

Algorithmus von Dijkstra

Priority Queue

INSERT(S, x) inserts the element x into the set S . This operation could be written as $S \leftarrow S \cup \{x\}$.

MAXIMUM(S) returns the element of S with the largest key.

EXTRACT-MAX(S) removes and returns the element of S with the largest key.

INCREASE-KEY(S, x, k) increases the value of element x 's key to the new value k , which is assumed to be at least as large as x 's current key value.

Initialisierung

INITIALIZE-SINGLE-SOURCE(G, s)

1 **for** each vertex $v \in V[G]$

2 **do** $d[v] \leftarrow \infty$

3 $\pi[v] \leftarrow \text{NIL}$

4 $d[s] \leftarrow 0$

Relax

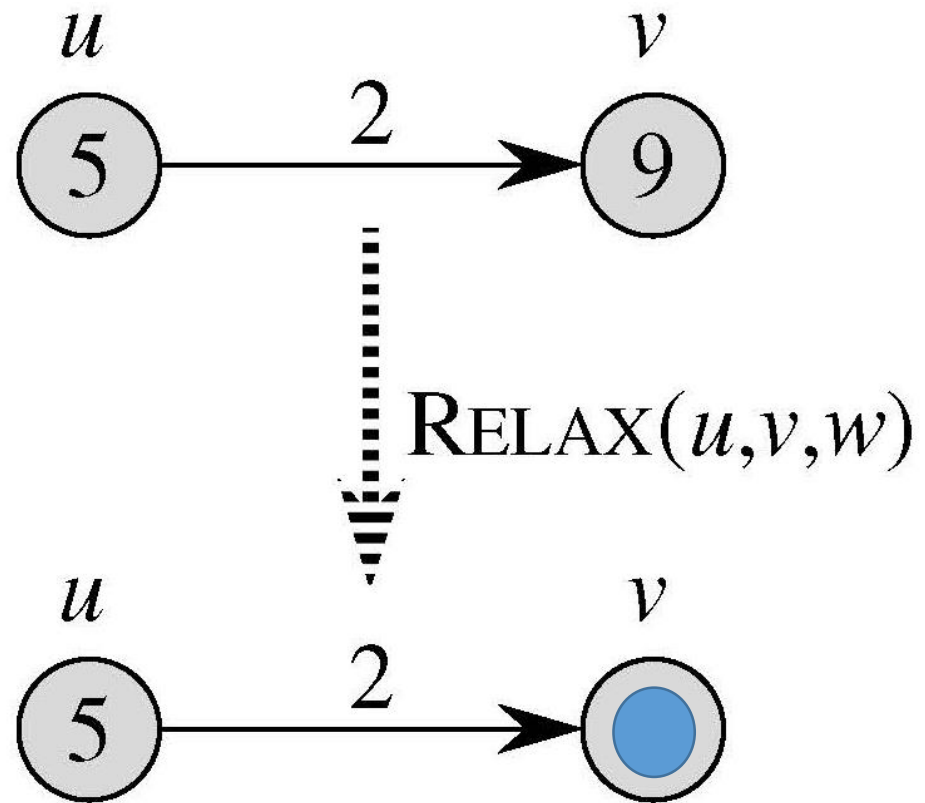
RELAX(u, v, w)

1 **if** $d[v] > d[u] + w(u, v)$

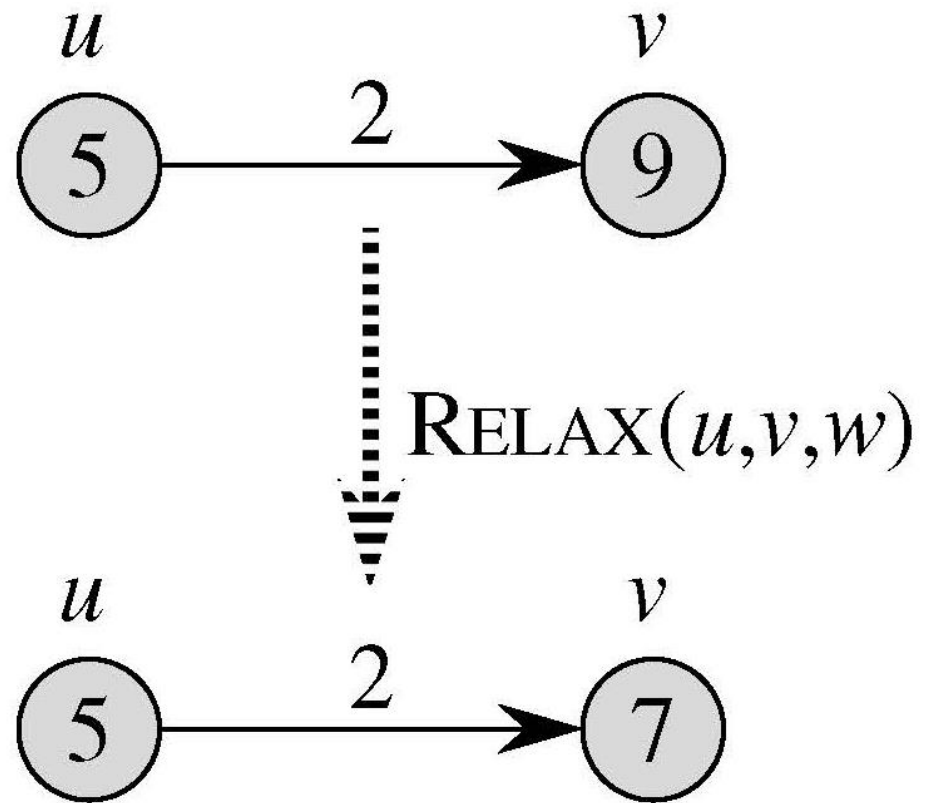
2 **then** $d[v] \leftarrow d[u] + w(u, v)$

