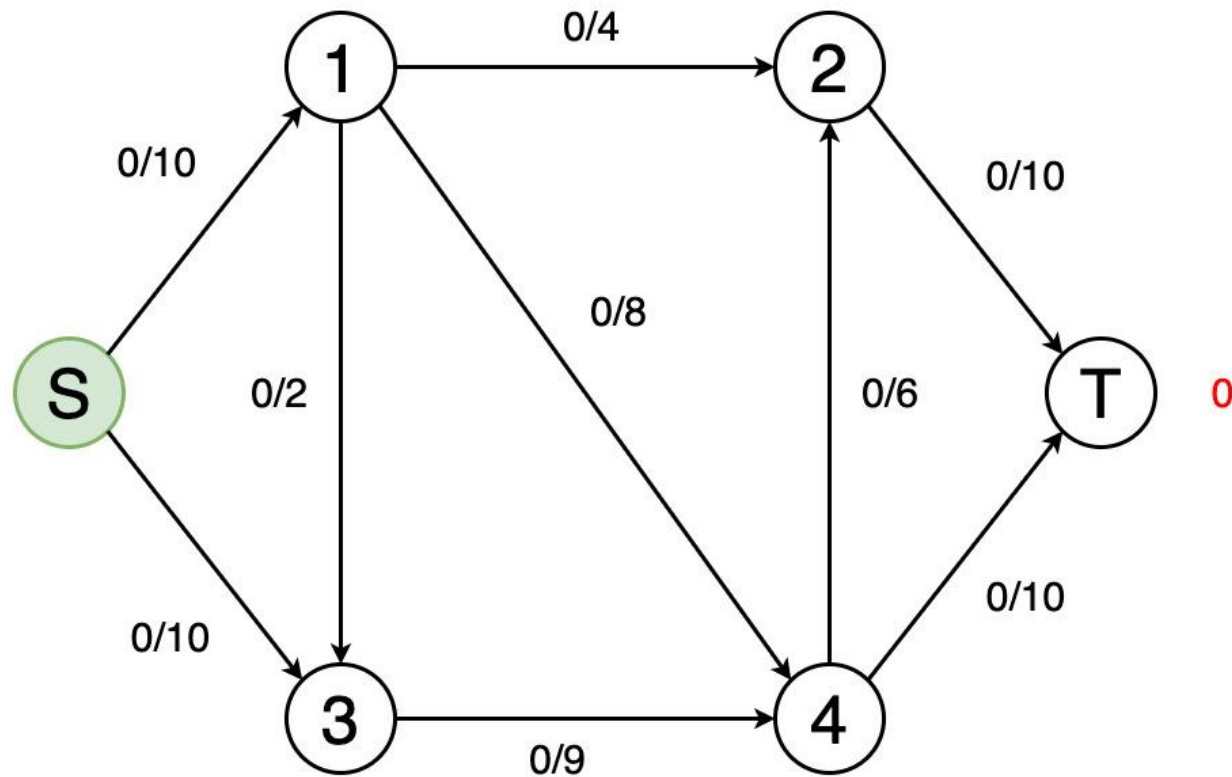


Ford Fulkerson



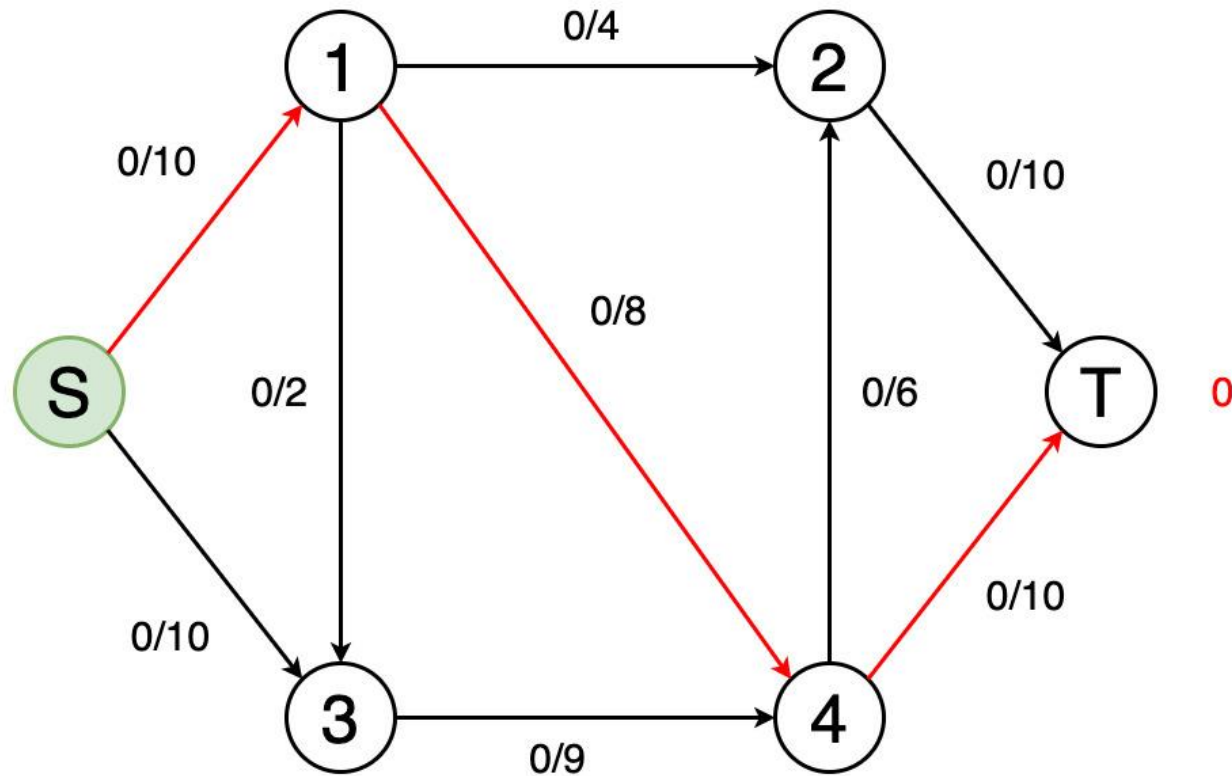


Ford Fulkerson



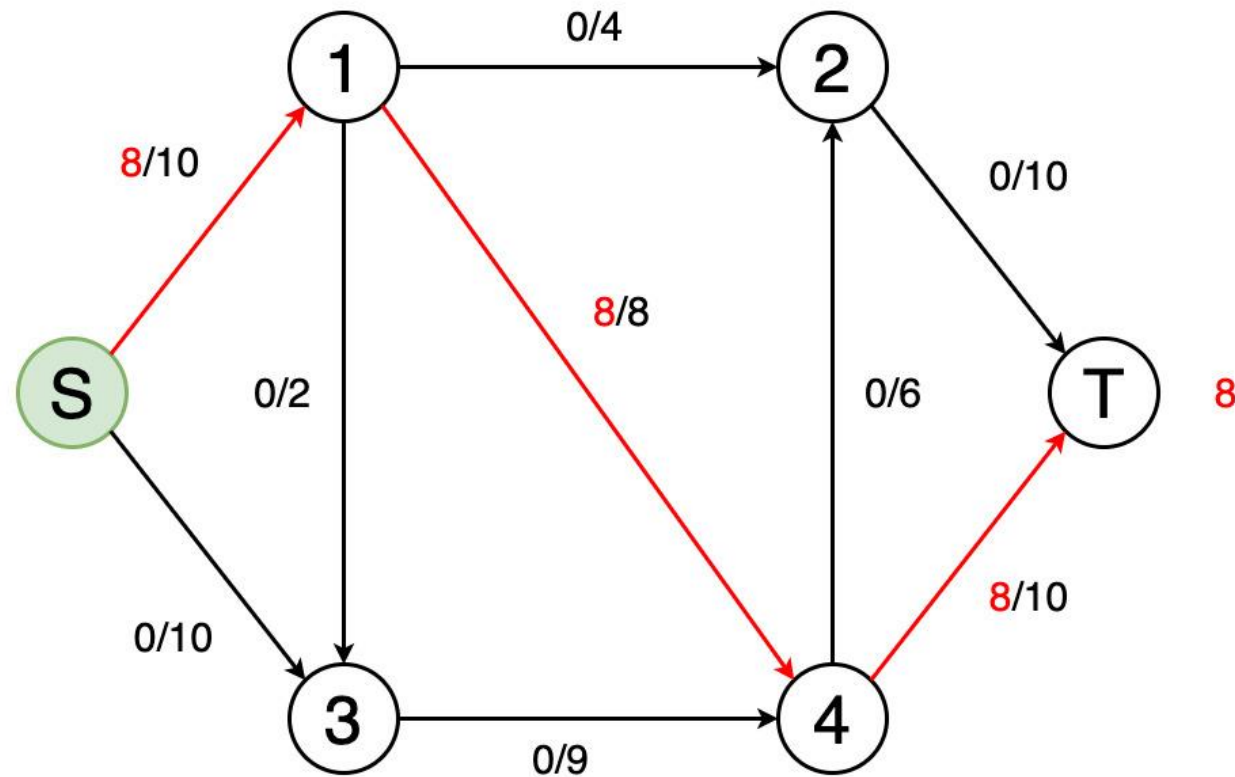


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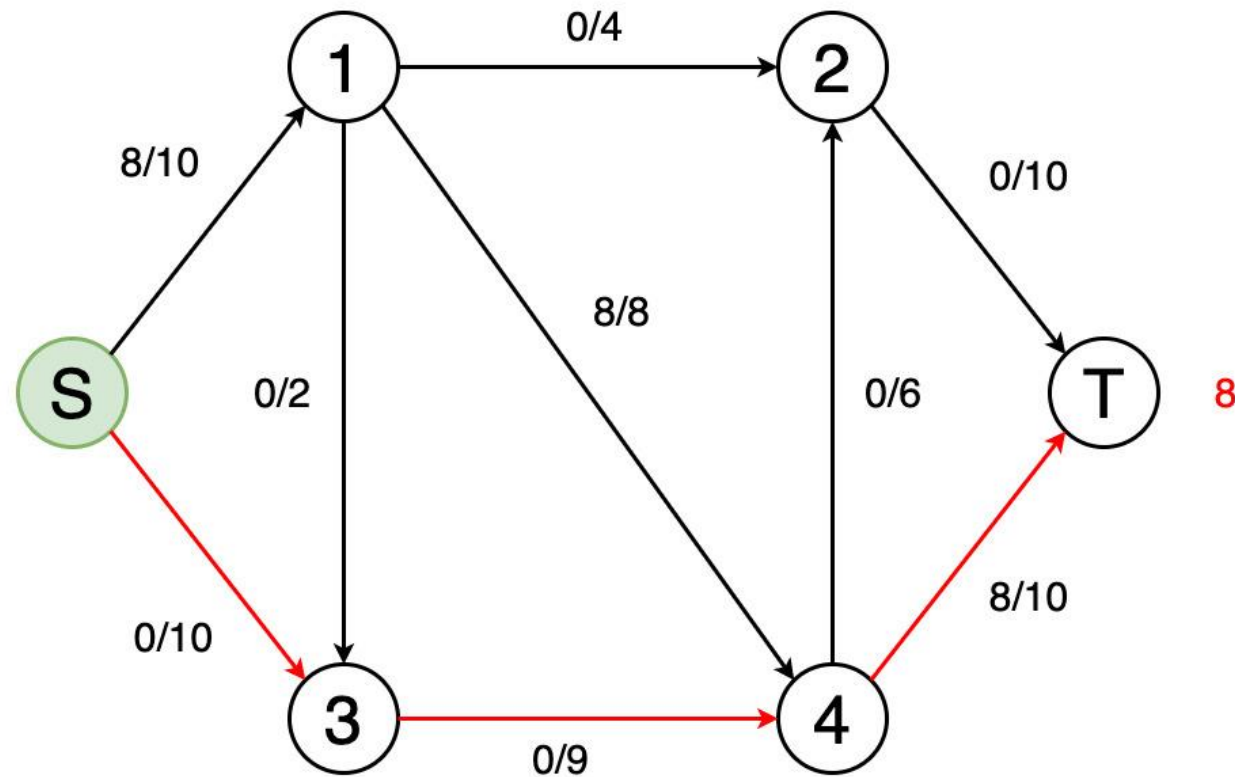


Ford Fulkerson



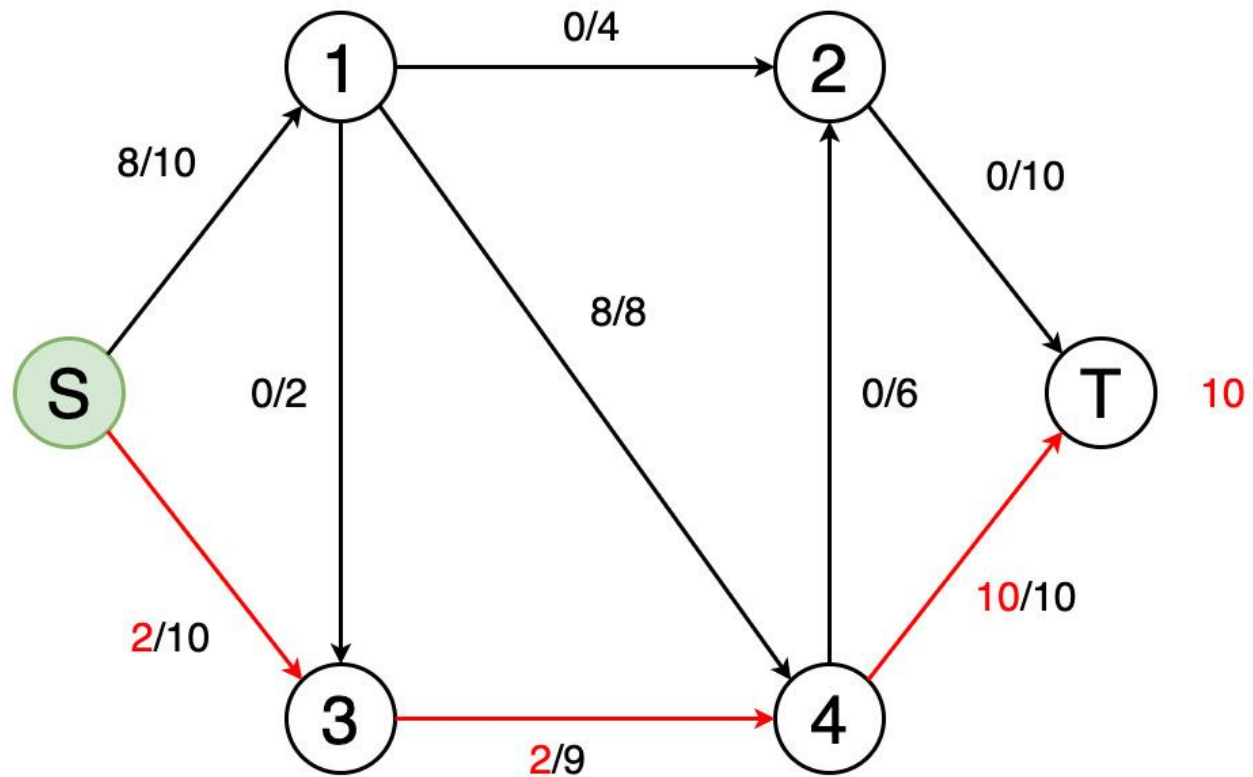


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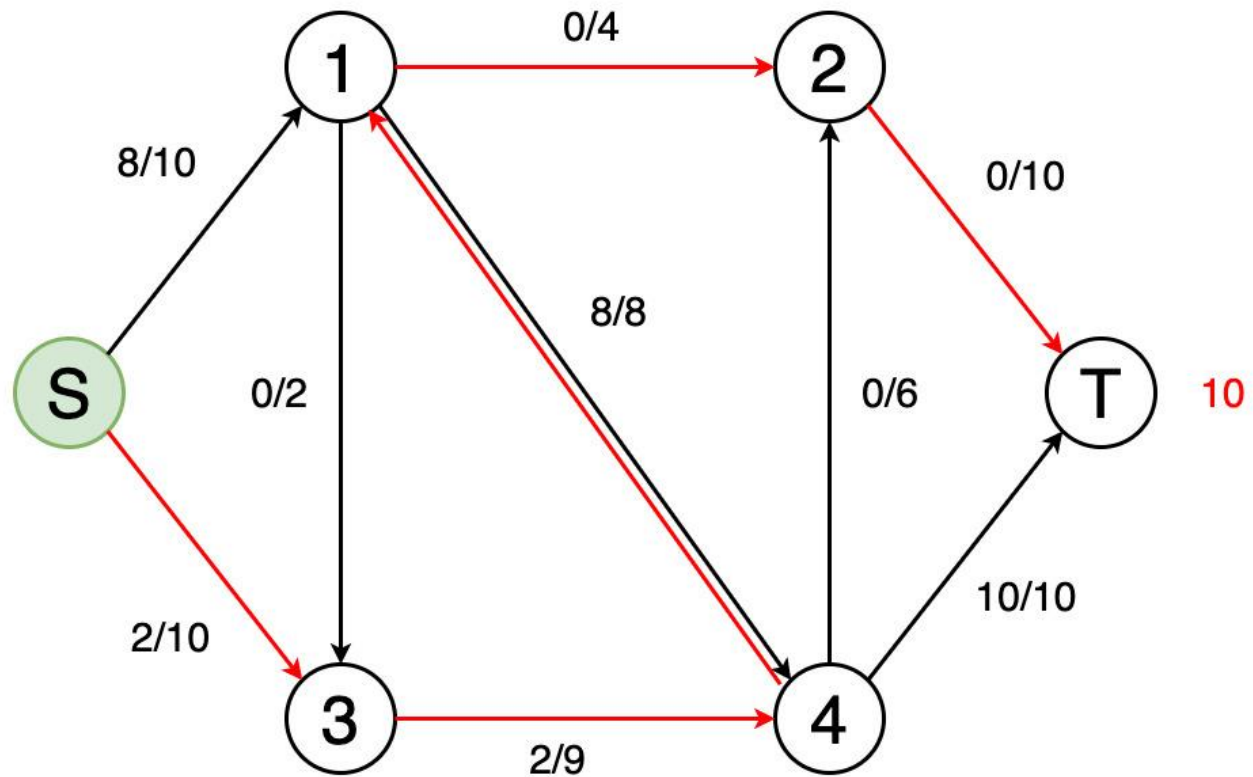


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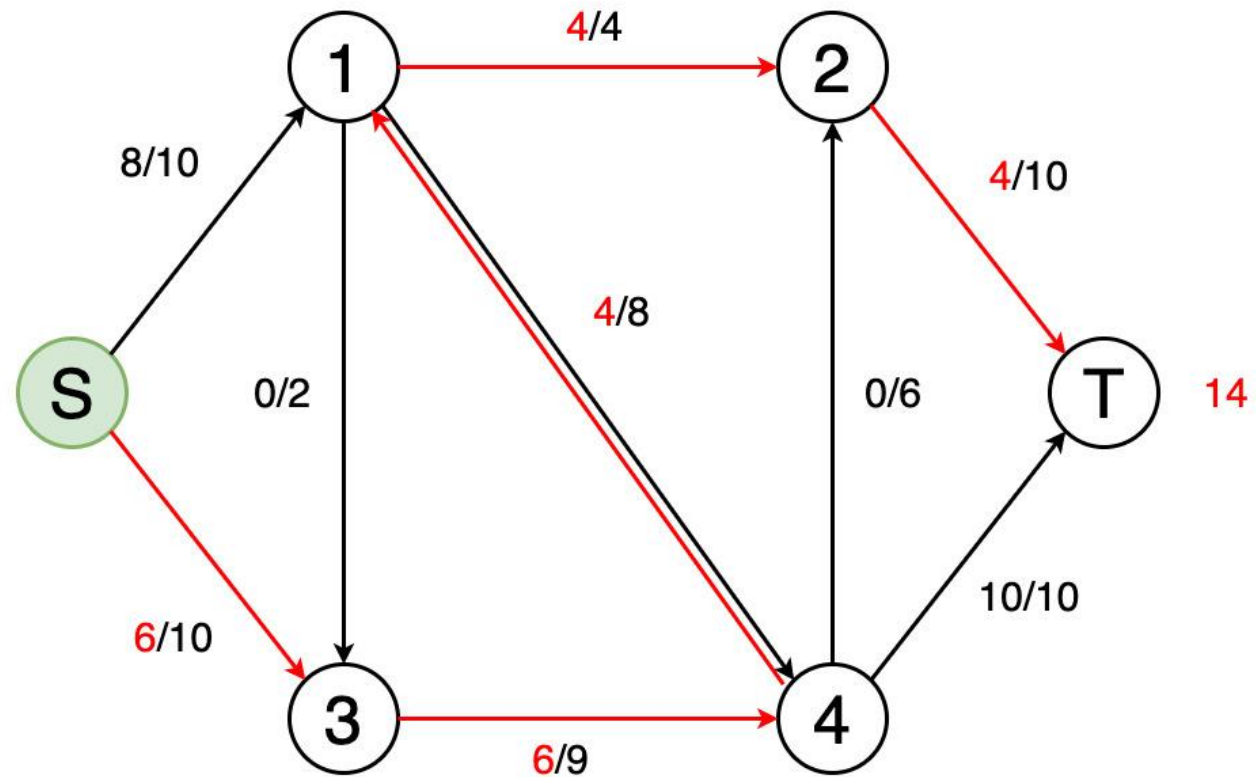


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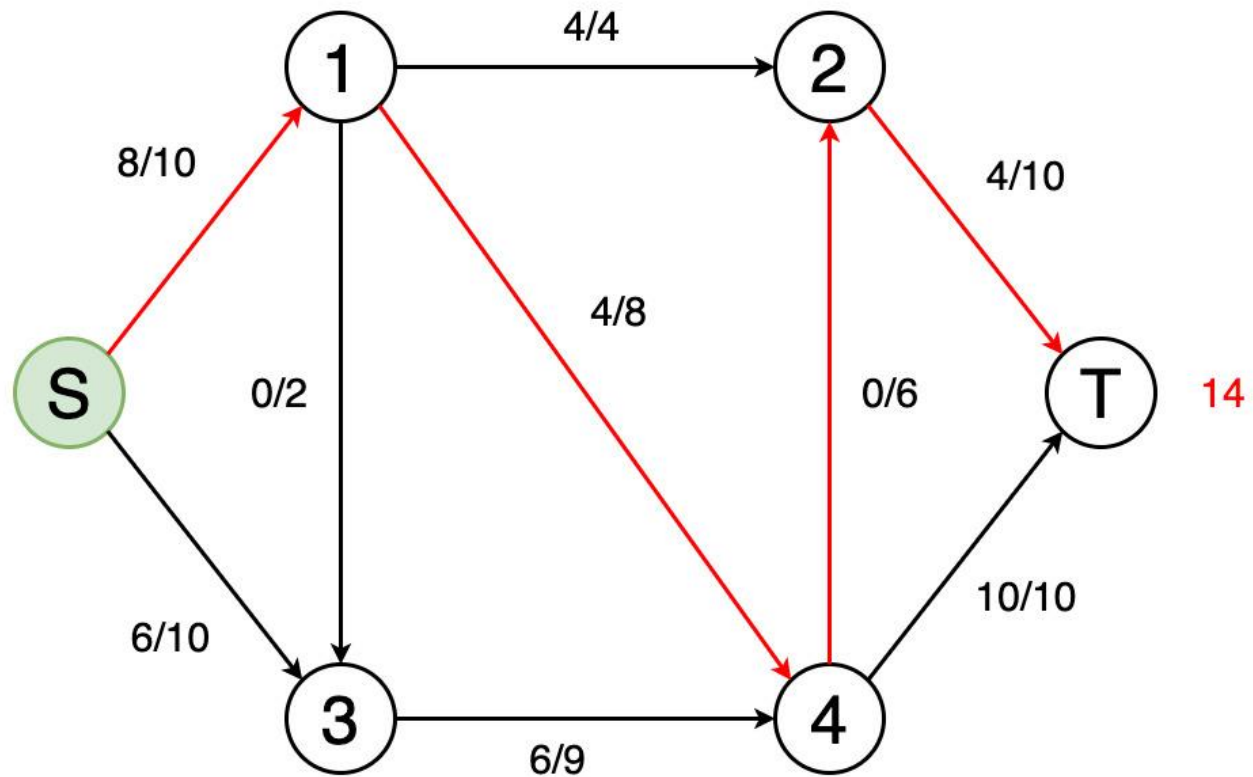