3 $\pi[v] \leftarrow u$

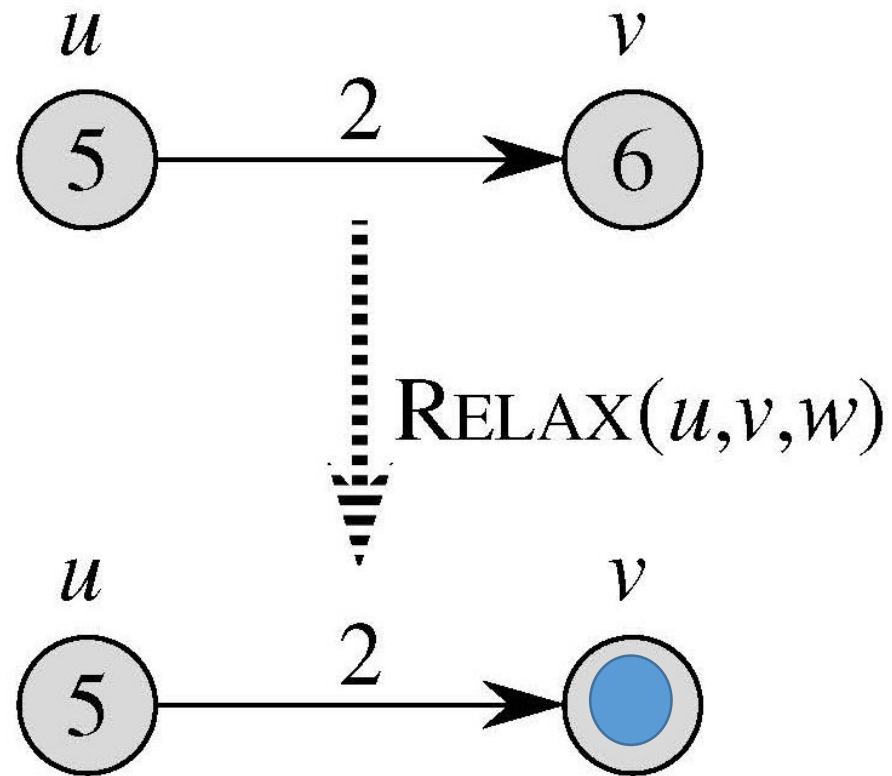
Beispiel RELAX I



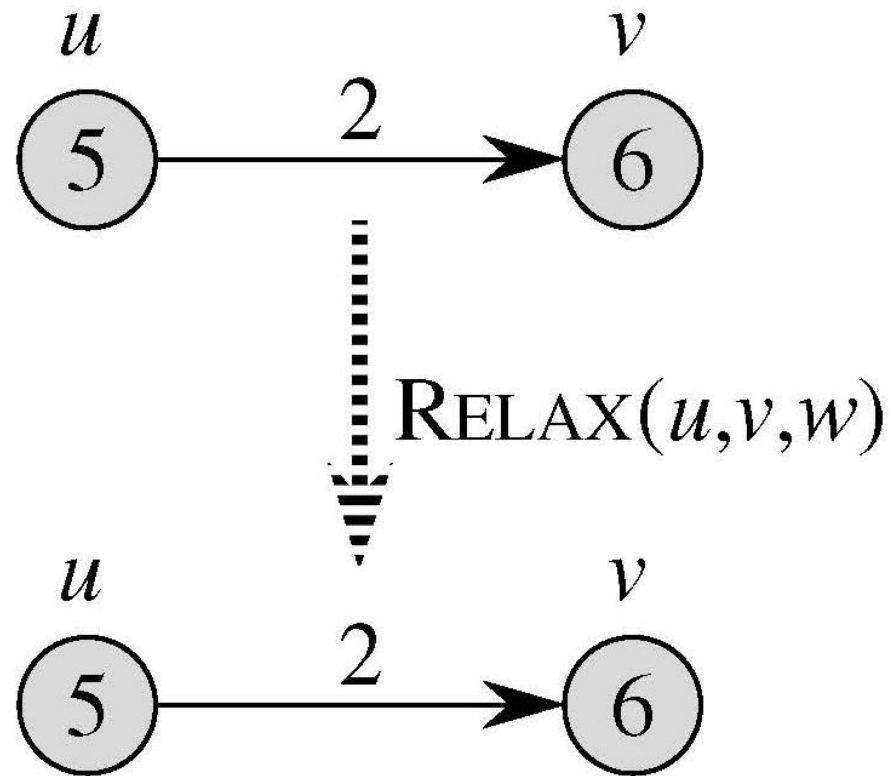
Beispiel RELAX I



Beispiel RELAX II

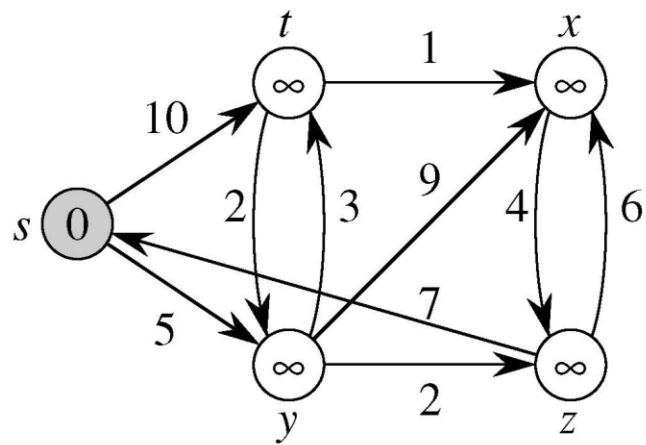


Beispiel RELAX II



DIJKSTRA(G, w, s)

```
1  INITIALIZE-SINGLE-SOURCE( $G, s$ )
2   $S \leftarrow \emptyset$ 
3   $Q \leftarrow V[G]$ 
4  while  $Q \neq \emptyset$ 
5      do  $u \leftarrow \text{EXTRACT-MIN}(Q)$ 
6           $S \leftarrow S \cup \{u\}$ 
7          for each vertex  $v \in \text{Adj}[u]$ 
8              do RELAX( $u, v, w$ )
```



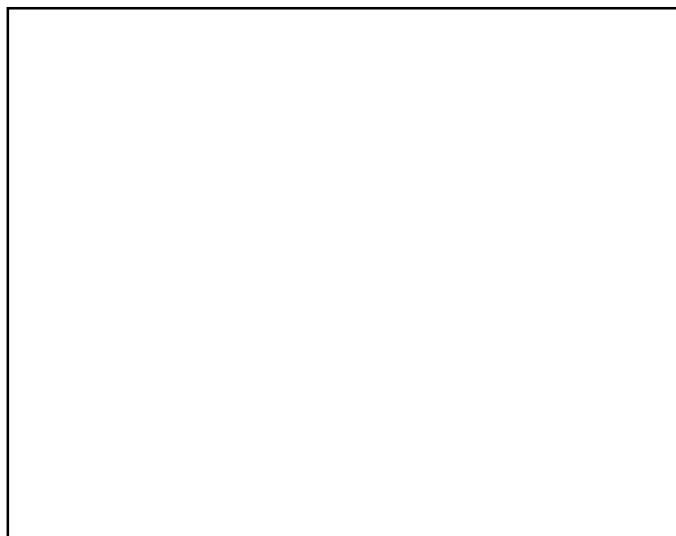
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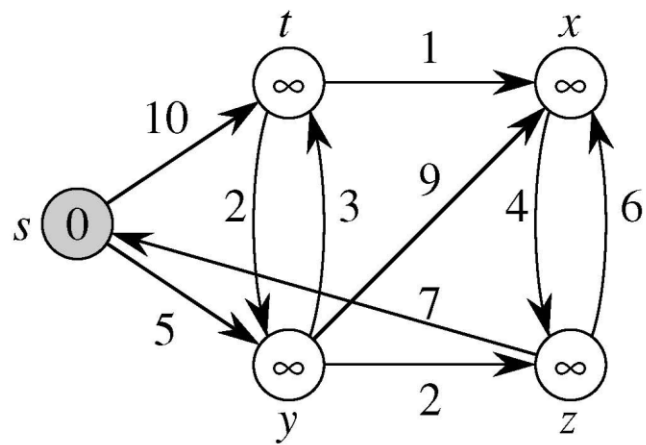