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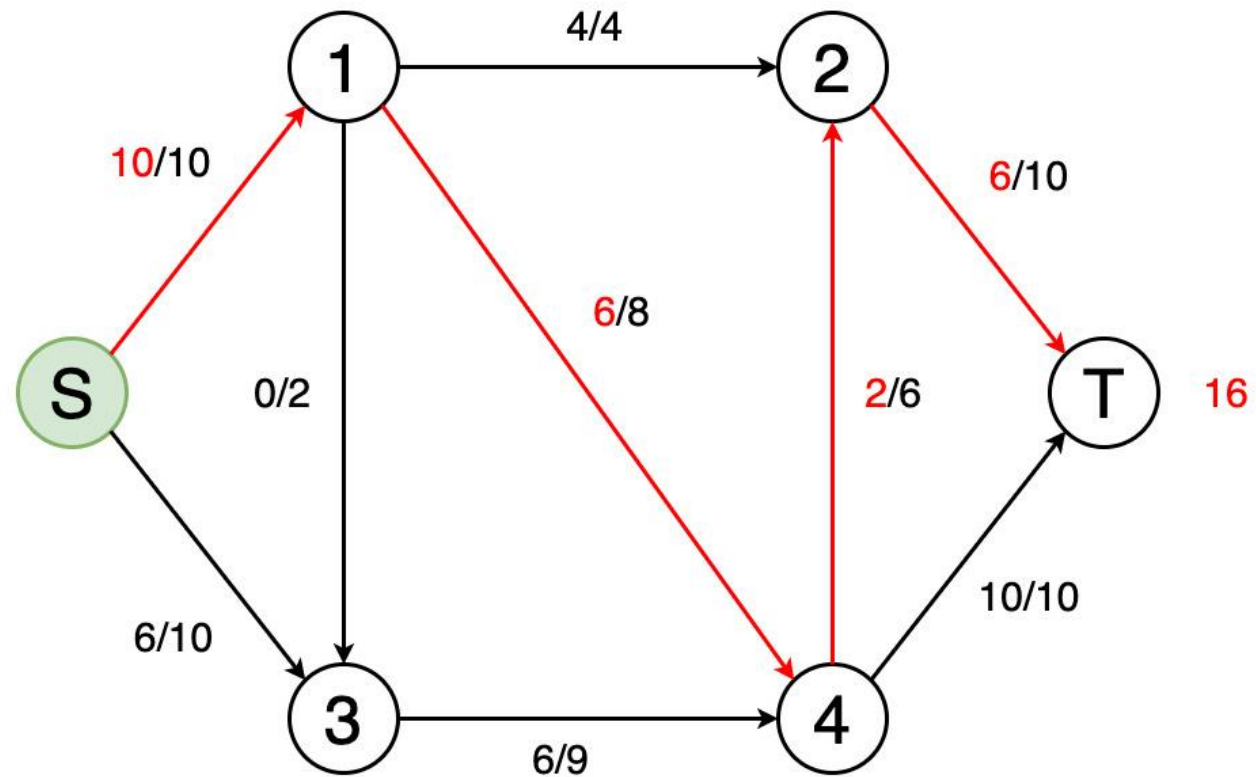


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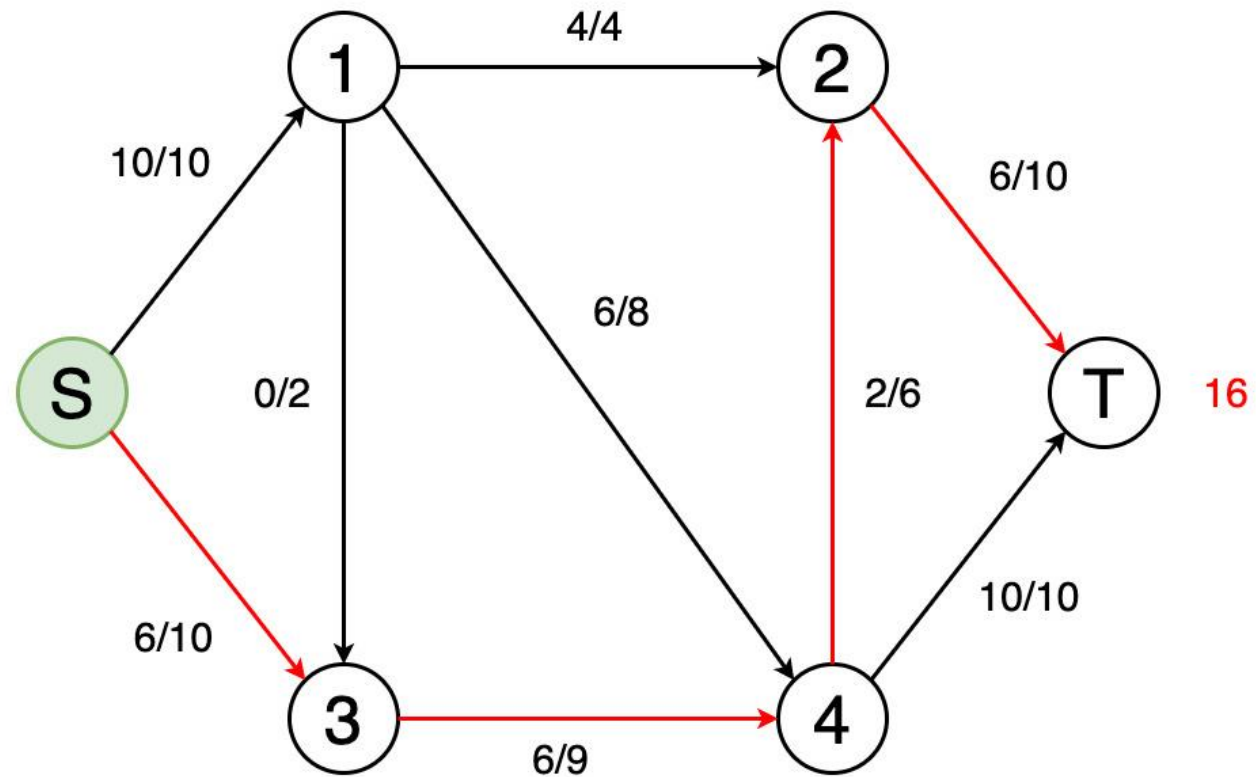


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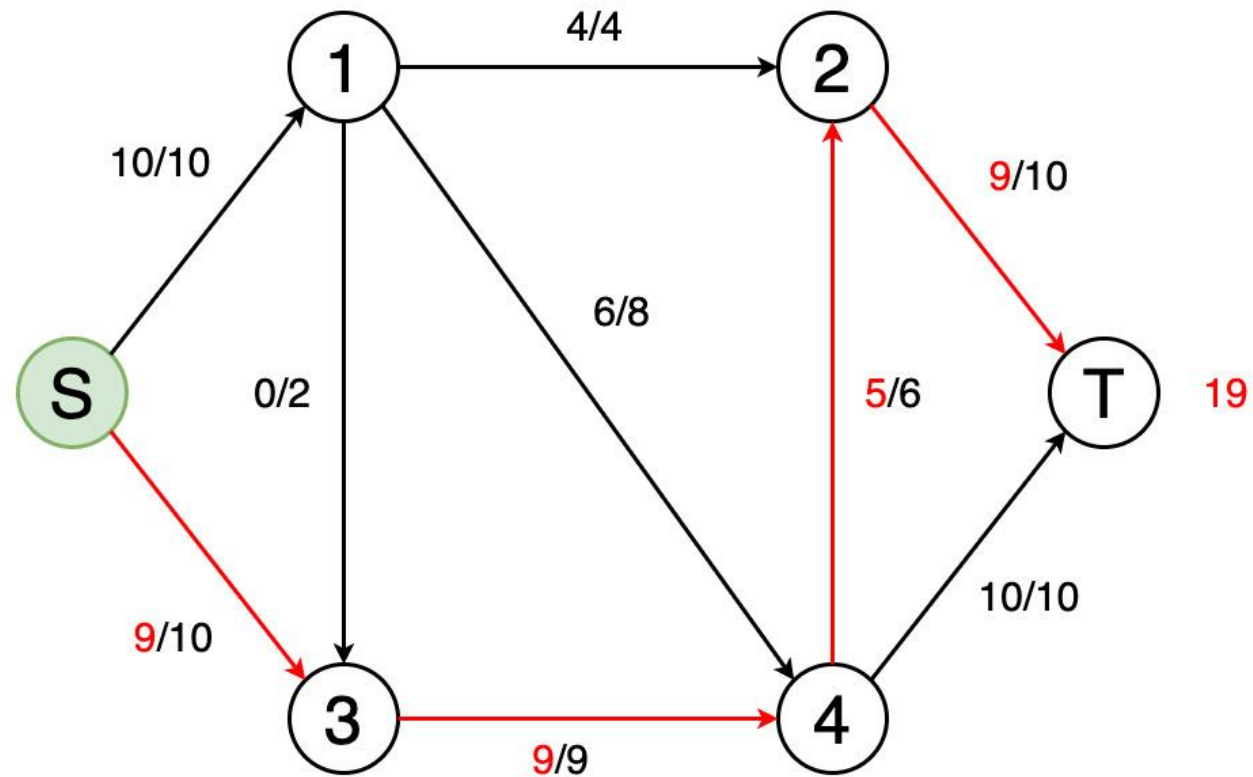