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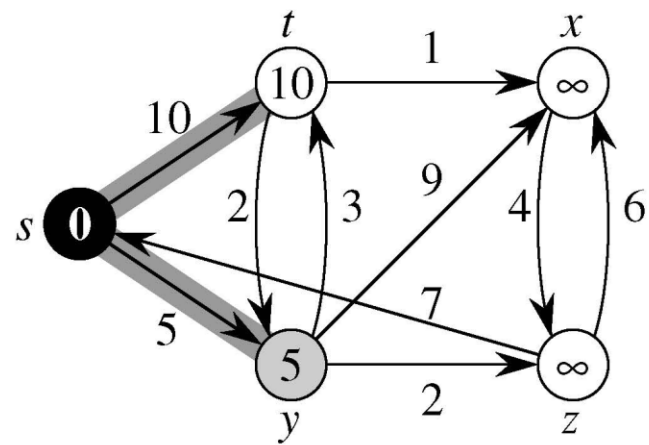


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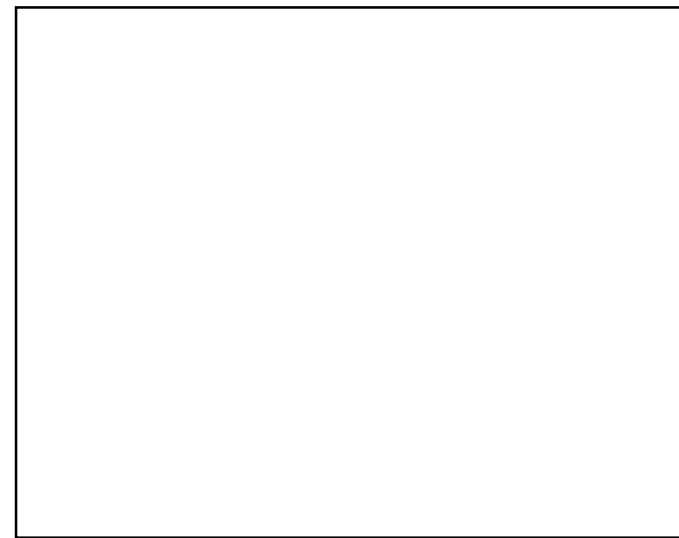




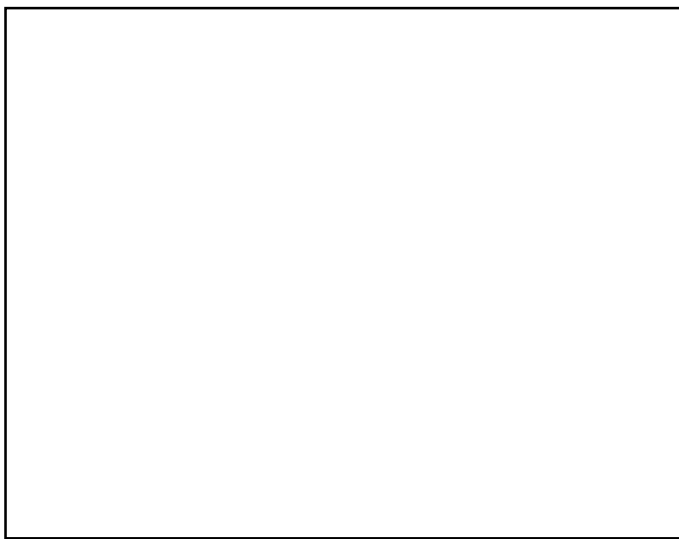
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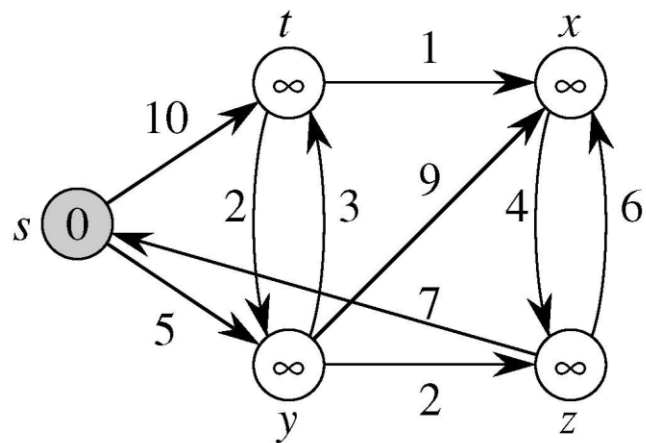


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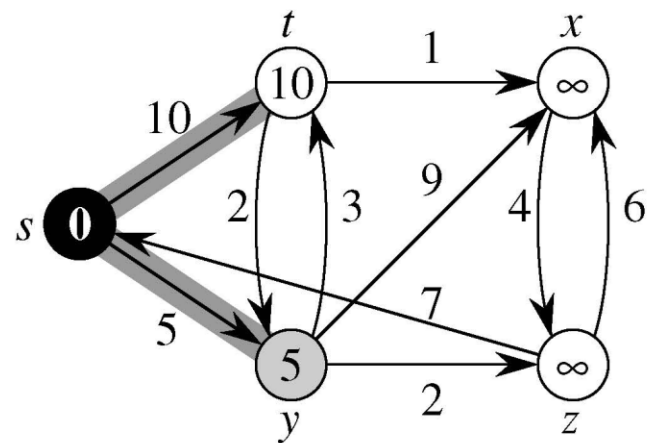


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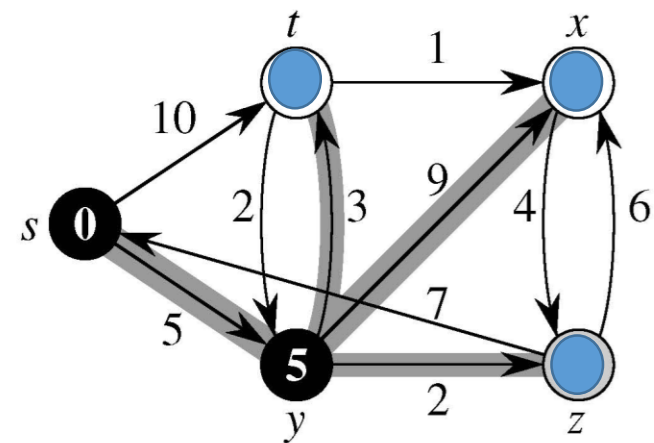




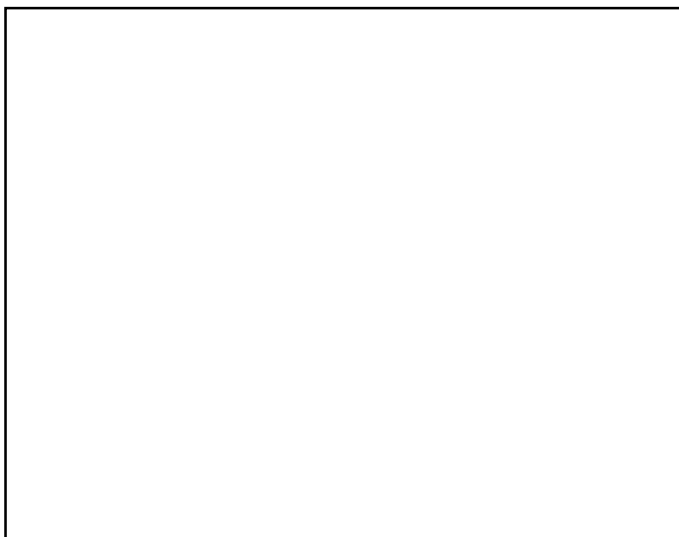
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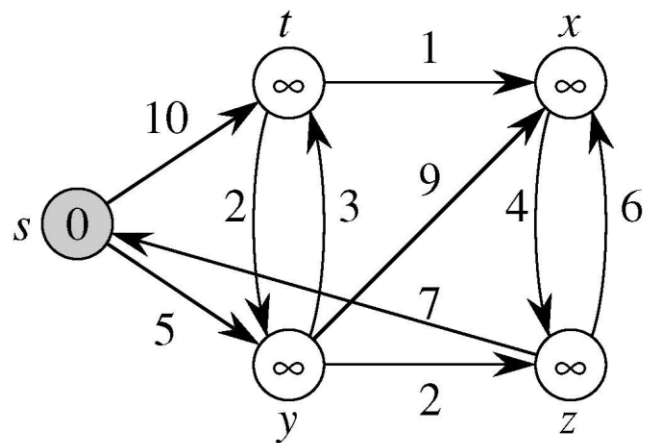


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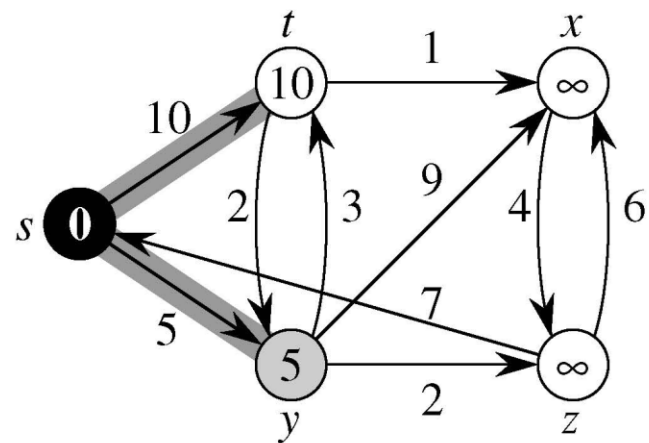