Ford Fulkerson



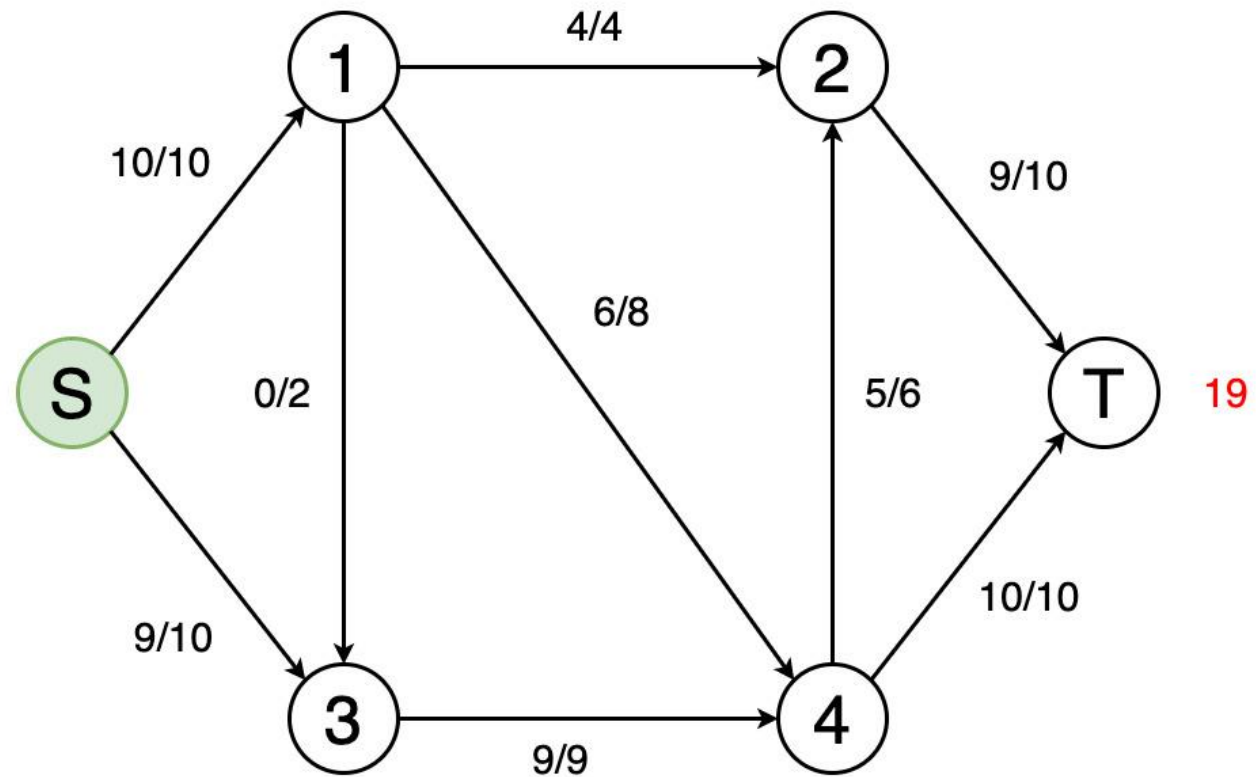


Ford Fulkerson



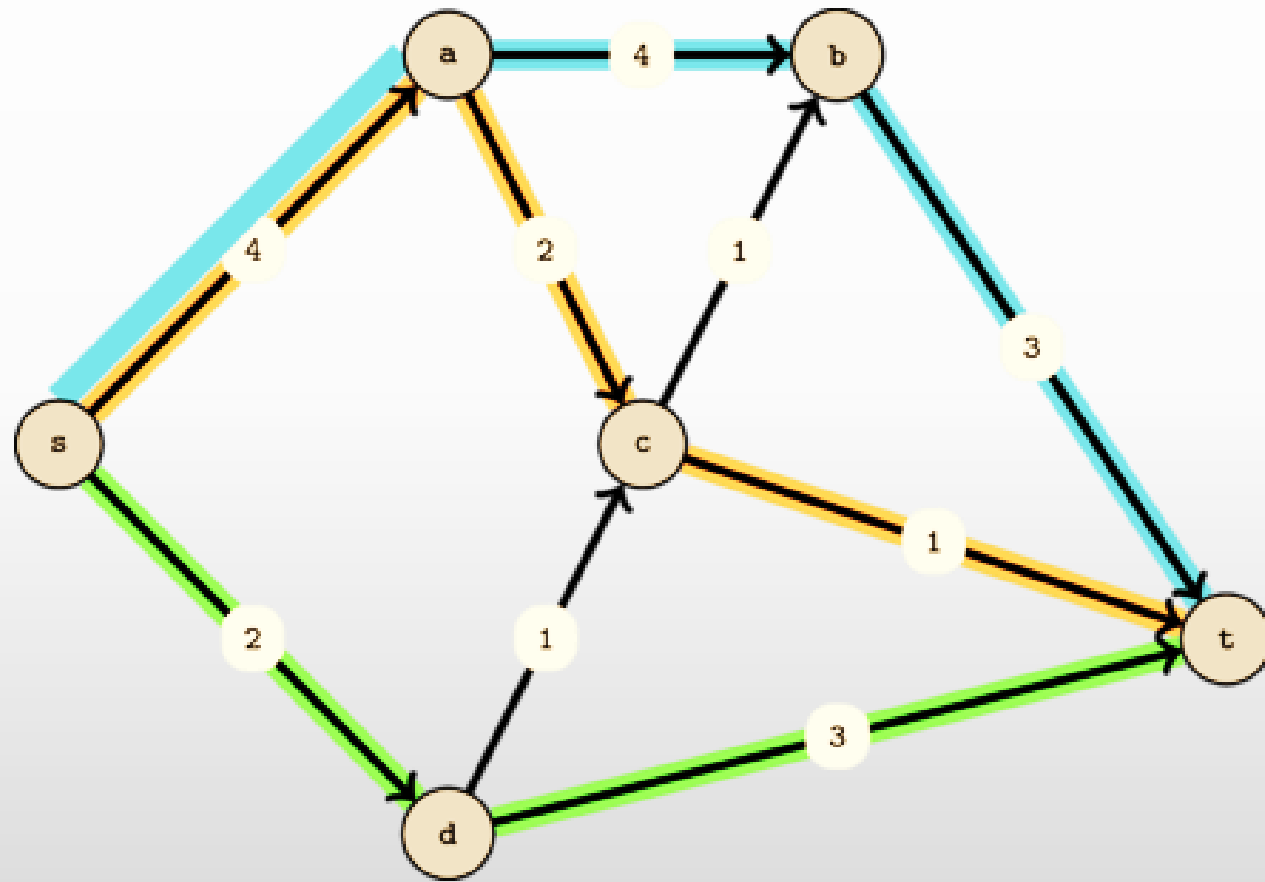


Ford Fulkerson



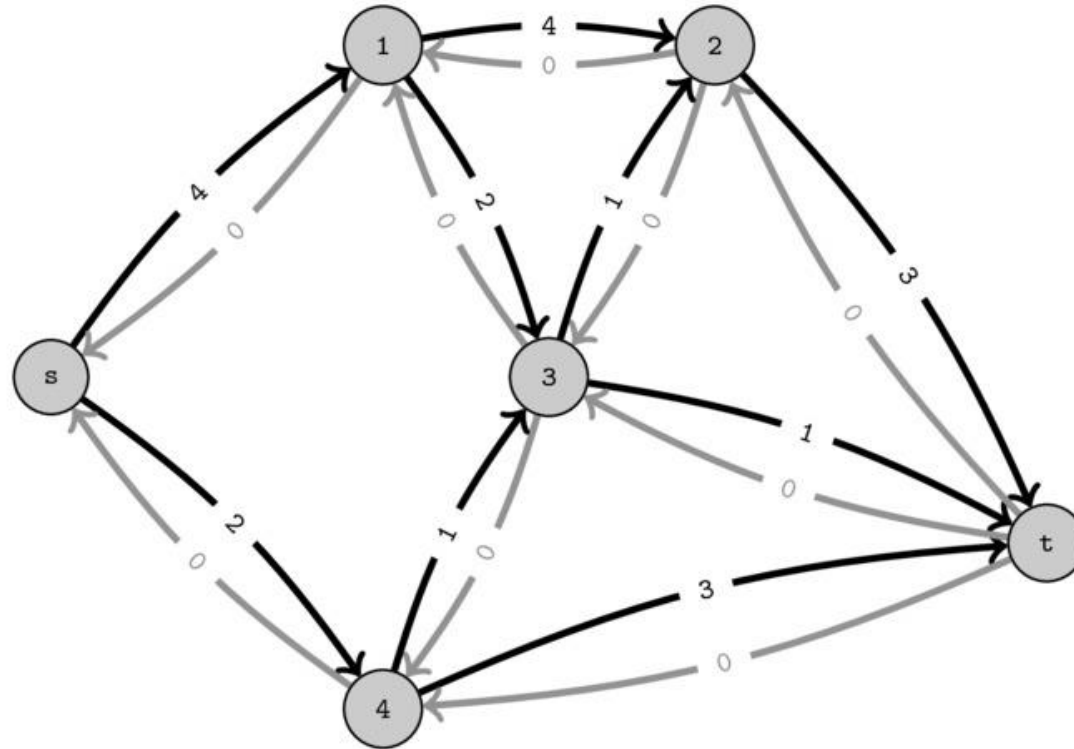


Edmonds Karp

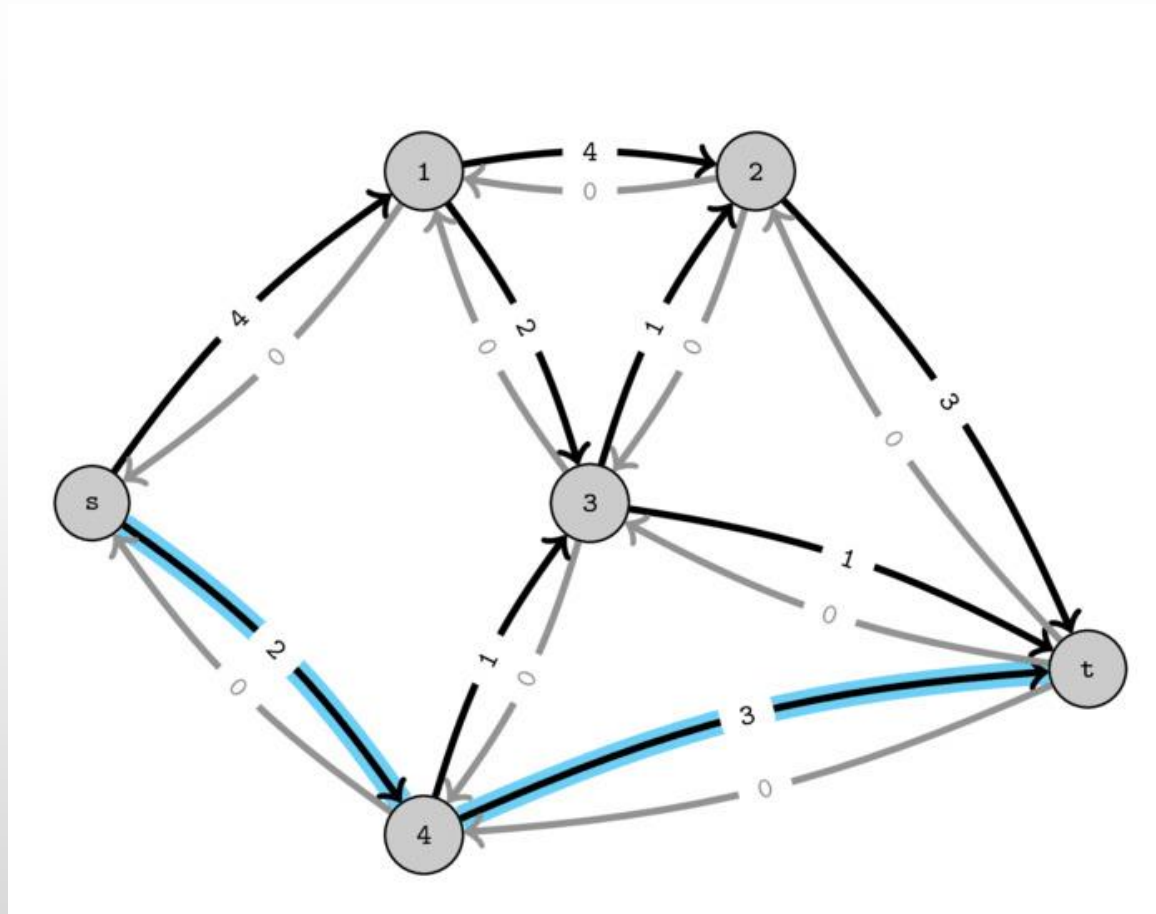


- 3 units of flow
- 1 unit of flow
- 2 units of flow

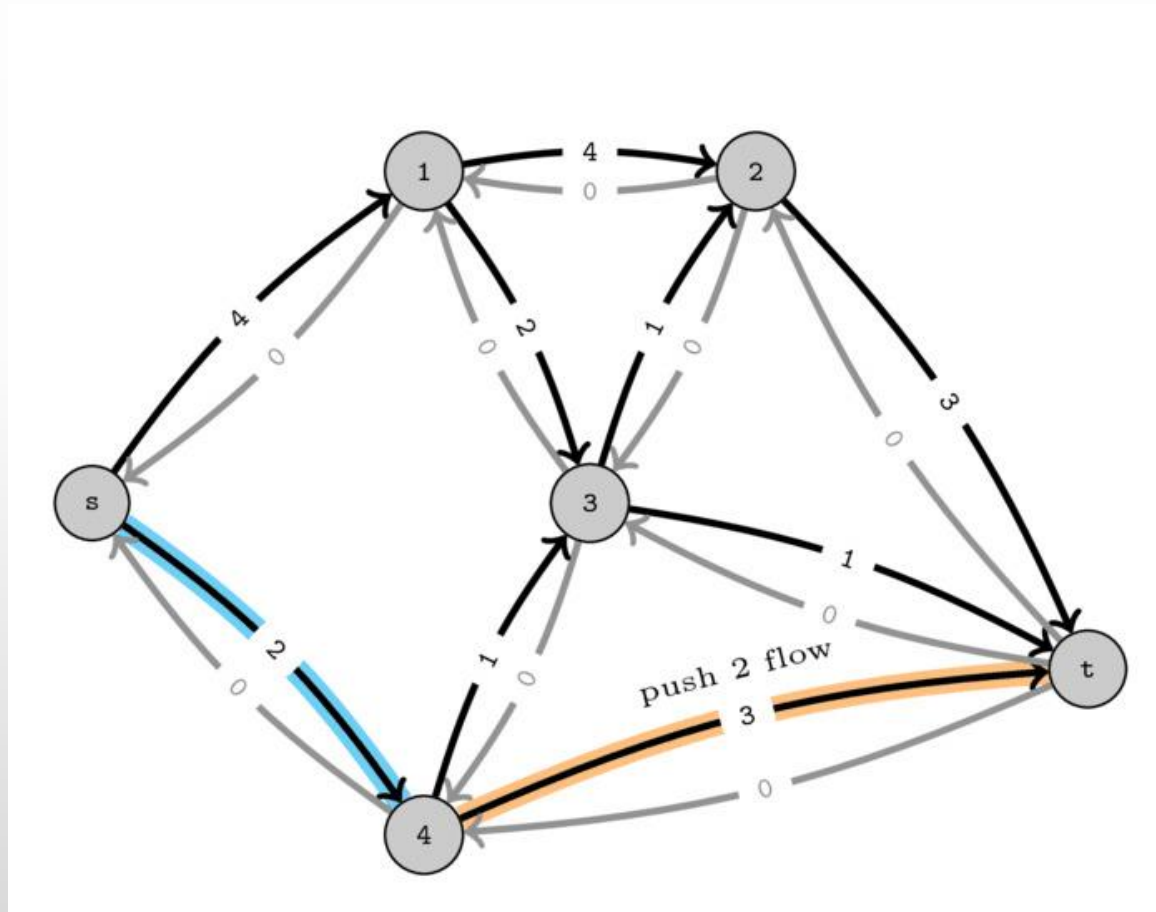
Edmonds Karp



Edmonds Karp

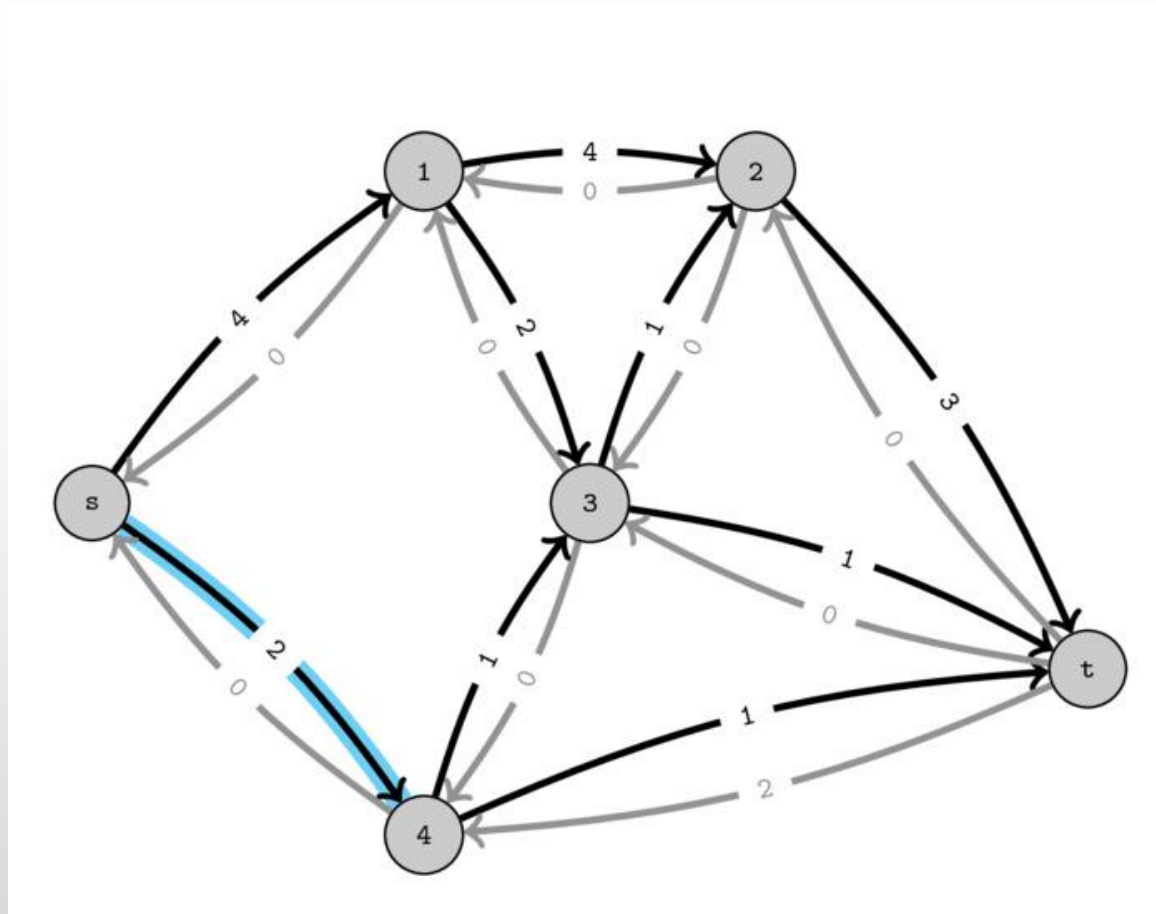


Edmonds Karp



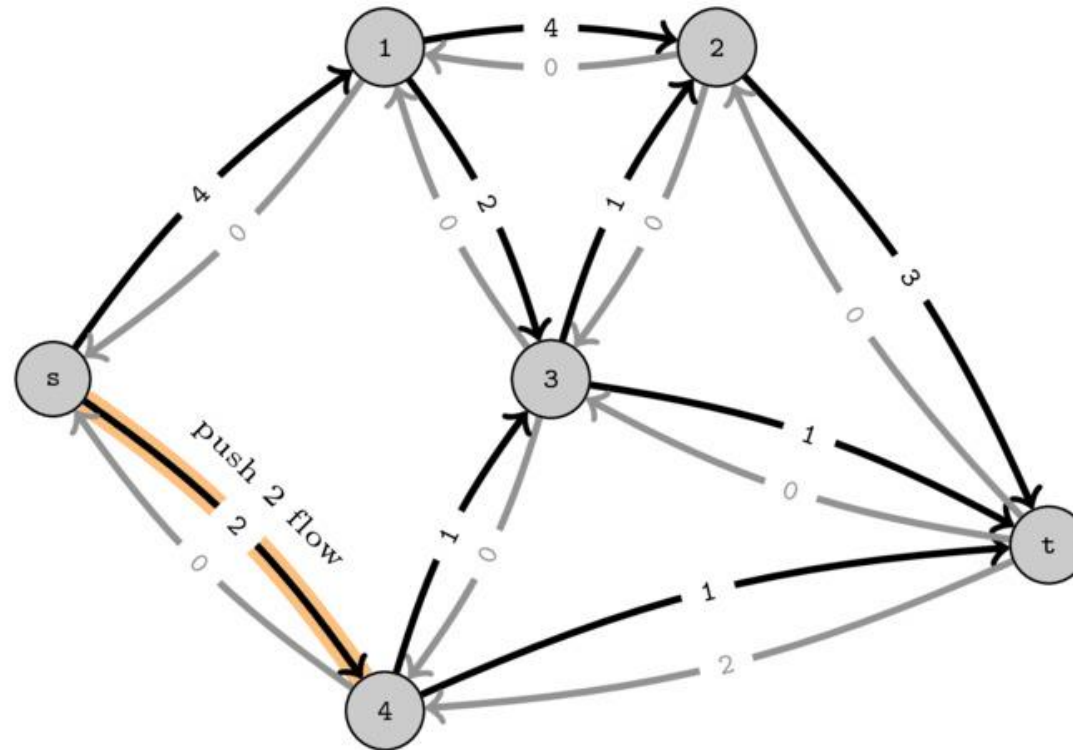


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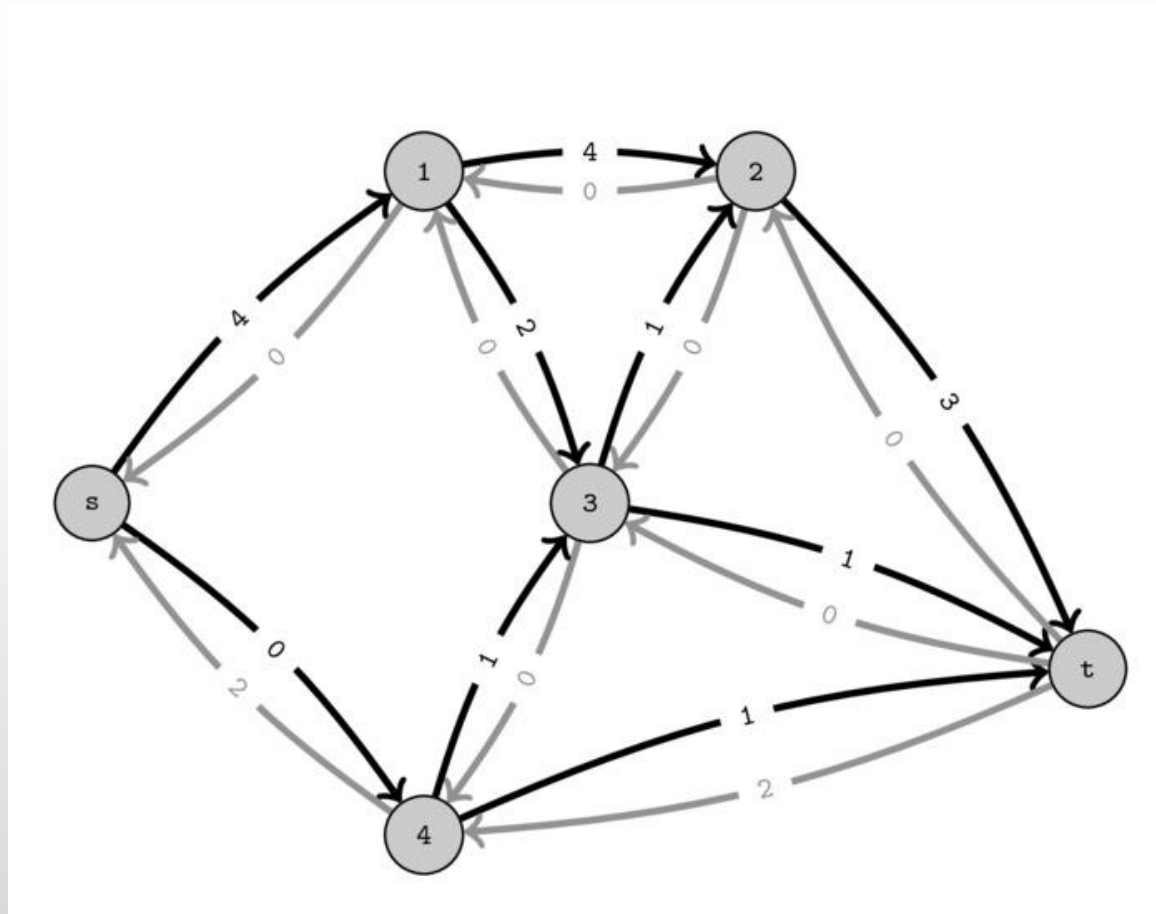




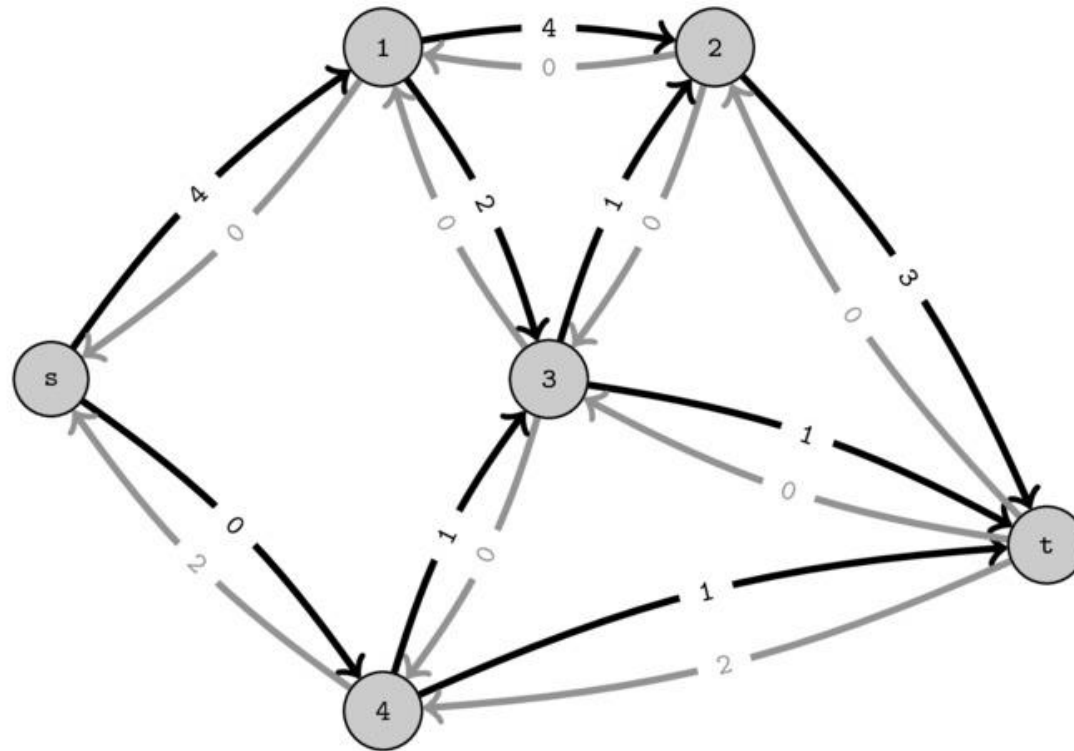
Edmonds Karp



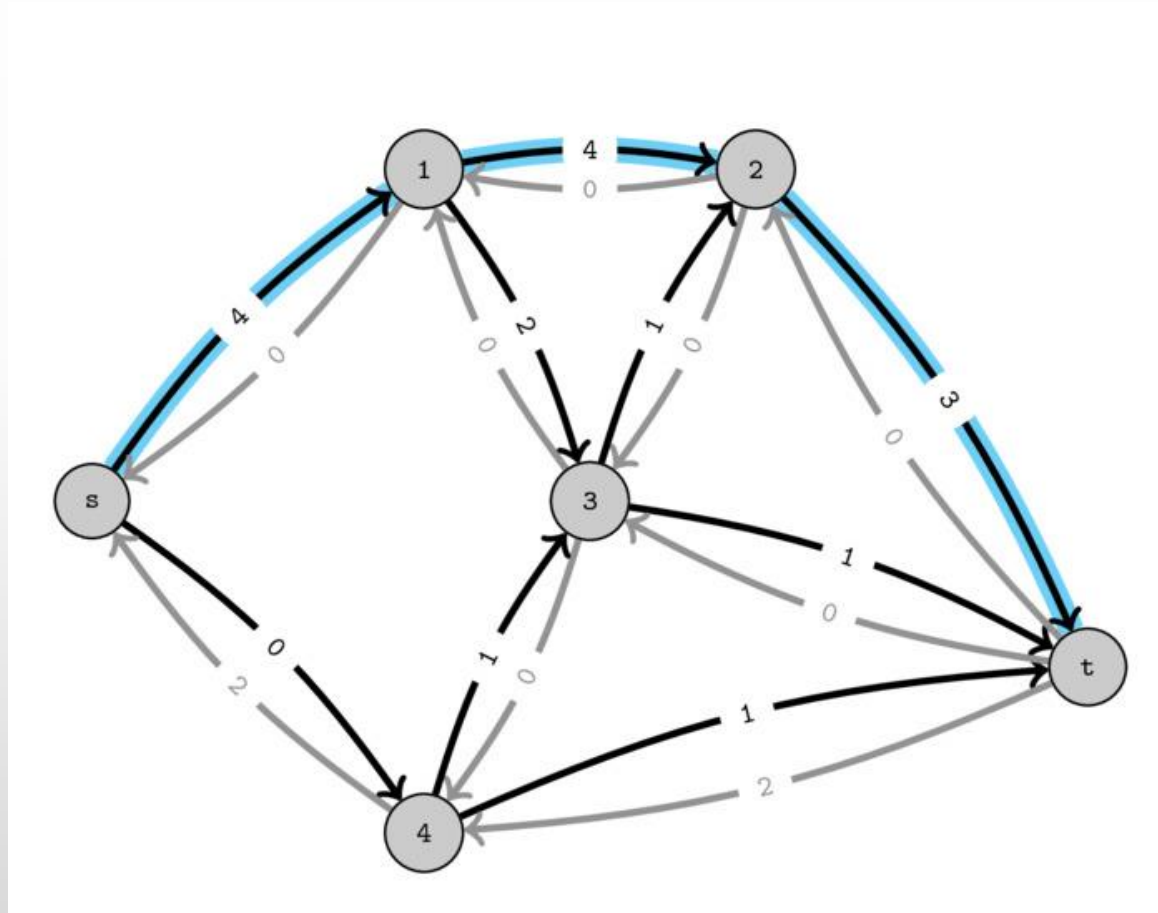
Edmonds Karp



Edmonds Karp

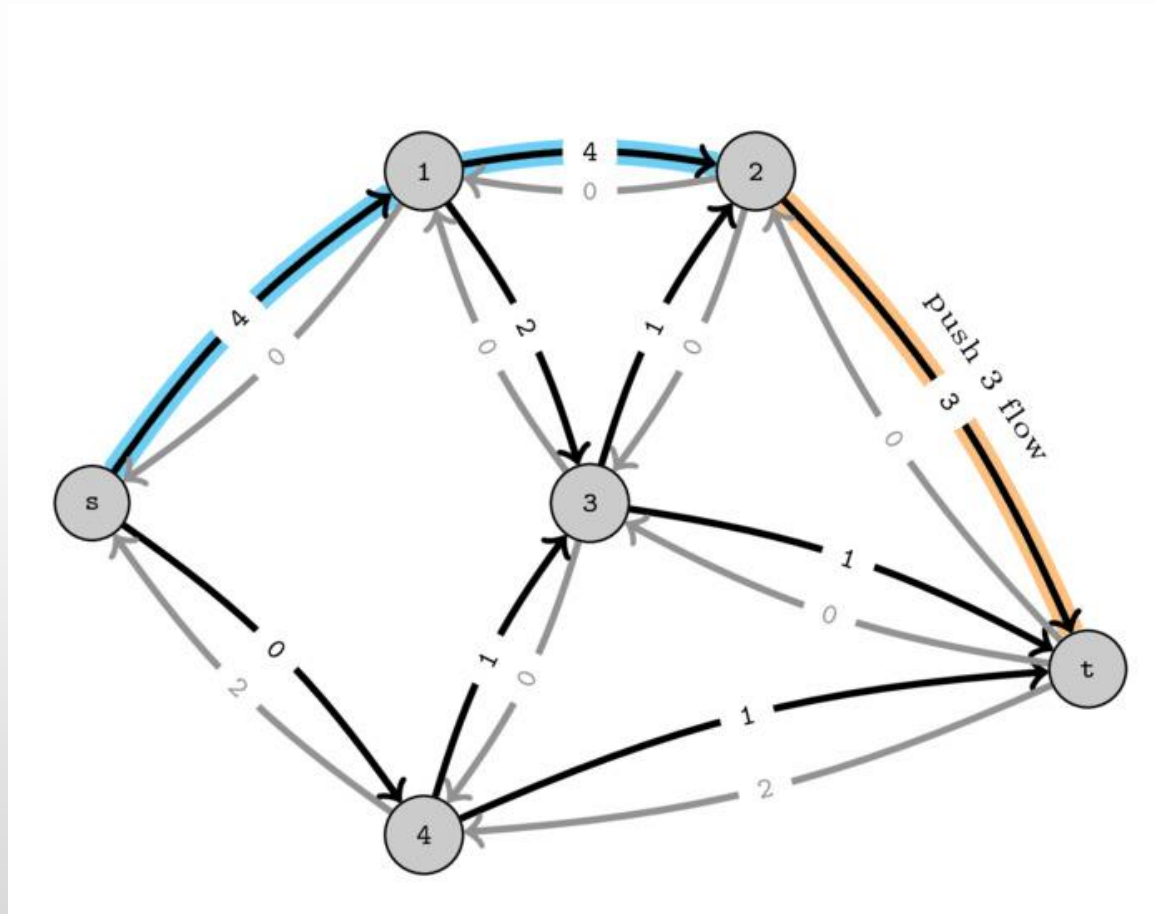


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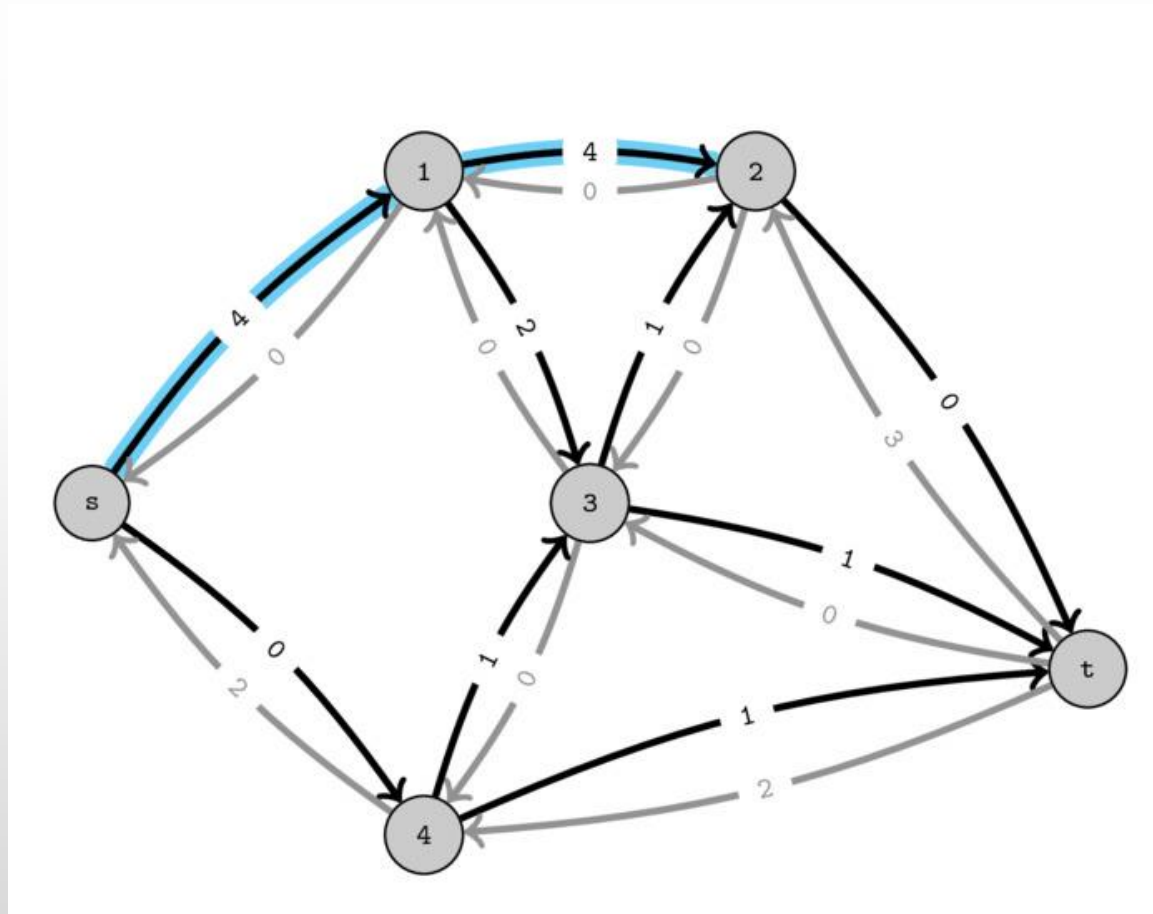




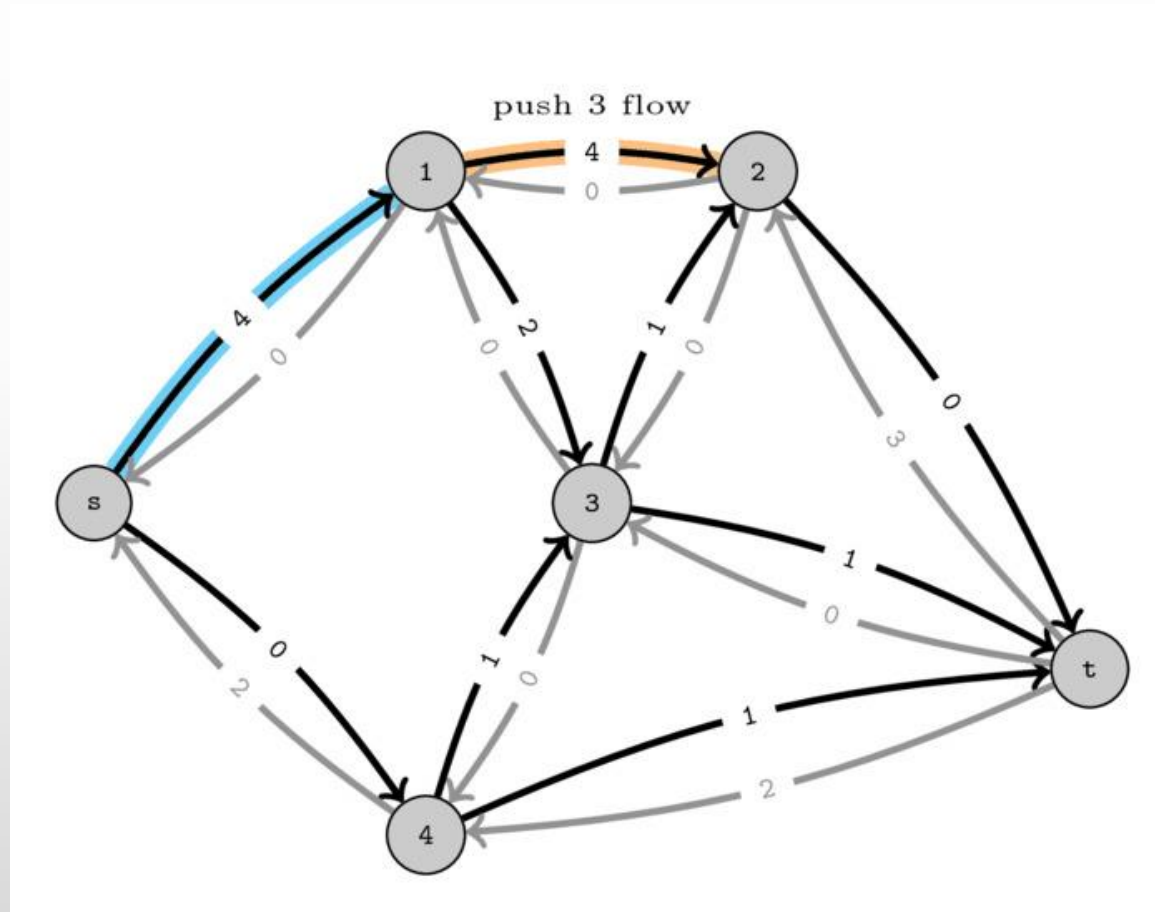
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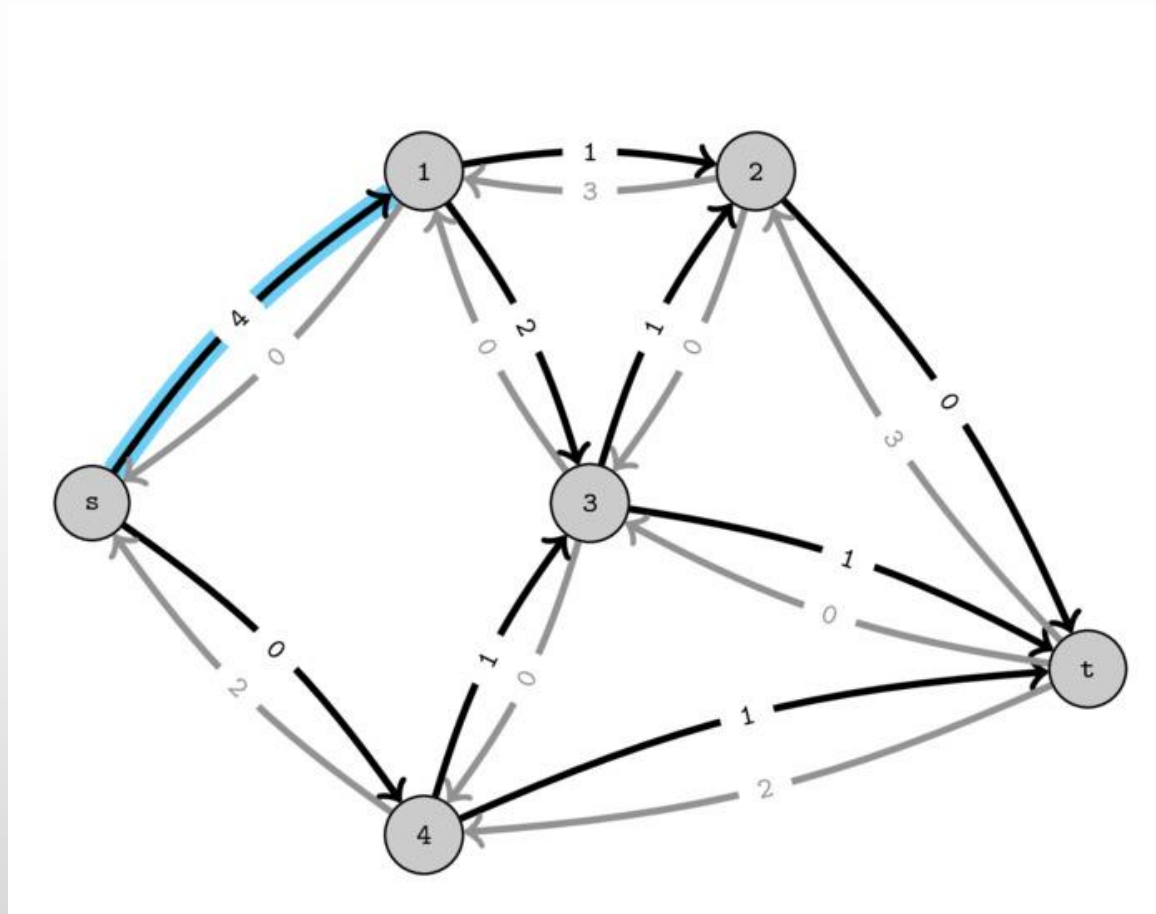
Edmonds Karp



Edmonds Karp

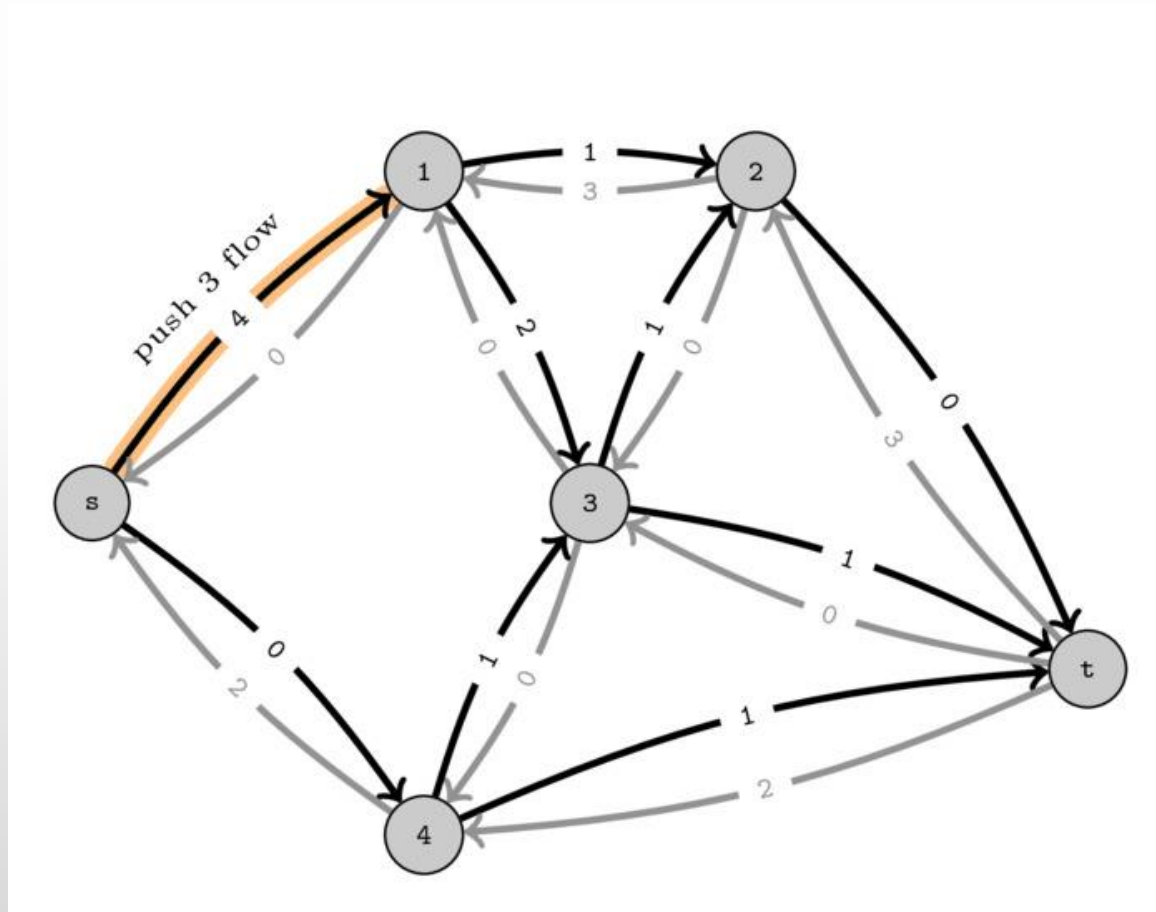


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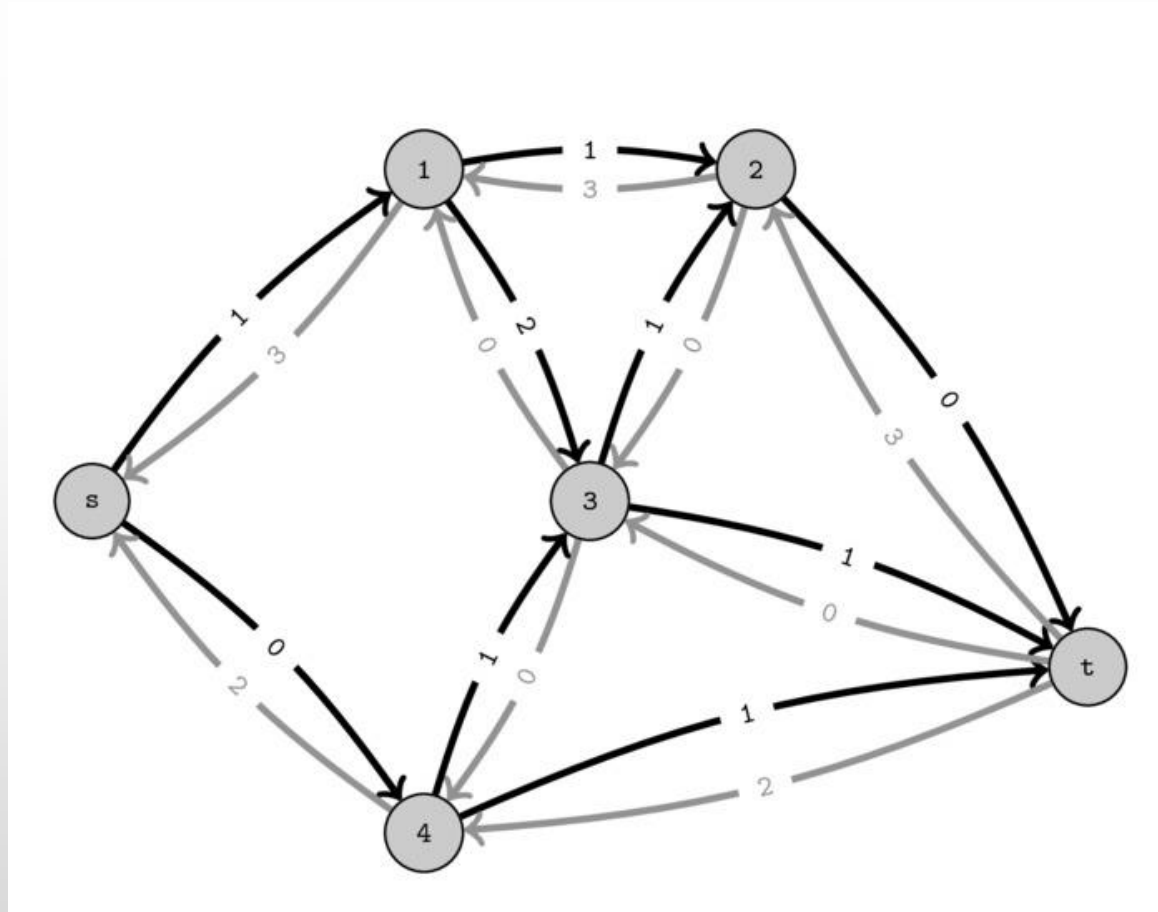




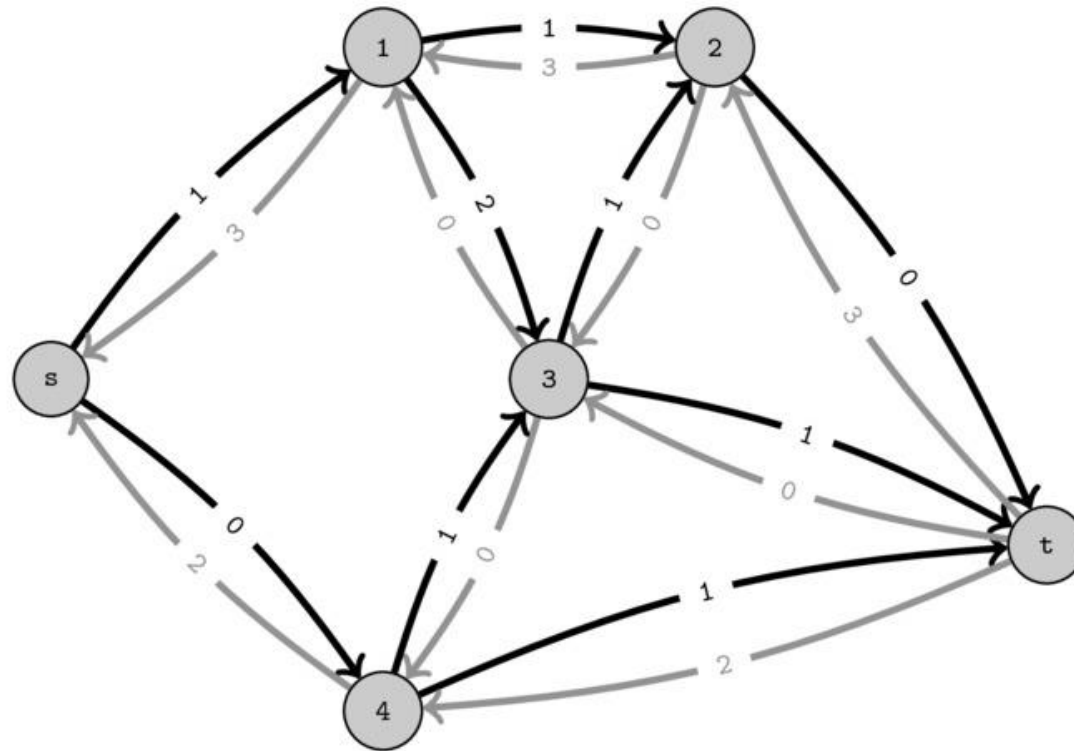
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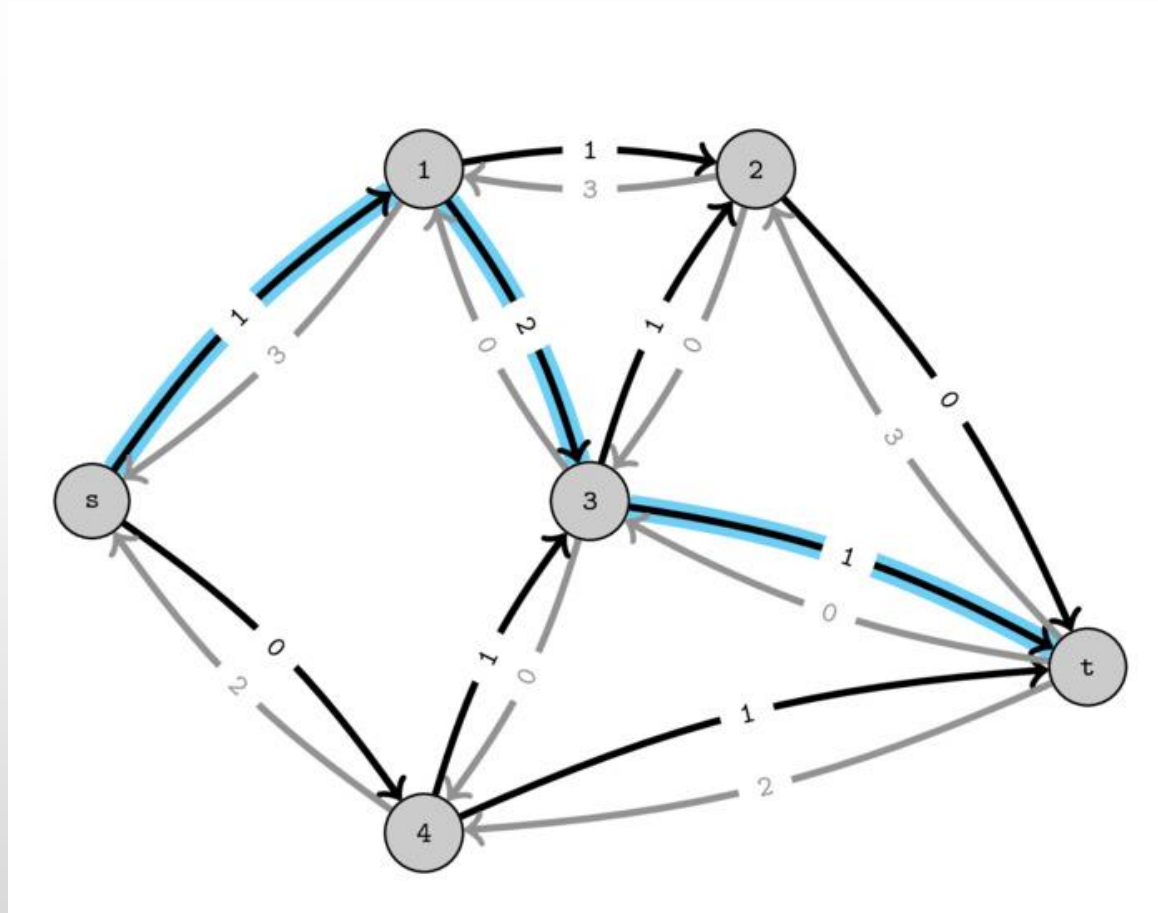
Edmonds Karp