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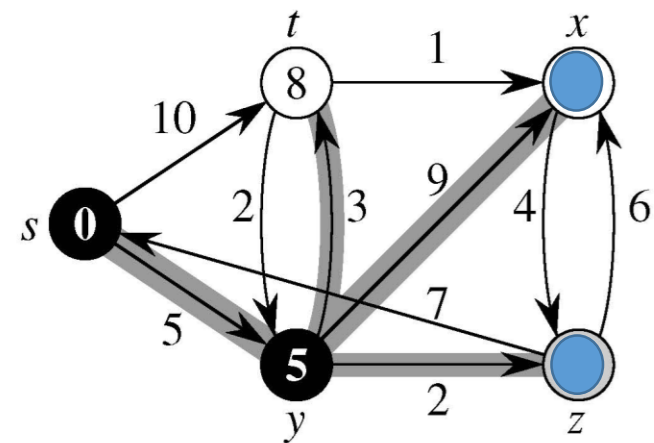




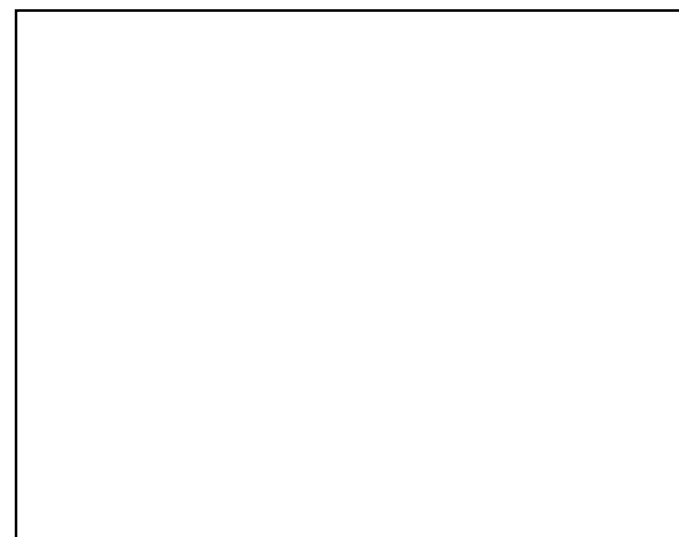
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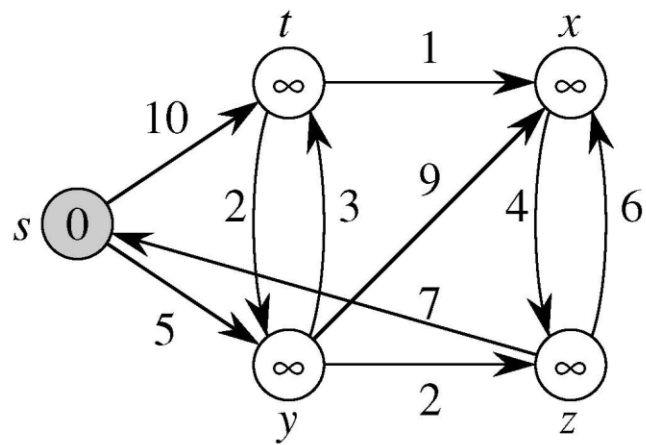


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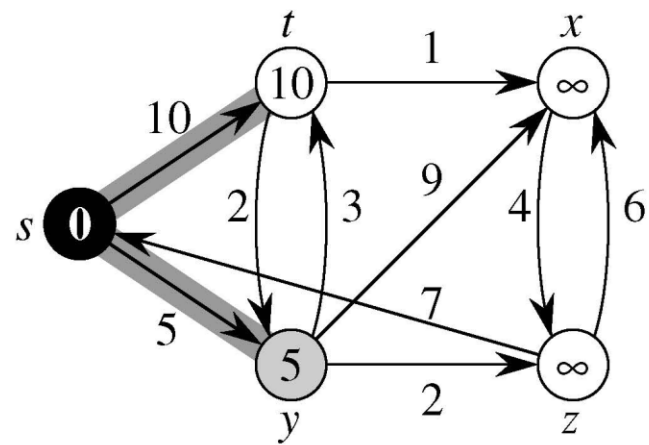


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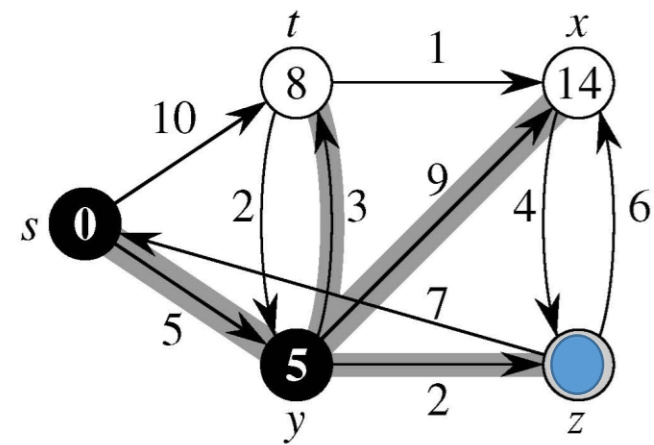