Edmonds Karp

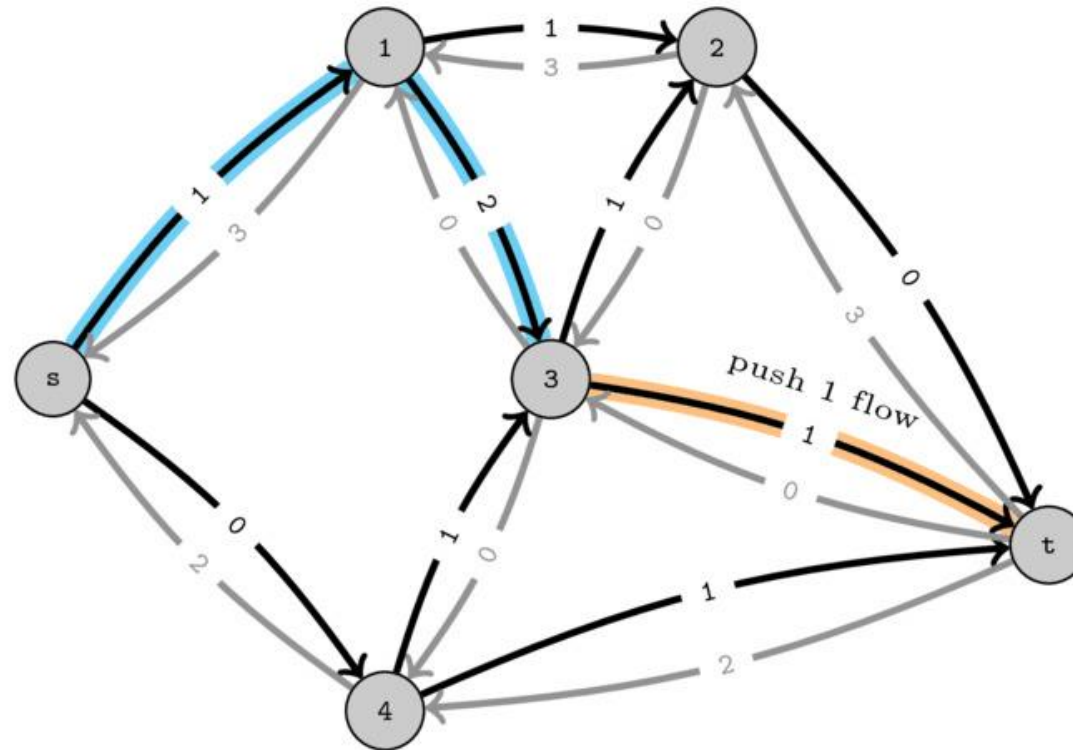


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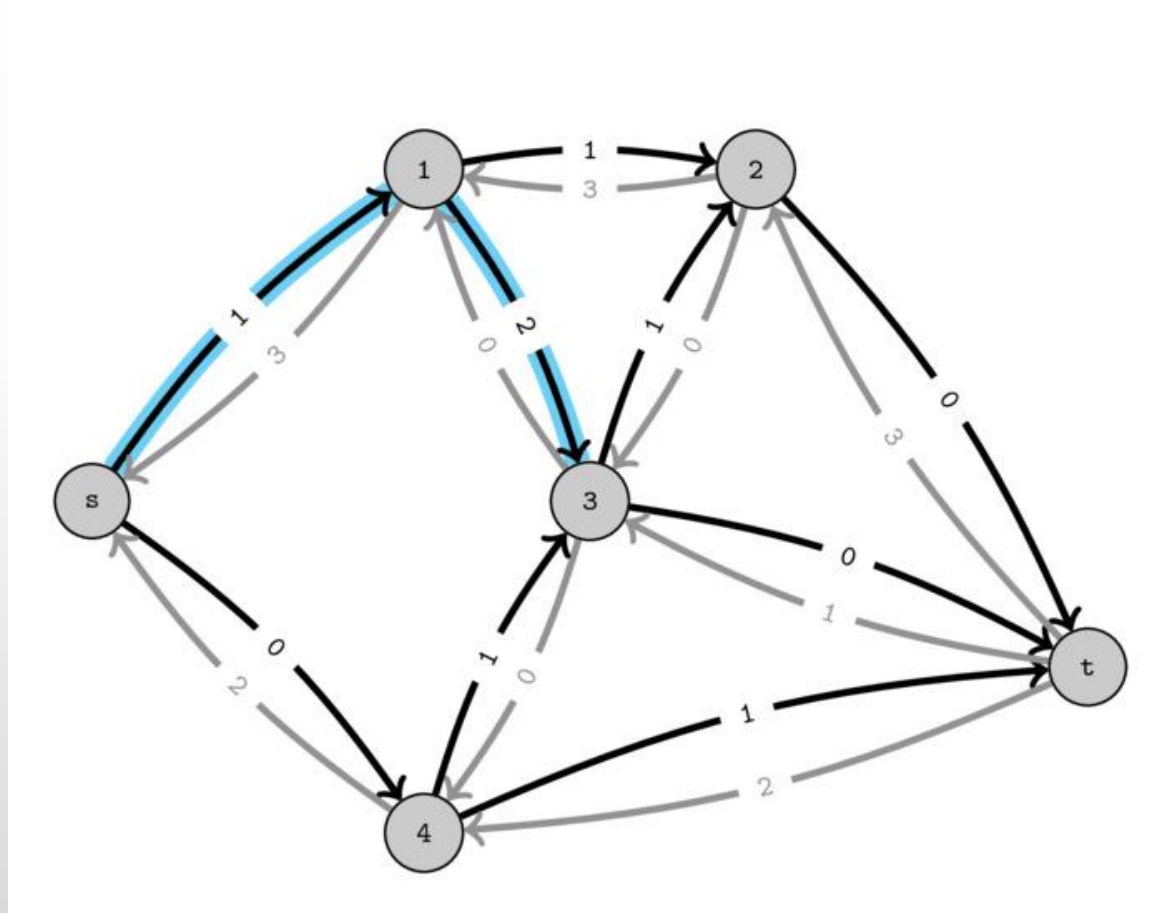




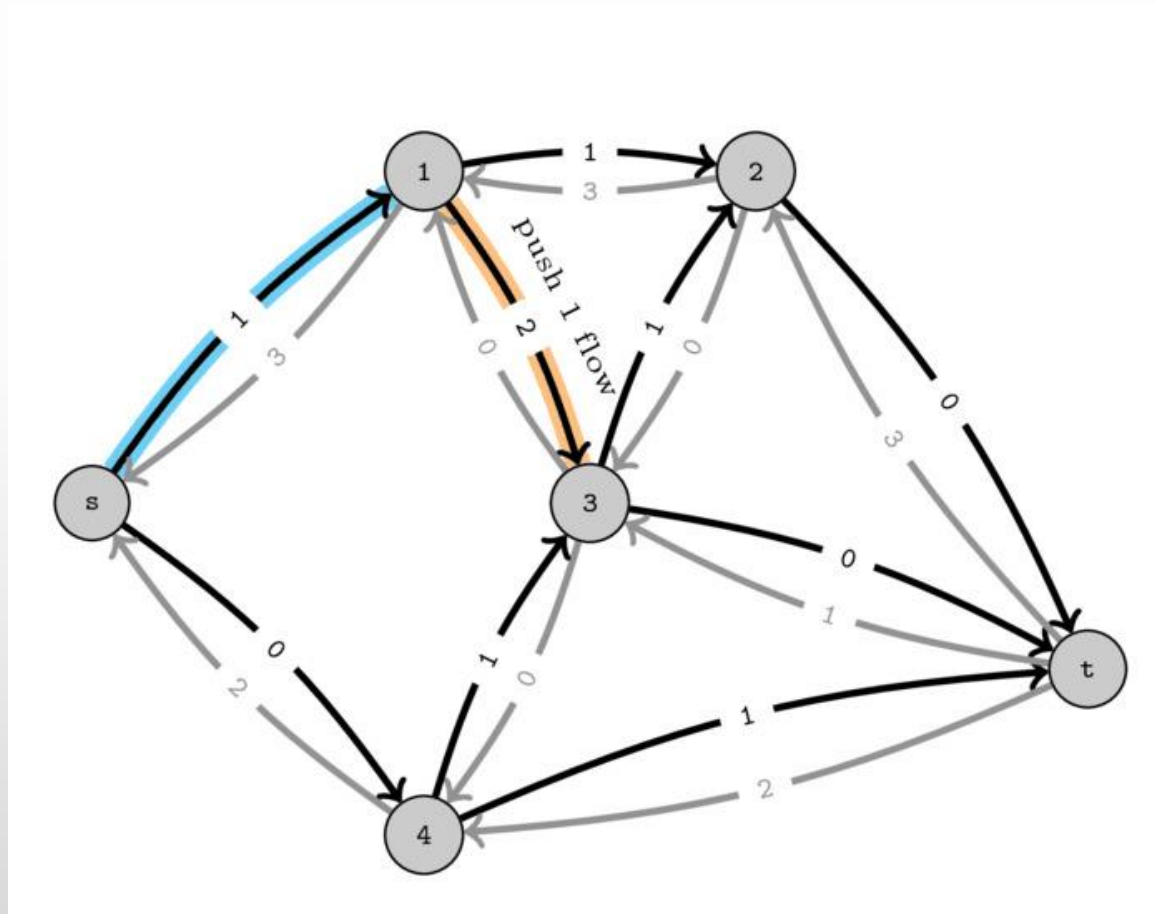
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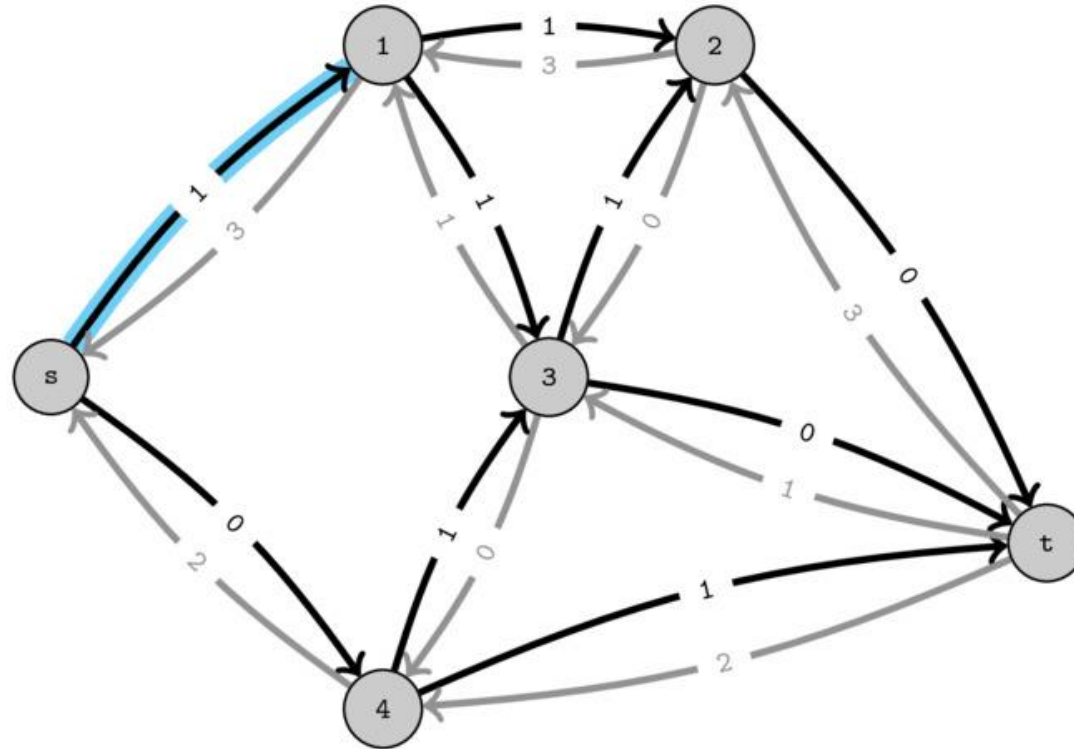
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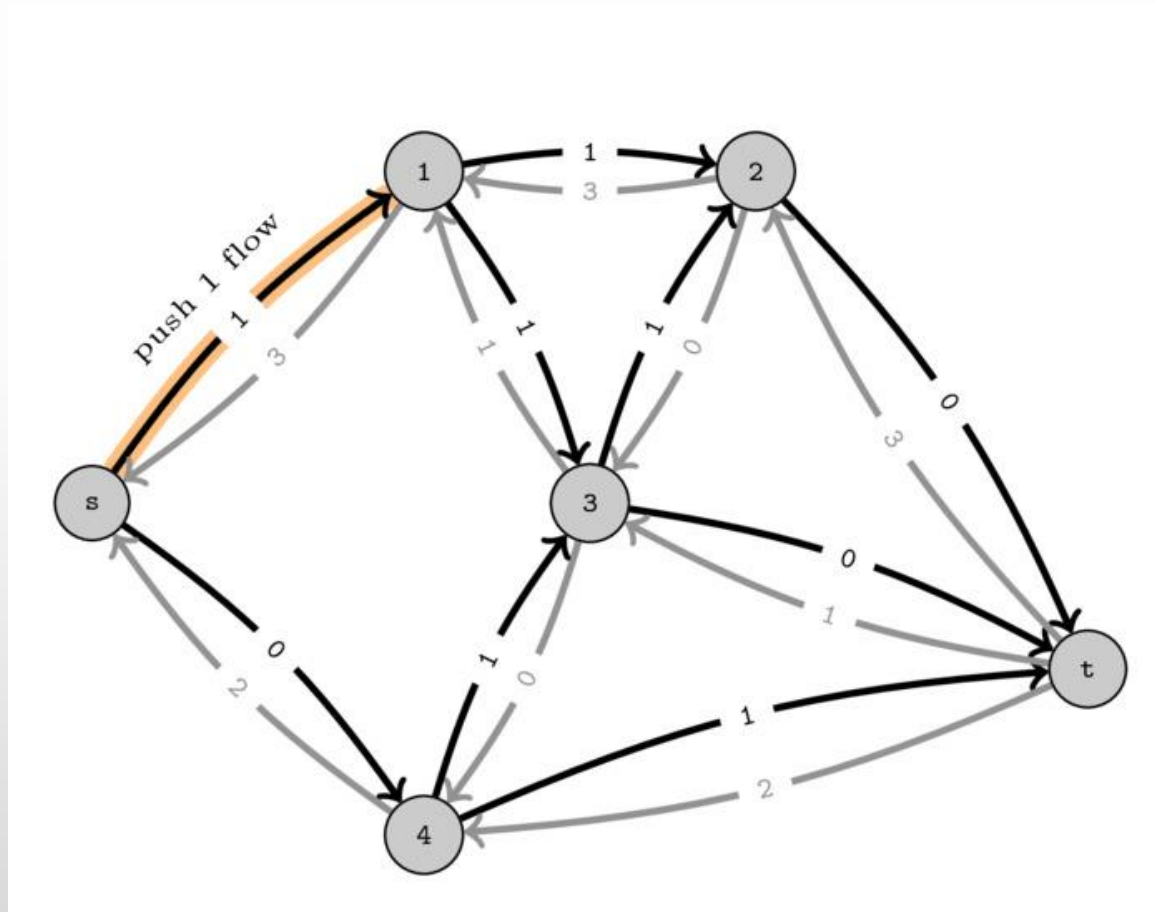
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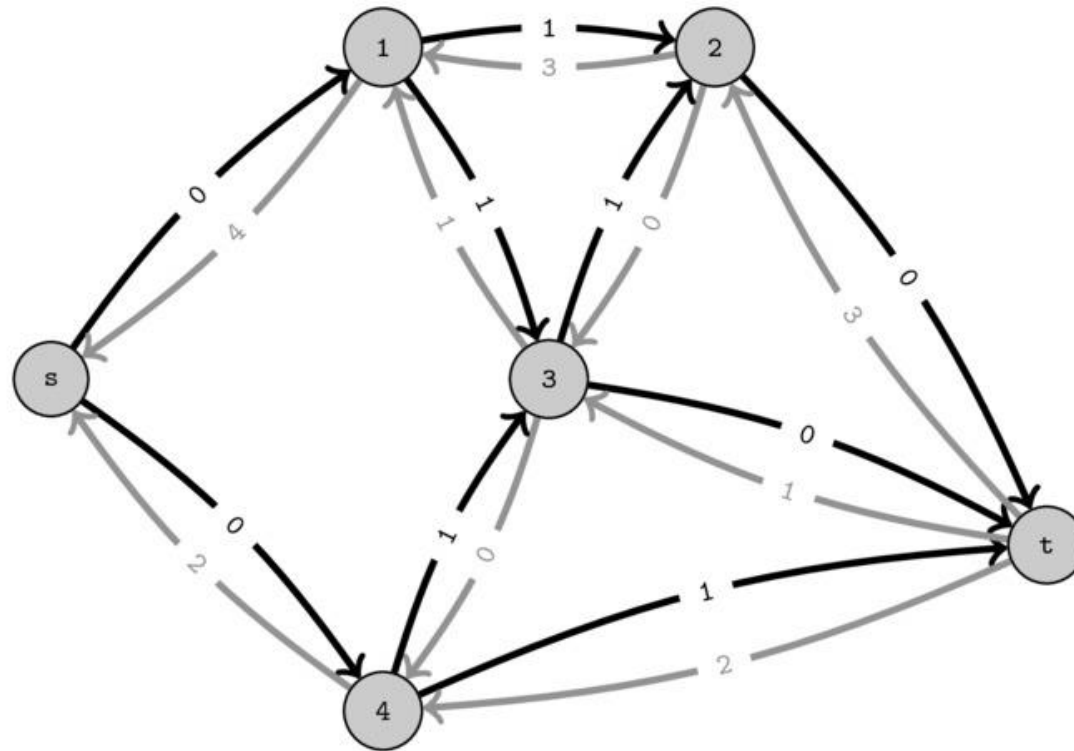
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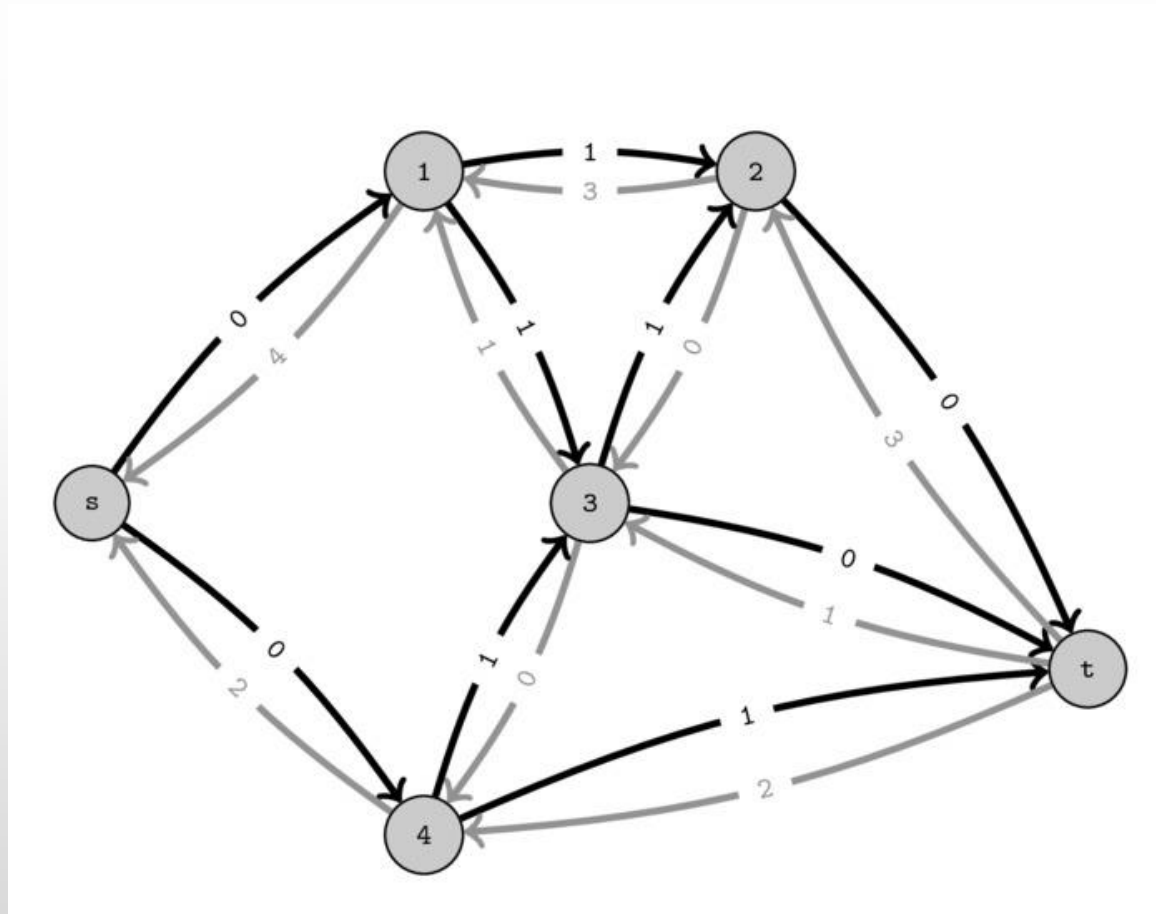
Edmonds Karp



Edmonds Karp



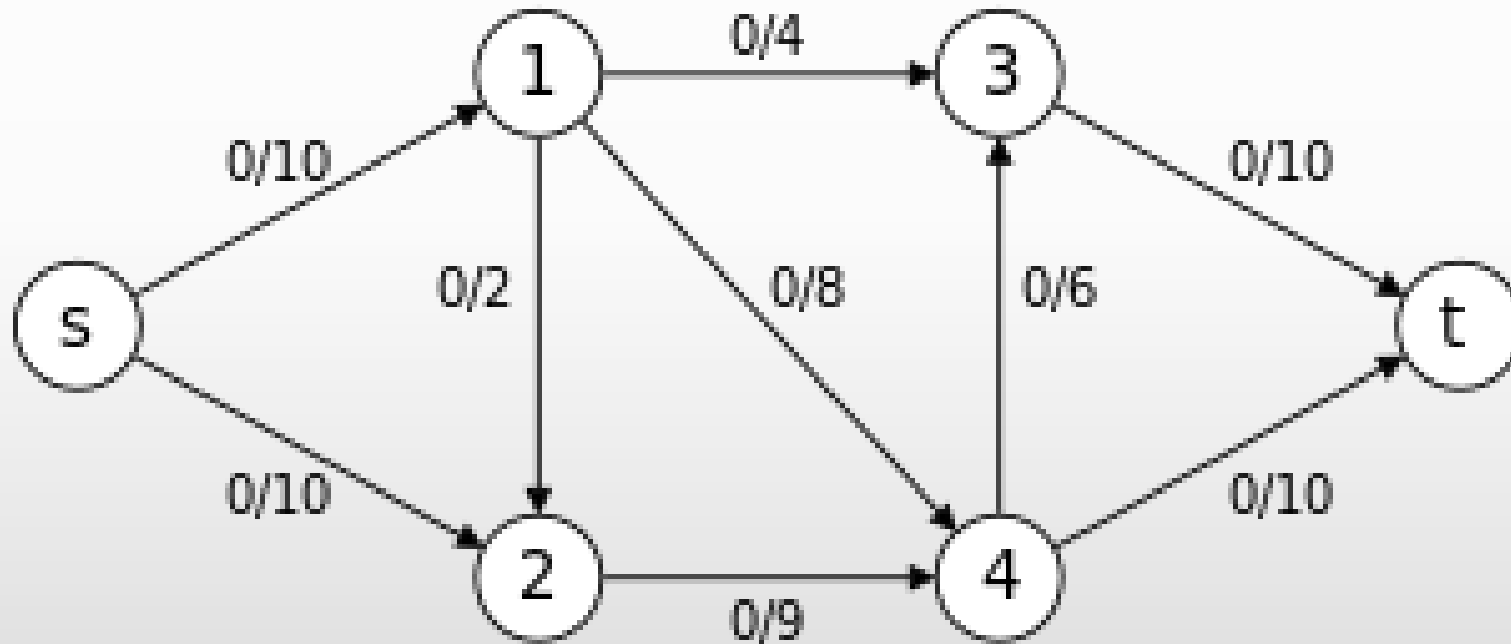
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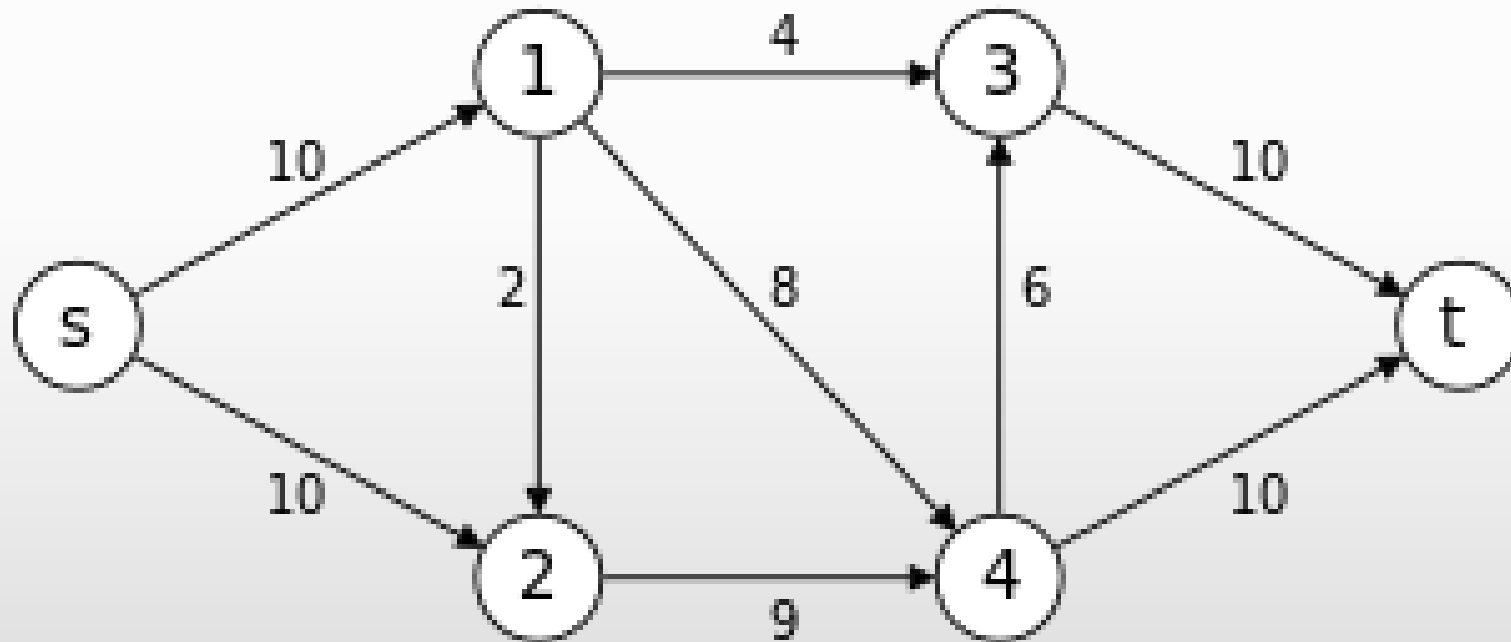
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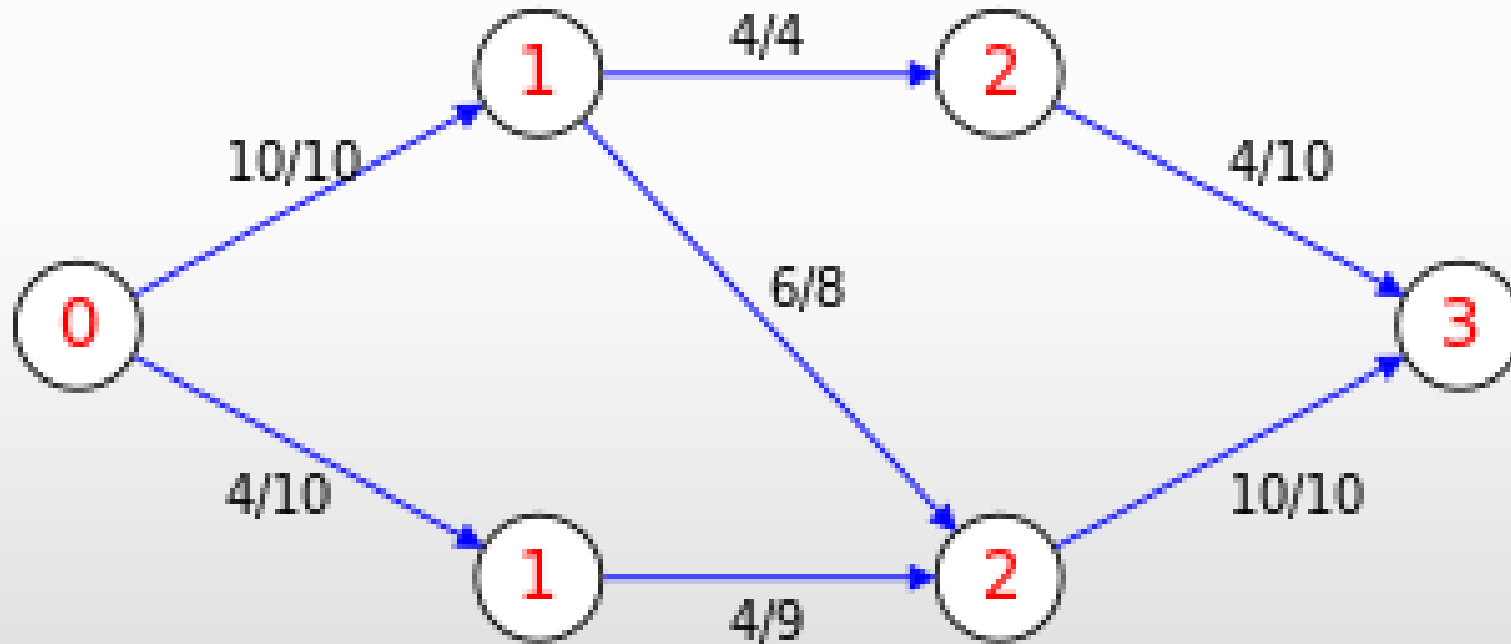
Dinic's



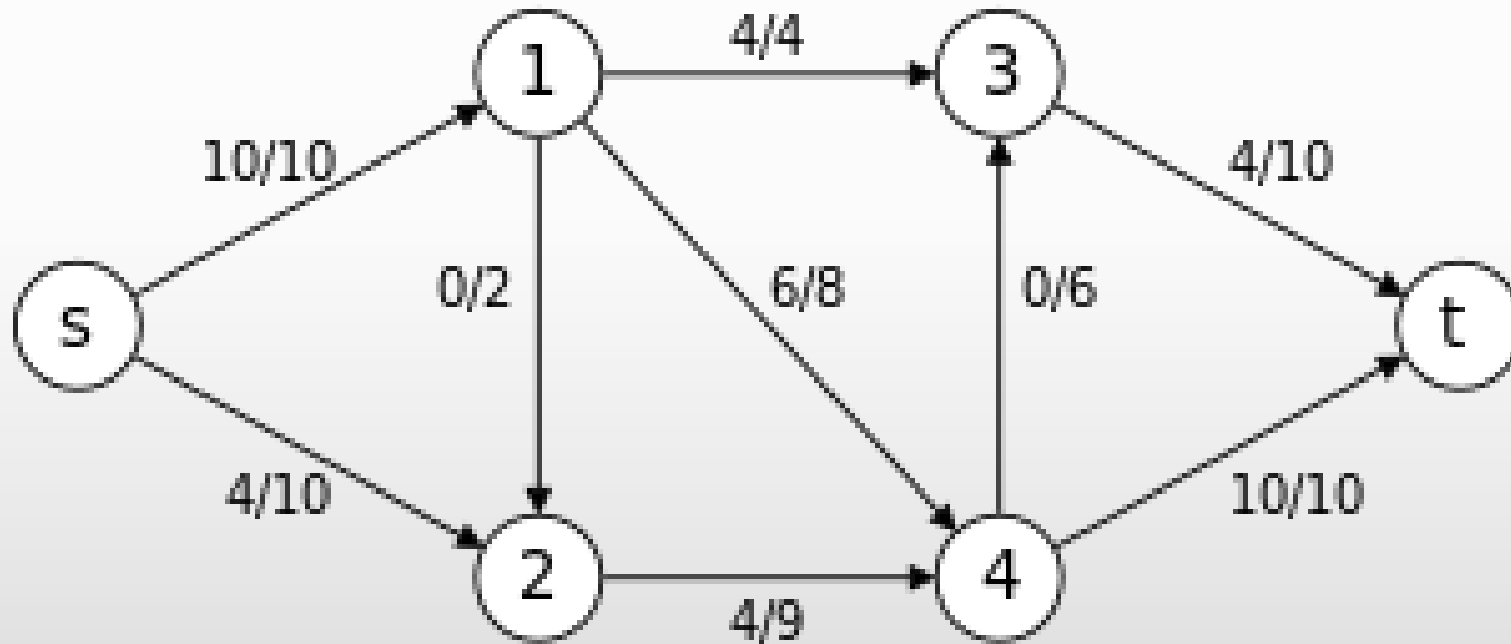
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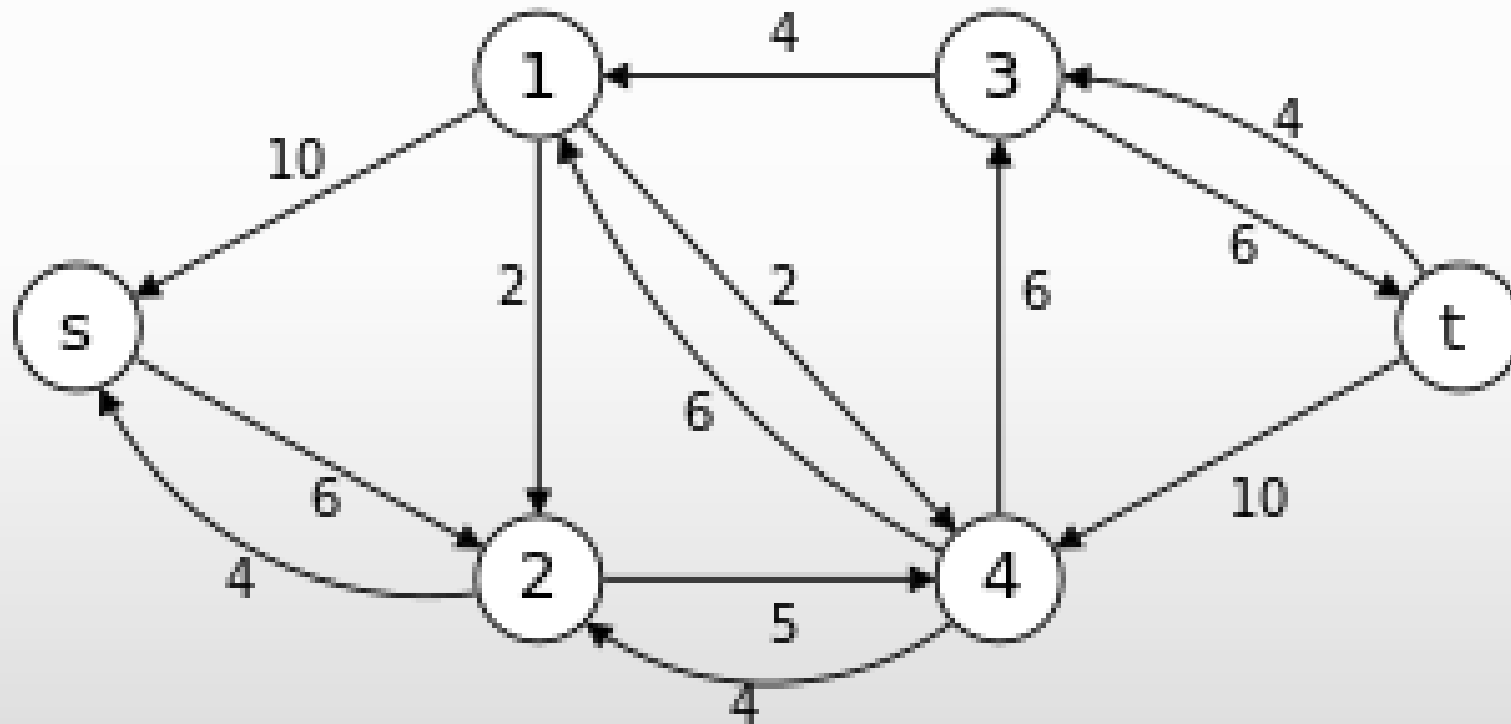
Dinic's



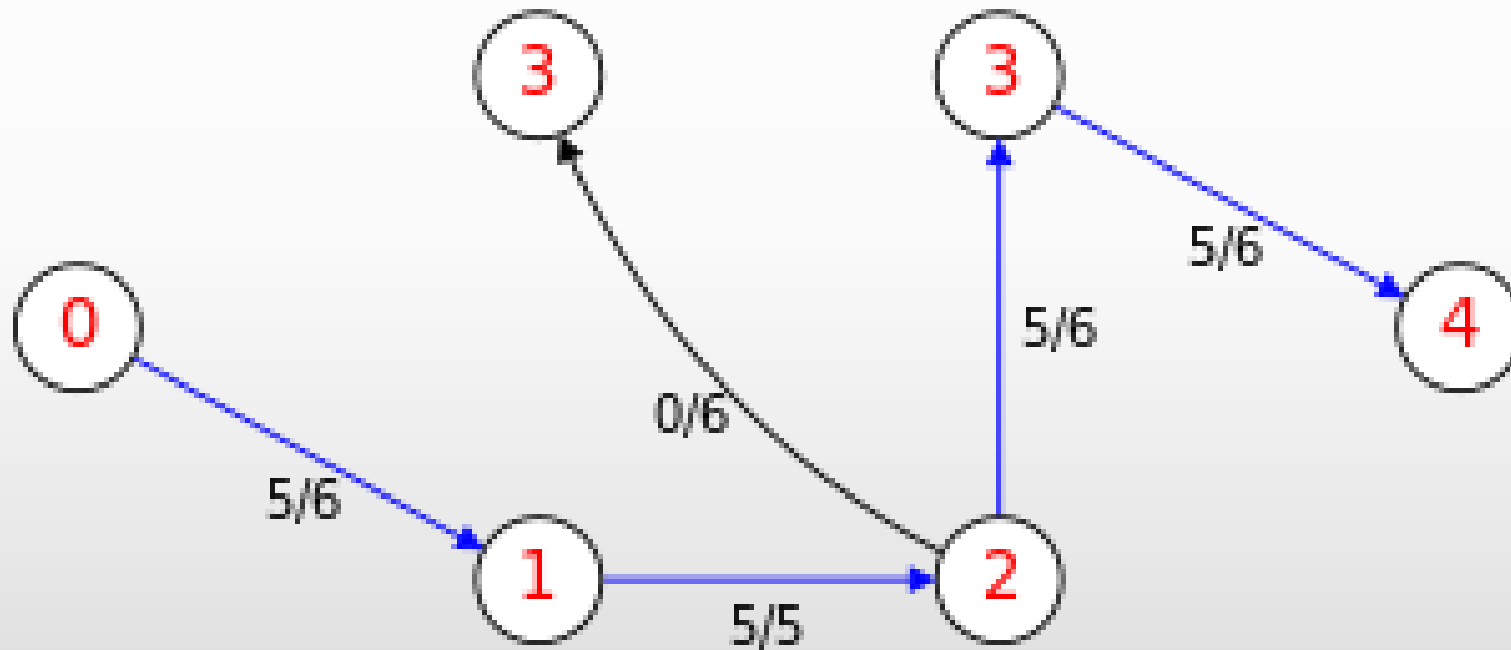
Dinic's



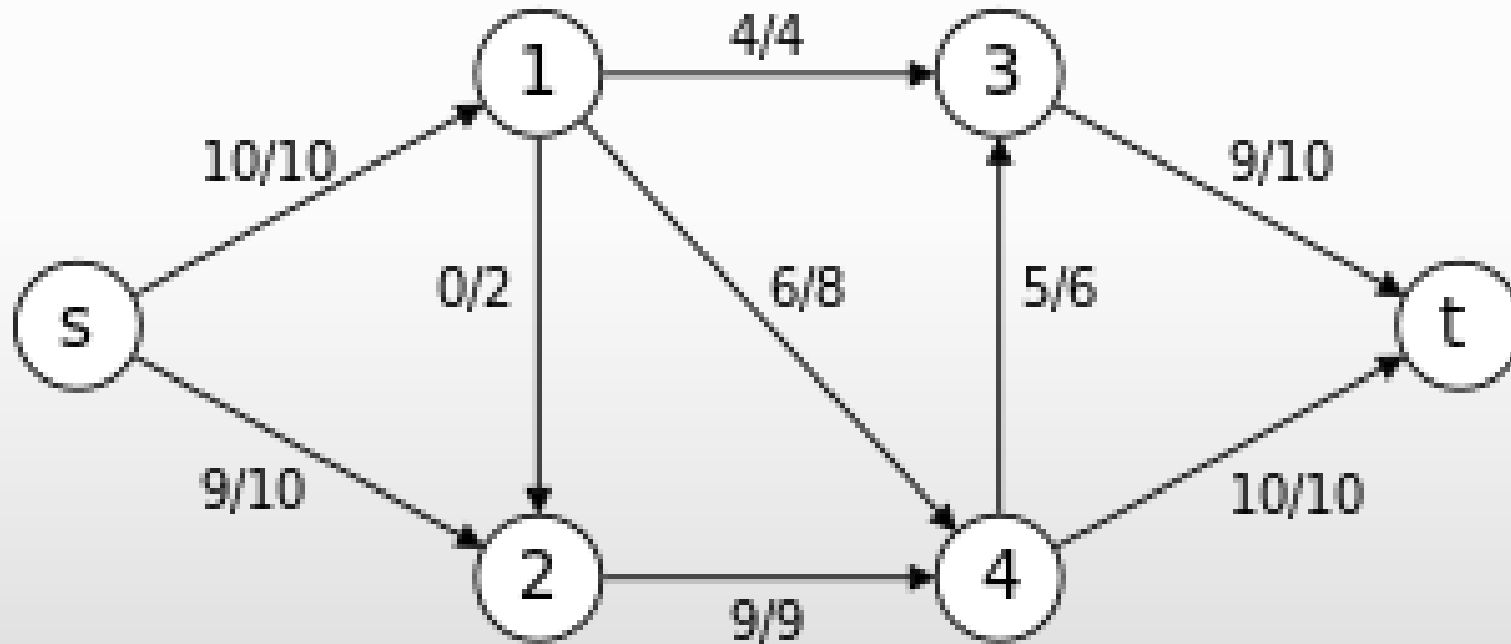
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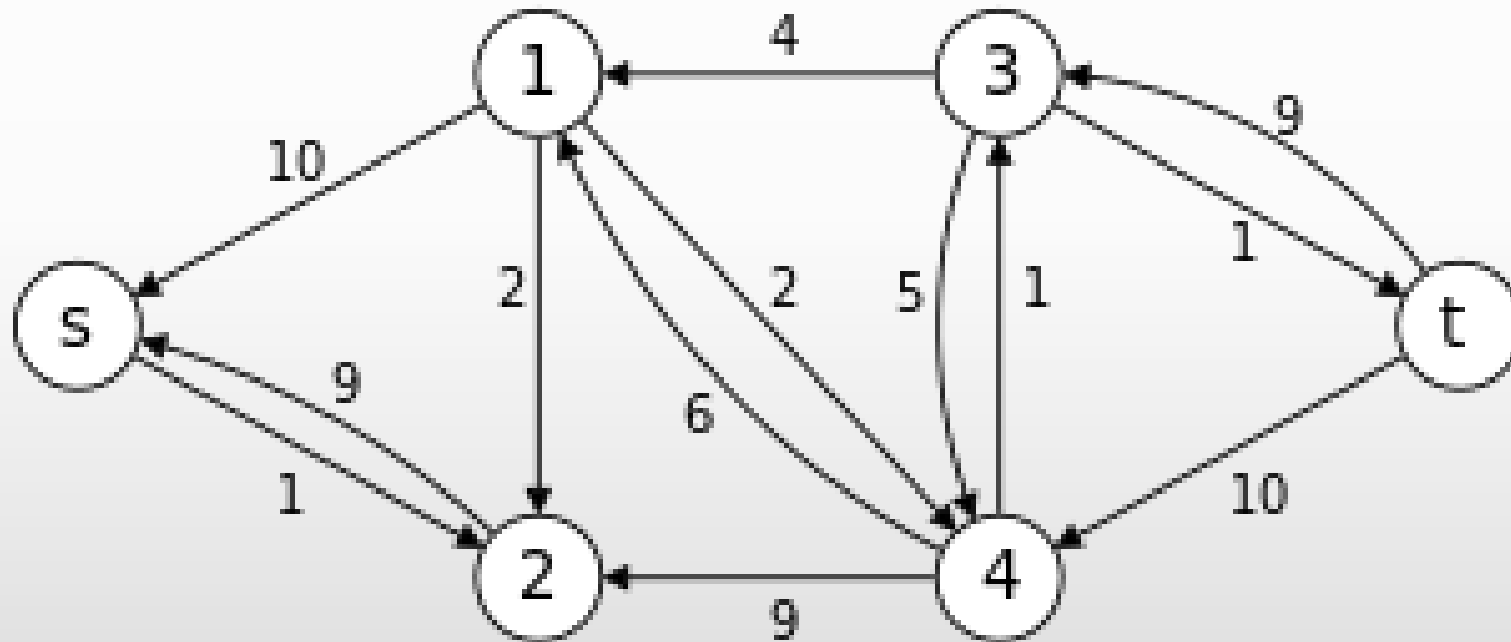
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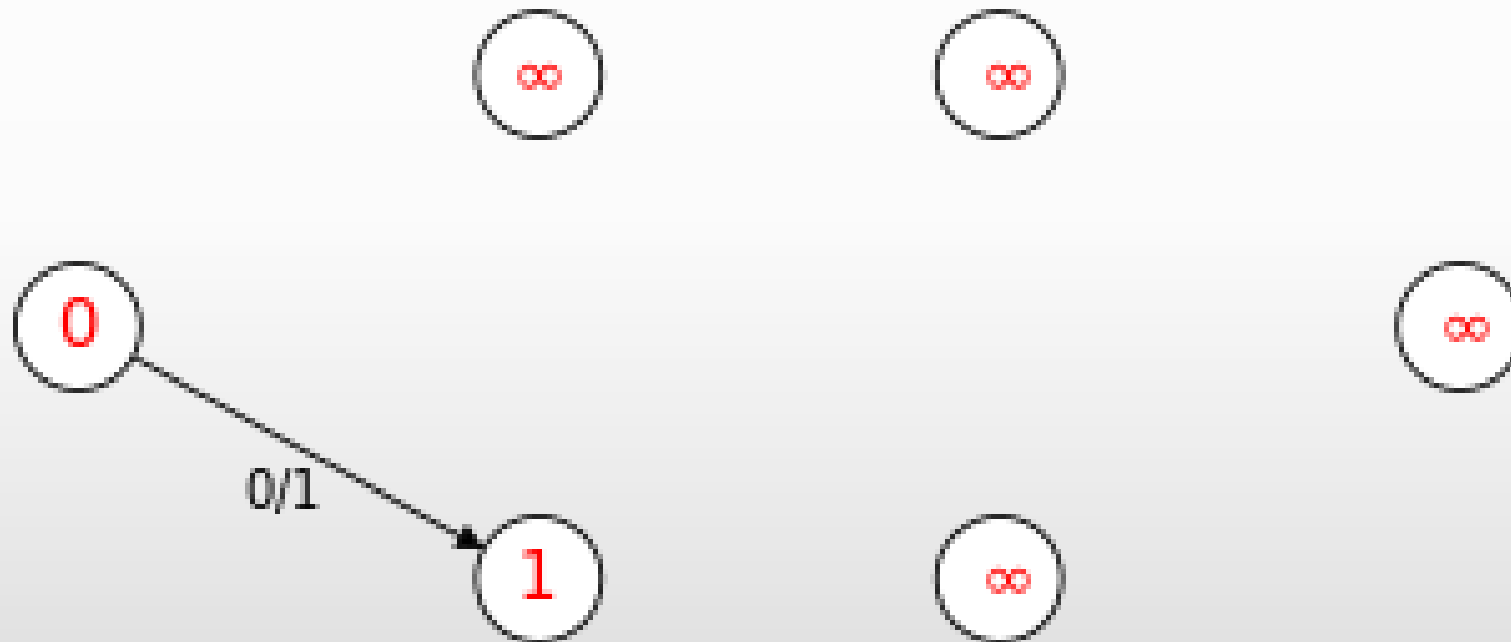
Dinic's