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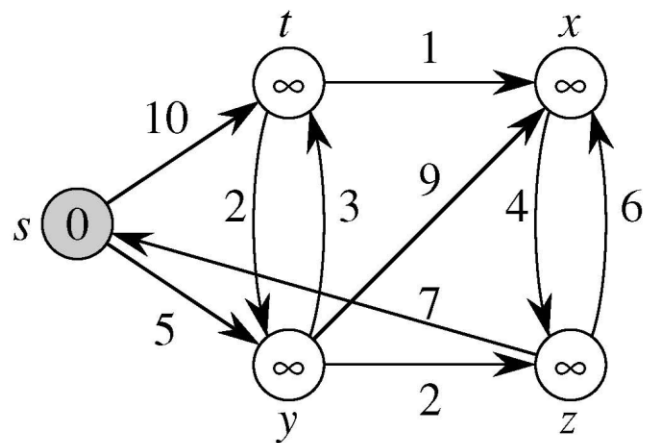


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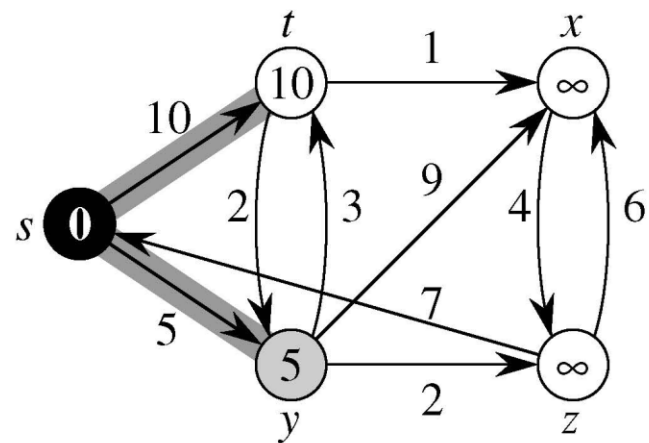


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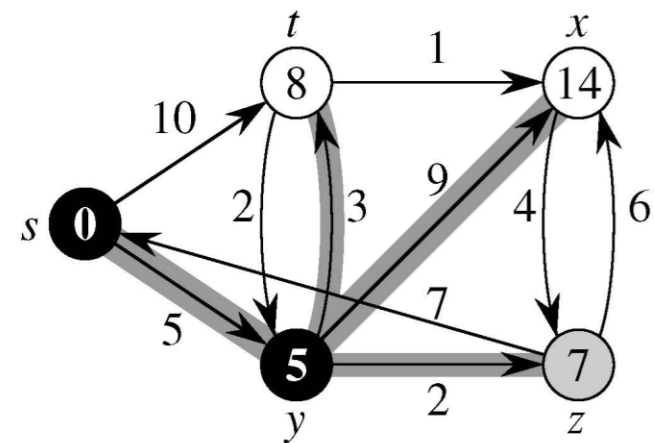




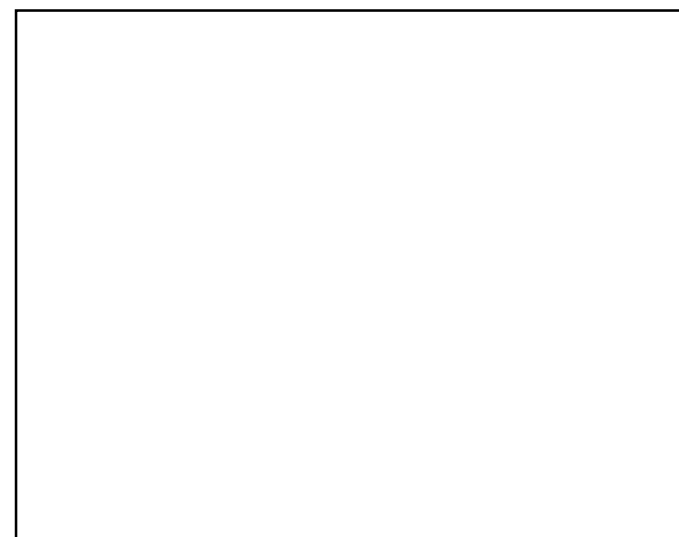
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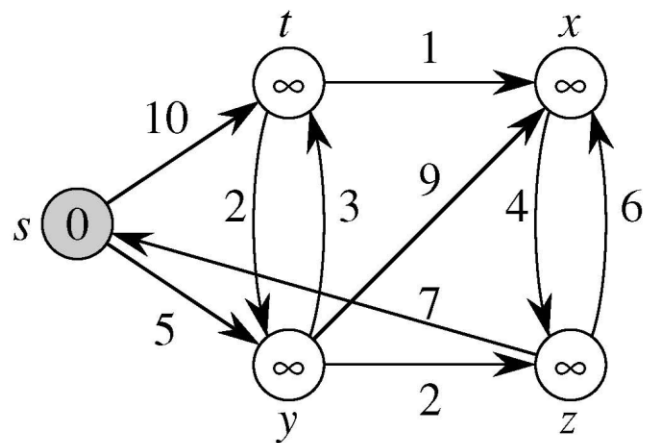