Dinic's



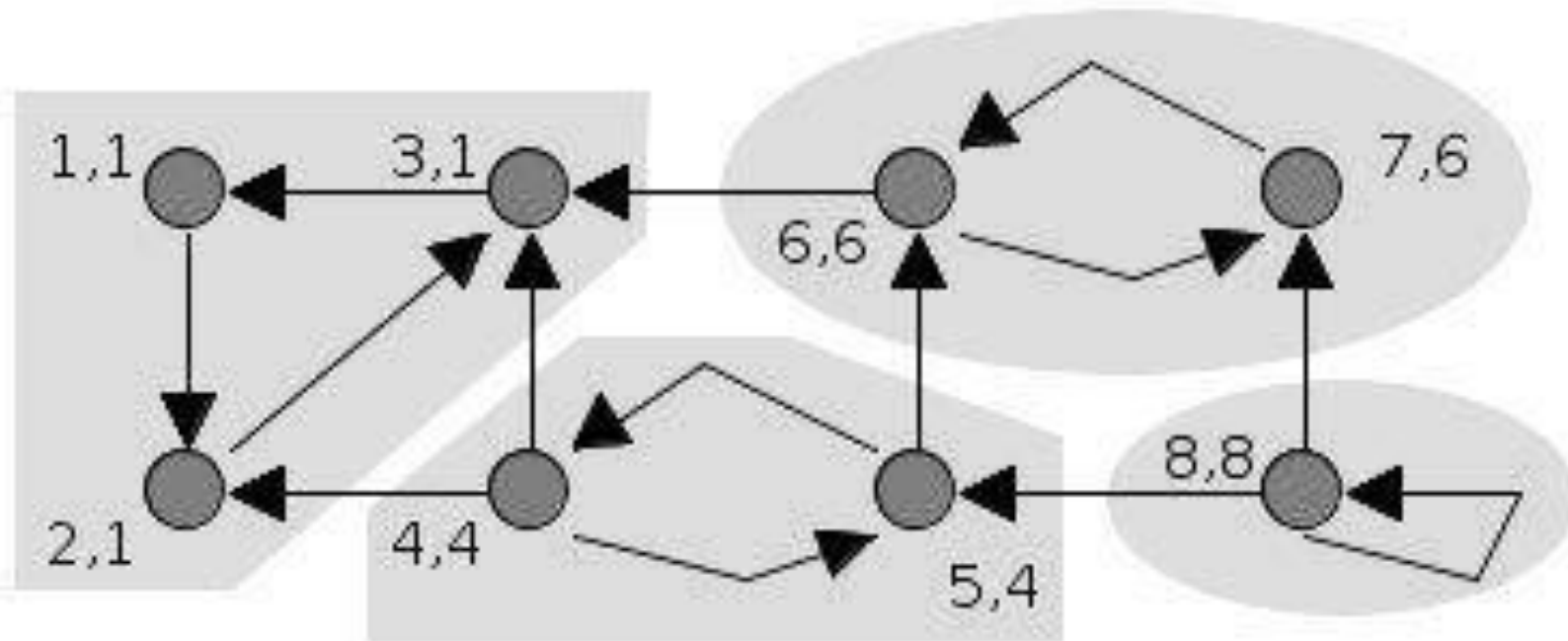
Dinic's





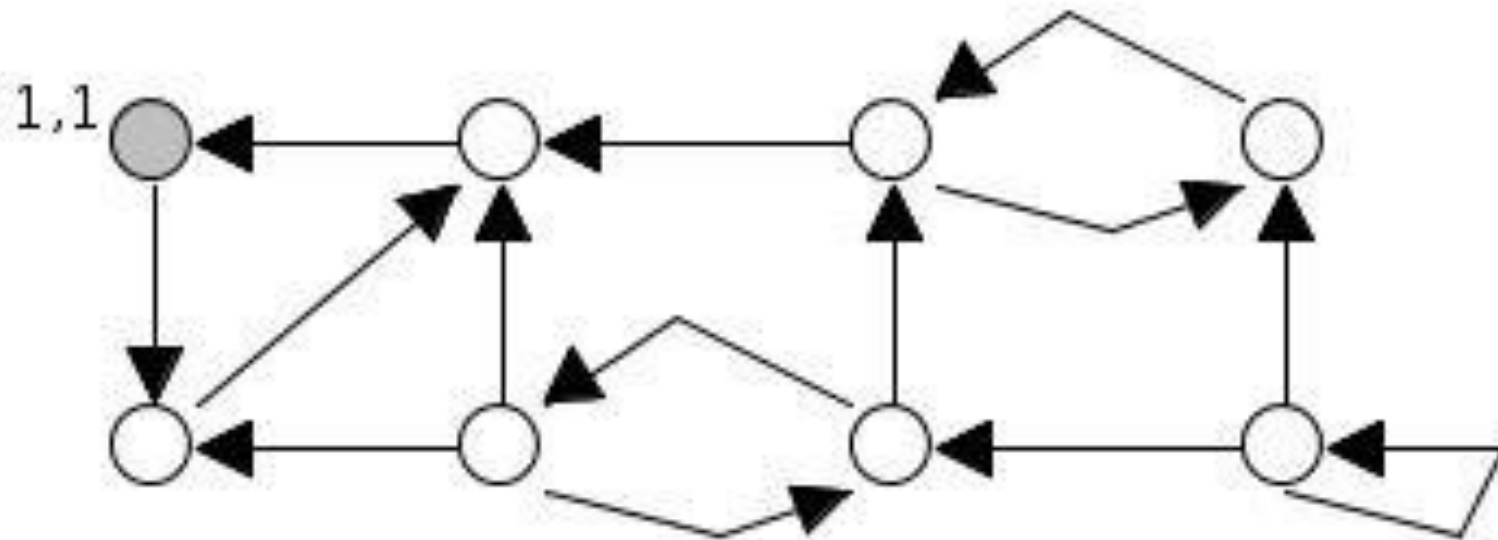


Tarjan's Strongly Connected Components



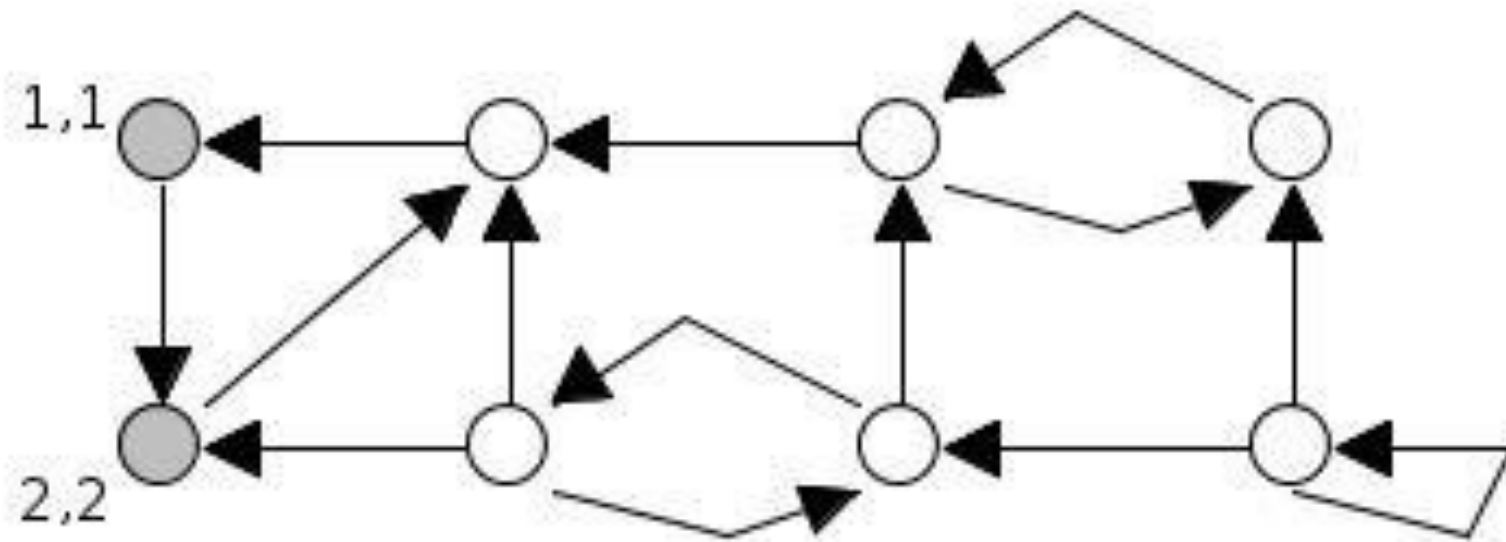


Tarjan's Strongly Connected Components



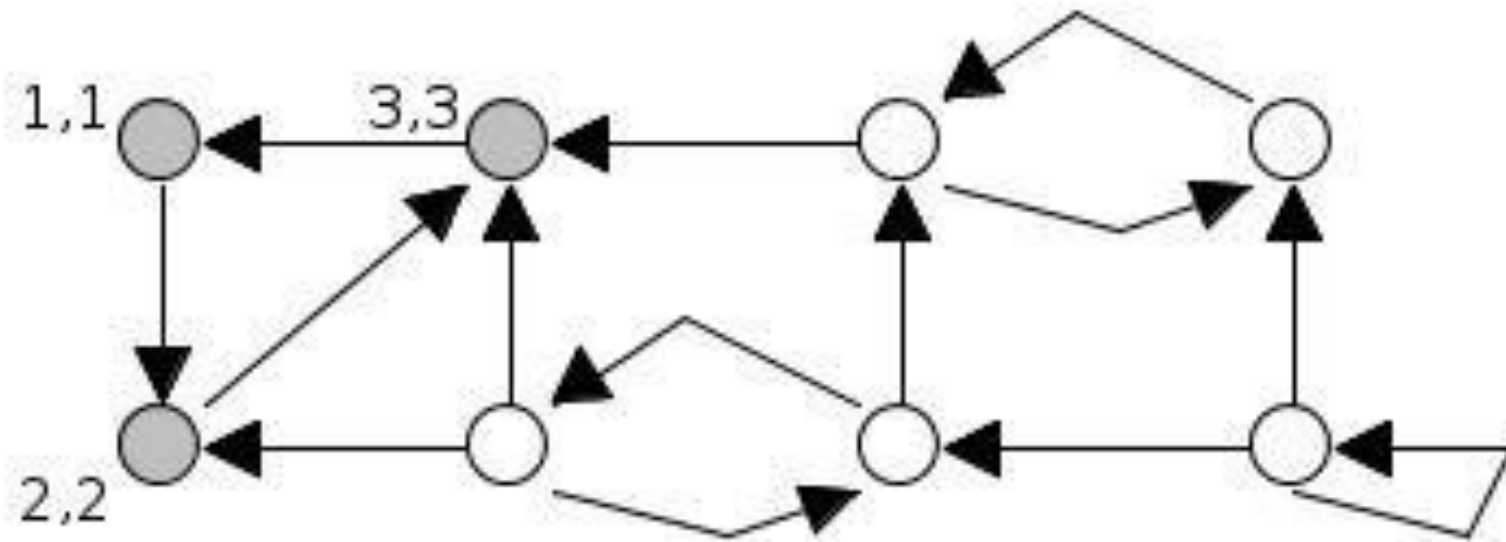


Tarjan's Strongly Connected Components



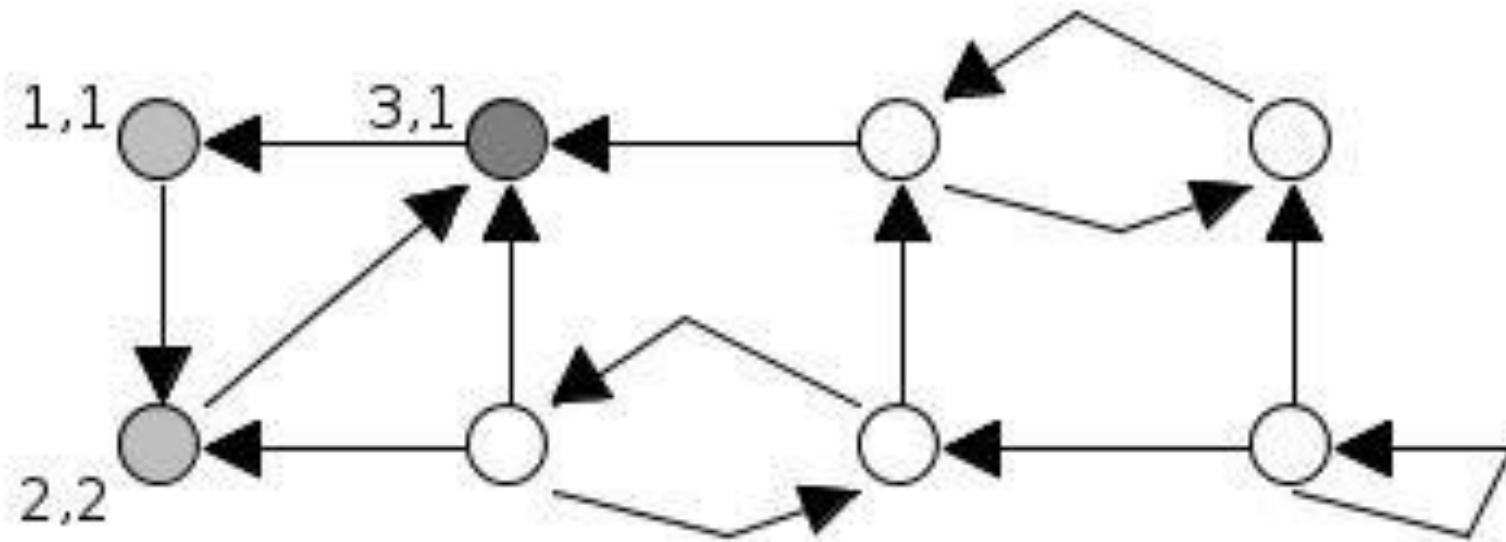


Tarjan's Strongly Connected Components





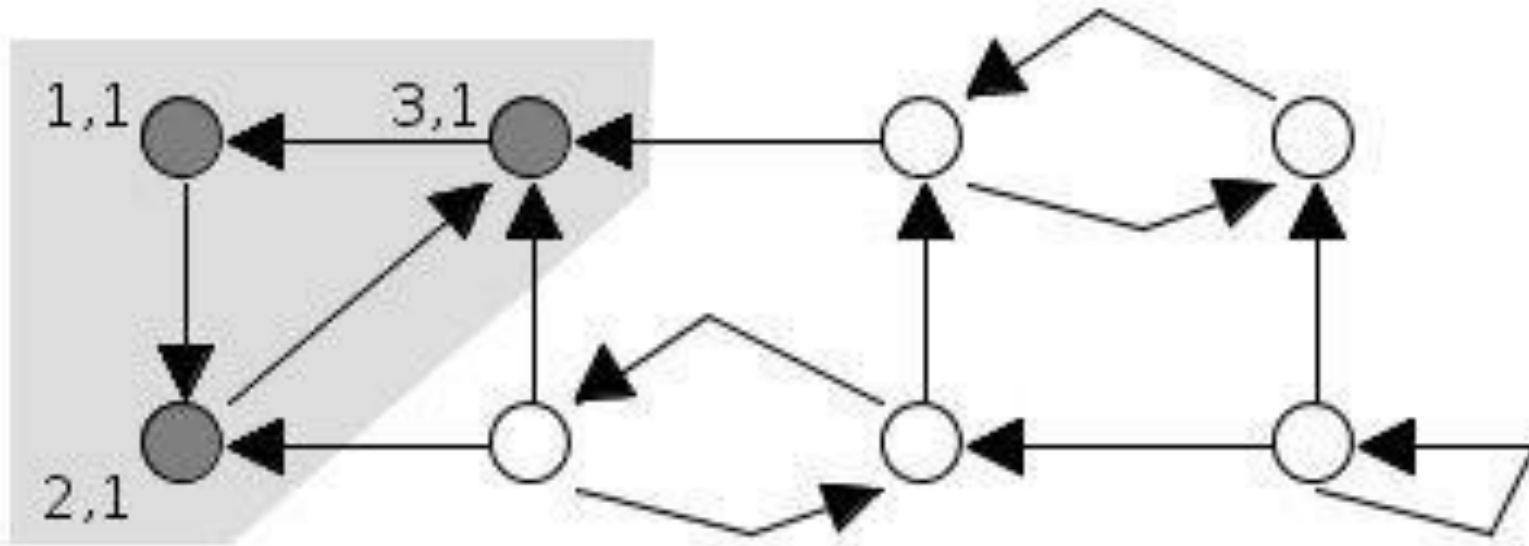
Tarjan's Strongly Connected Components





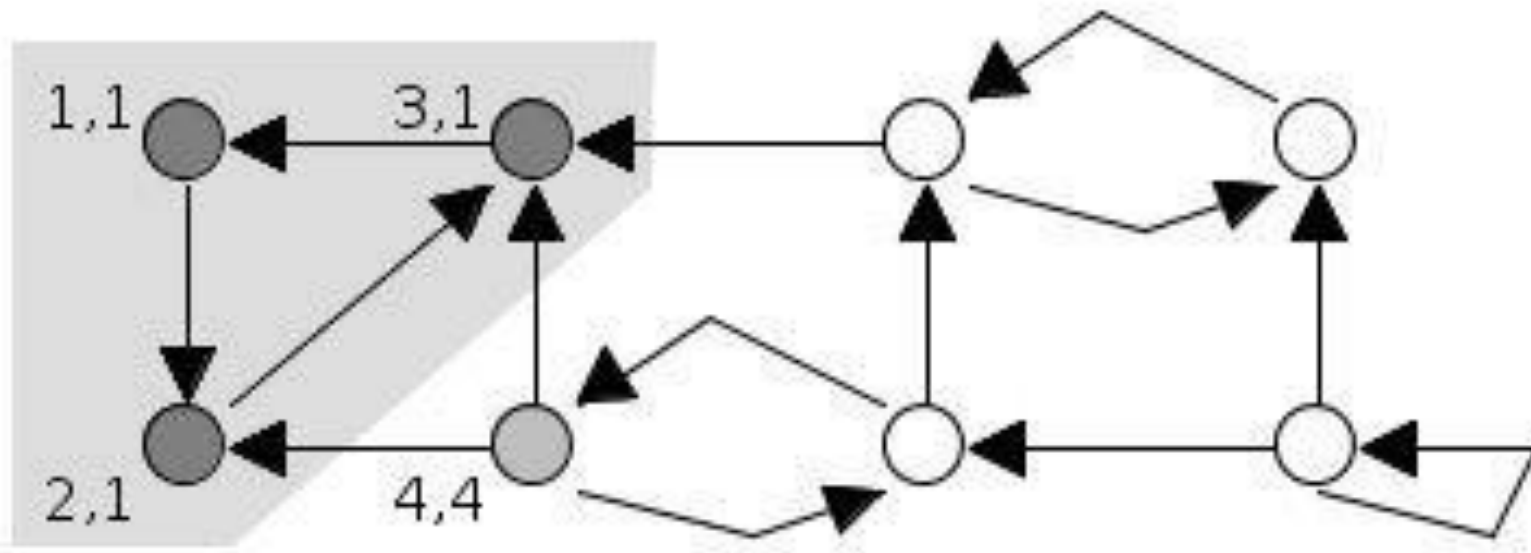


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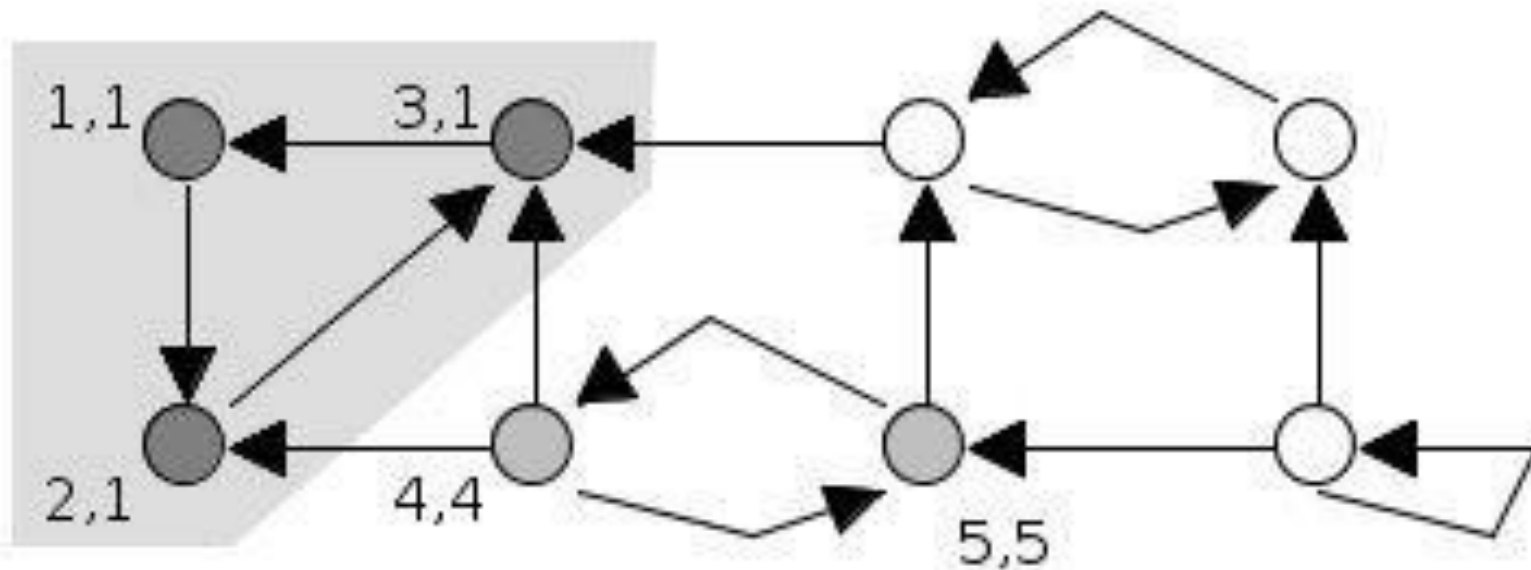


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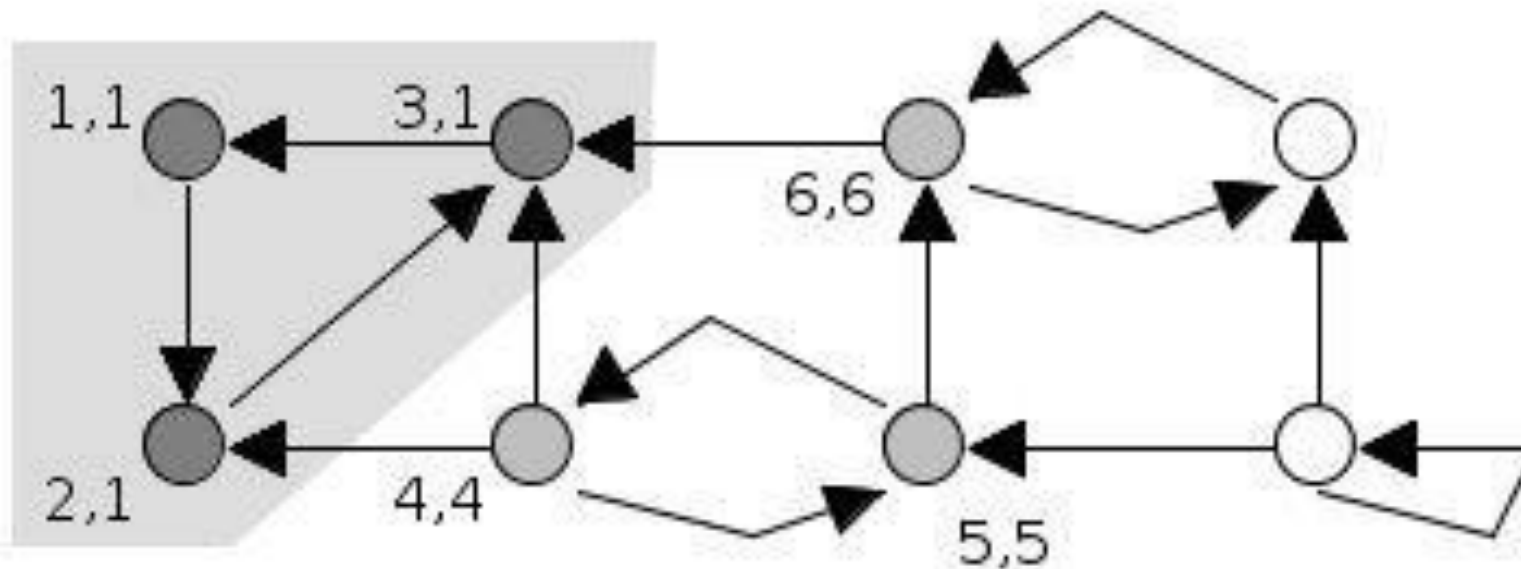


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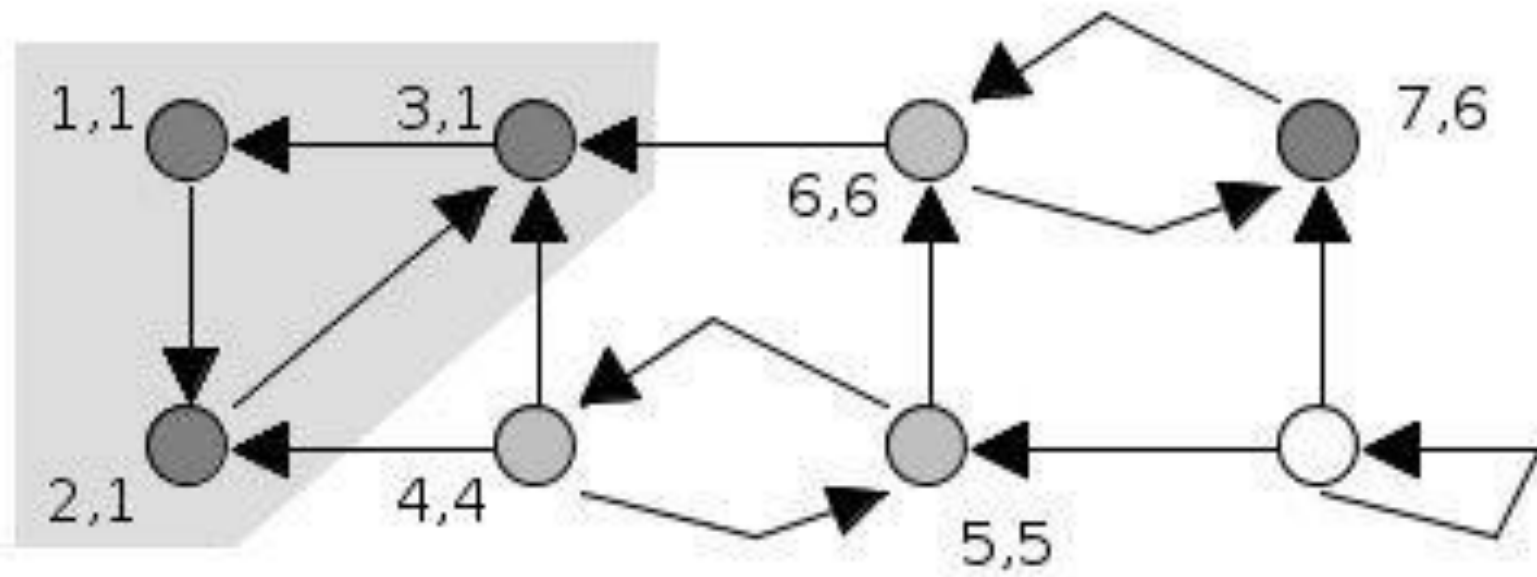
Tarjan's Strongly Connected Components





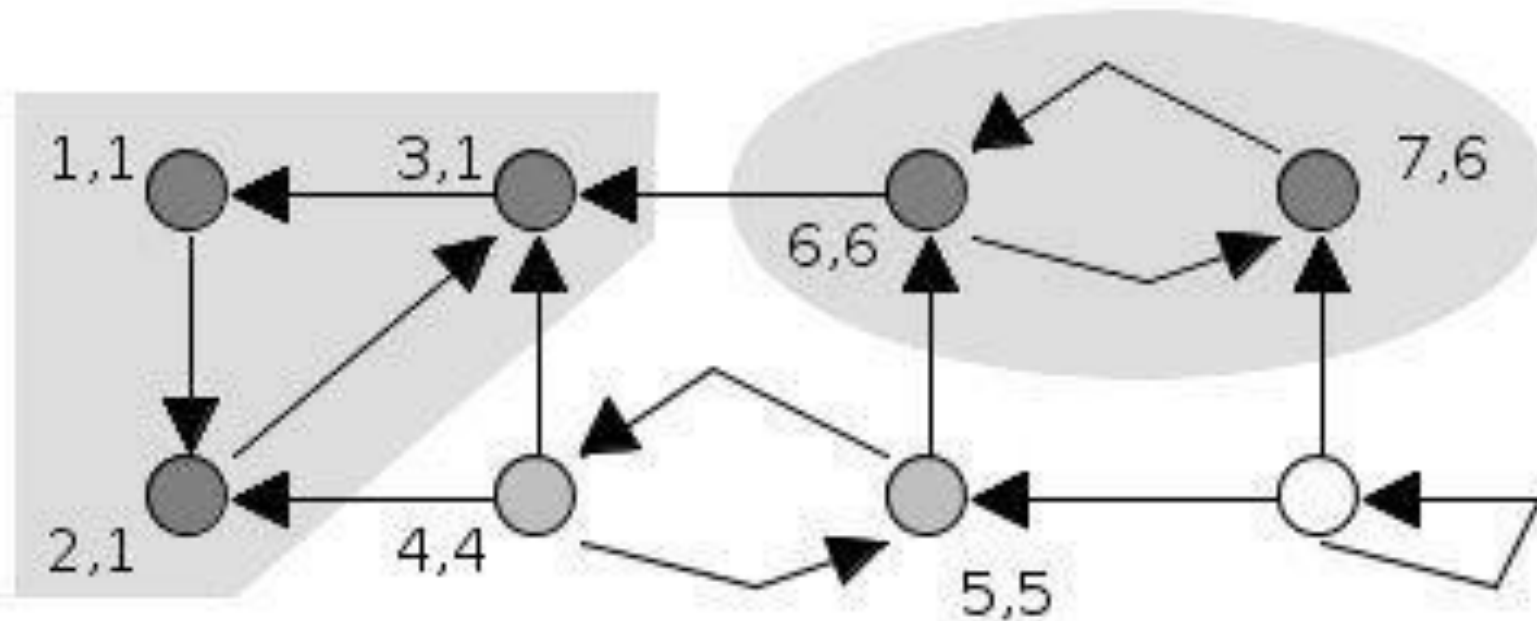


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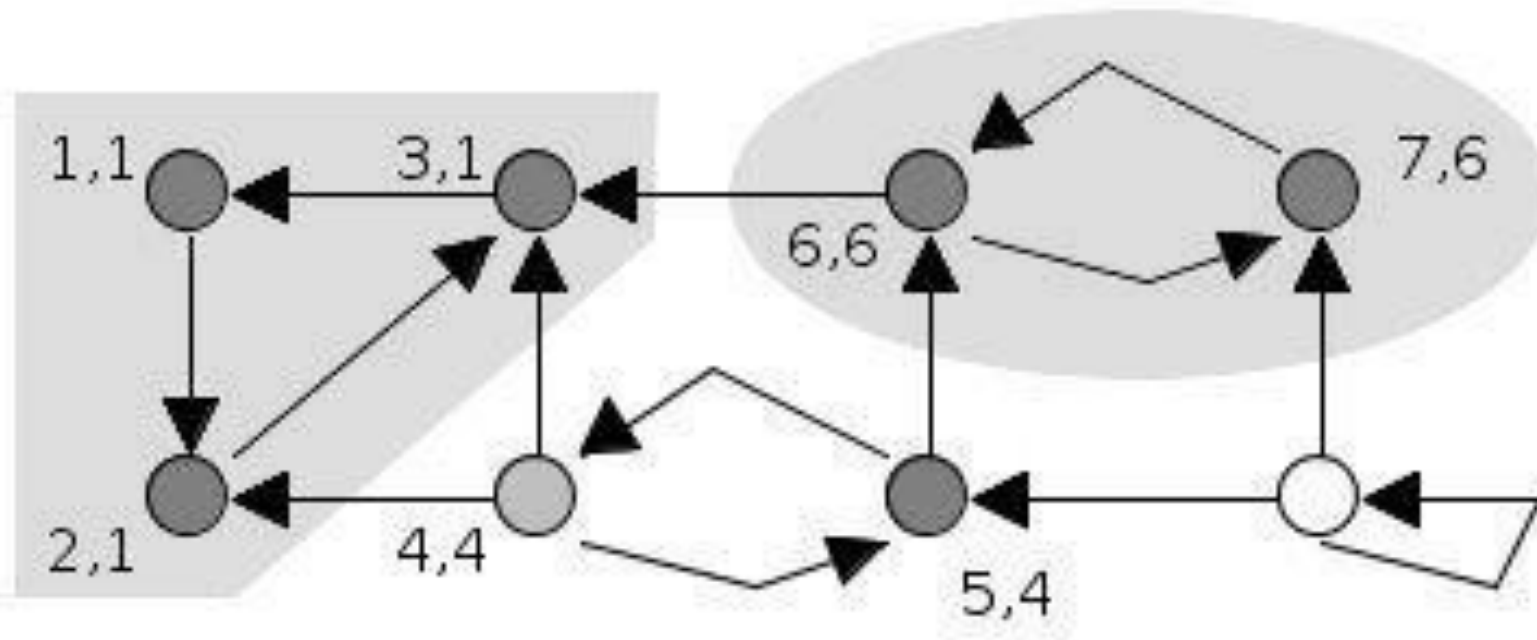


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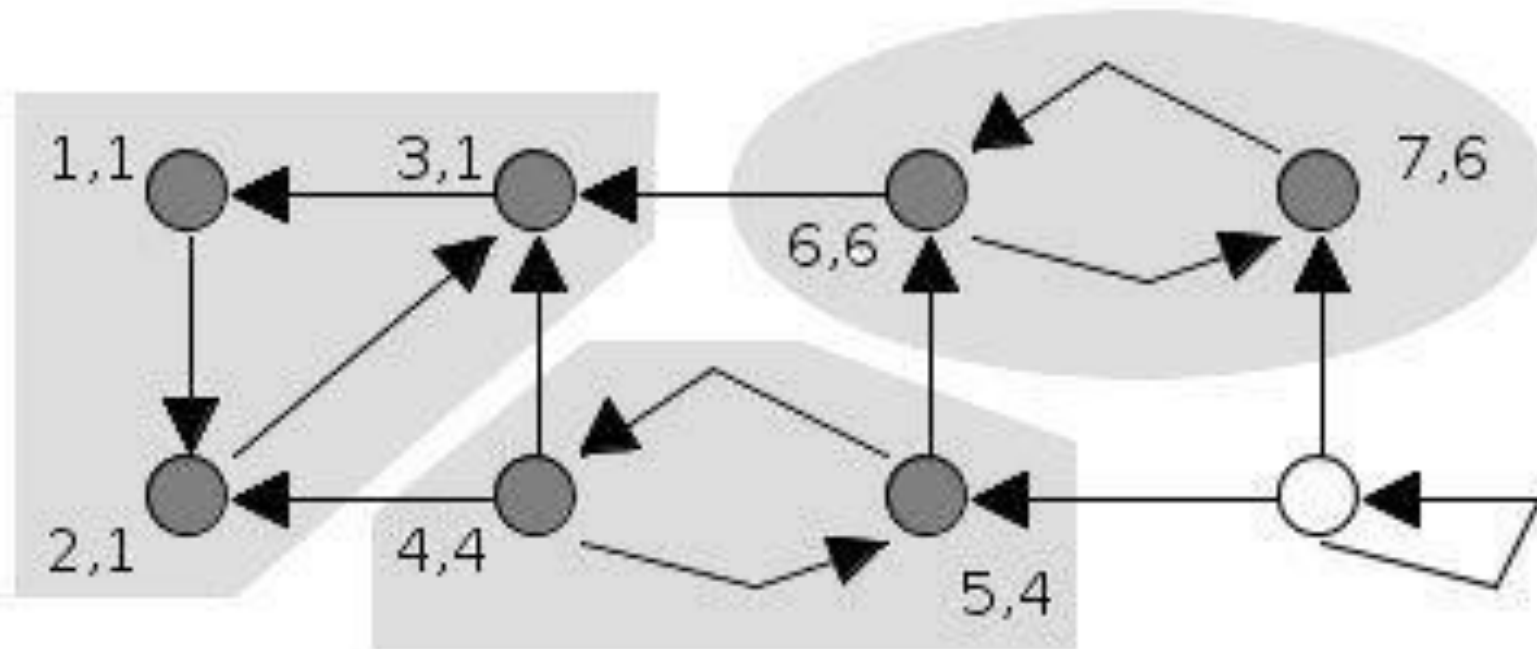


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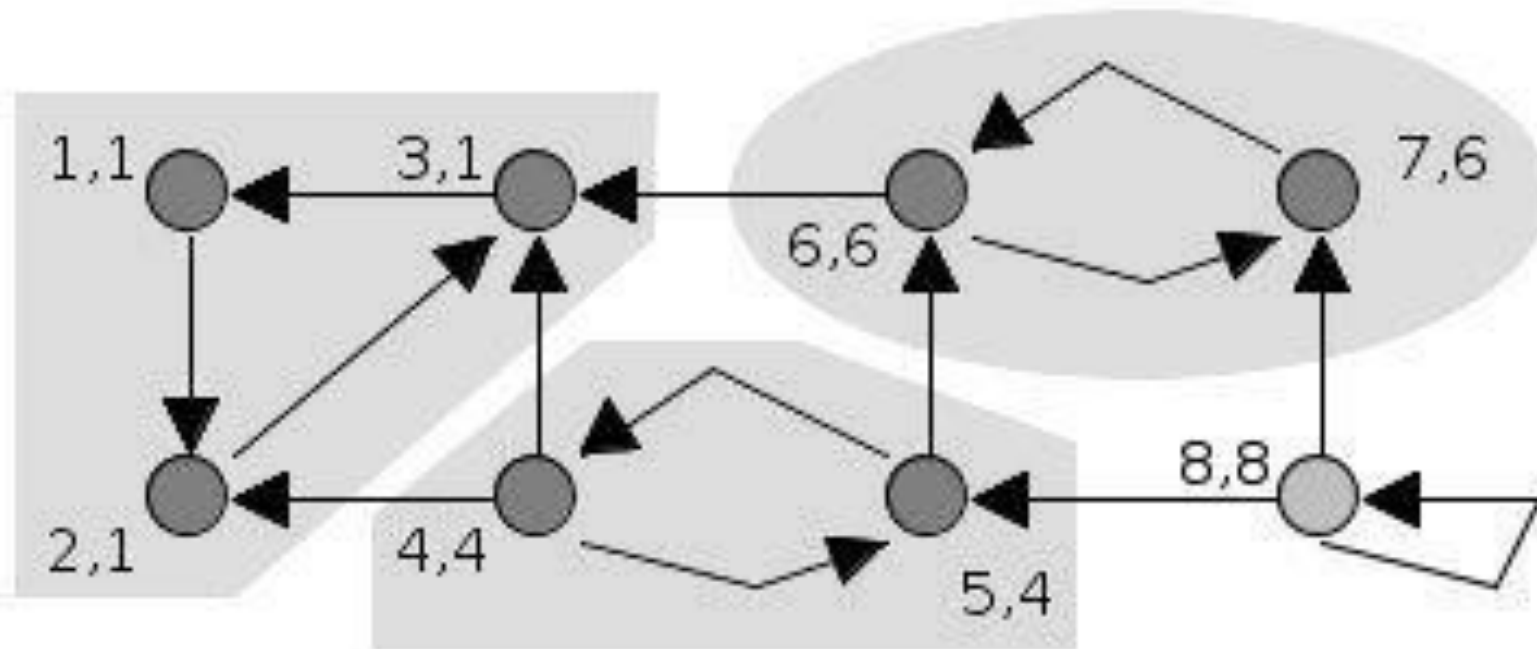


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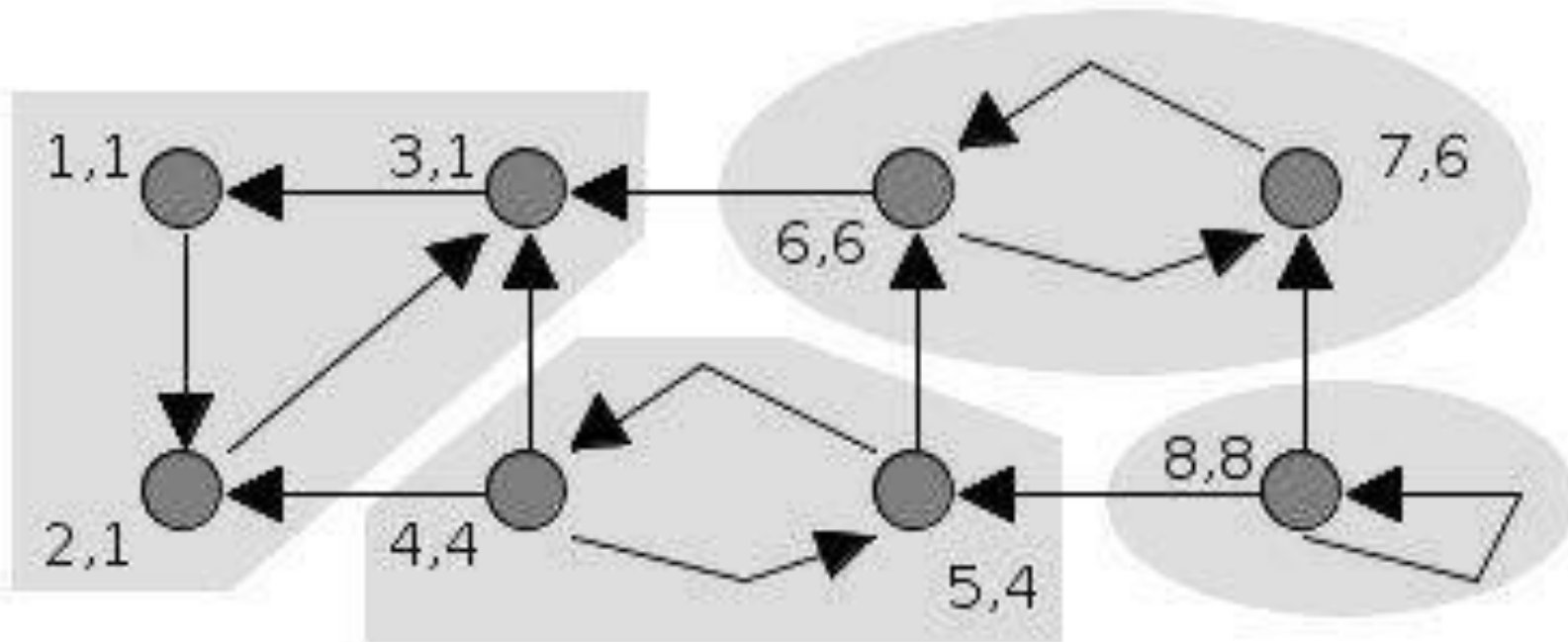


Tarjan's Strongly Connected Components





Tarjan's Strongly Connected Components







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