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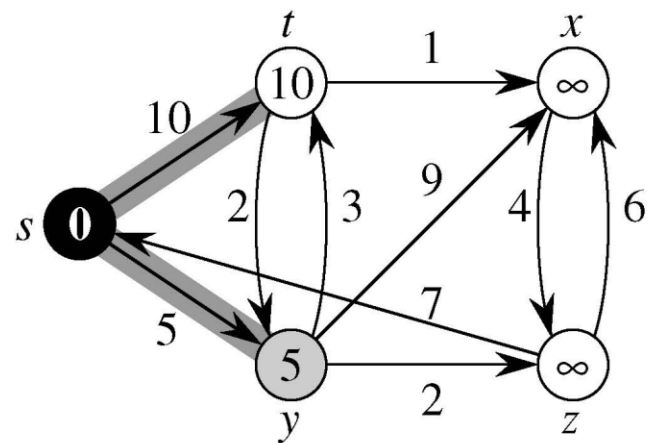


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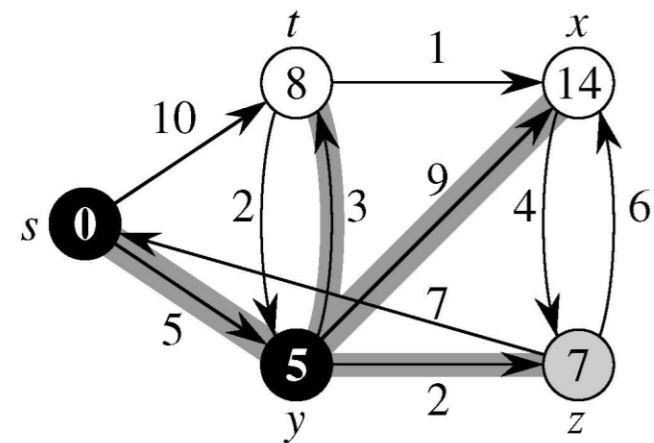




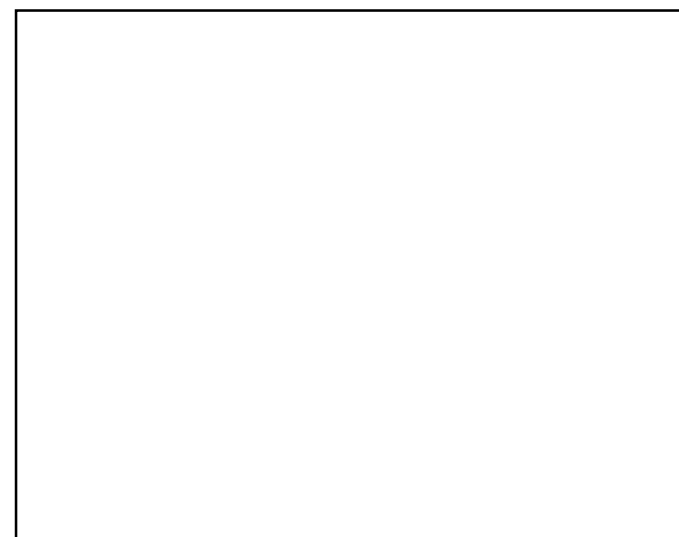
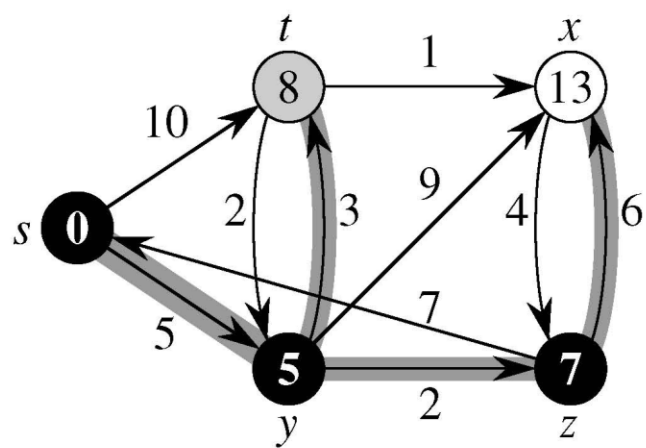
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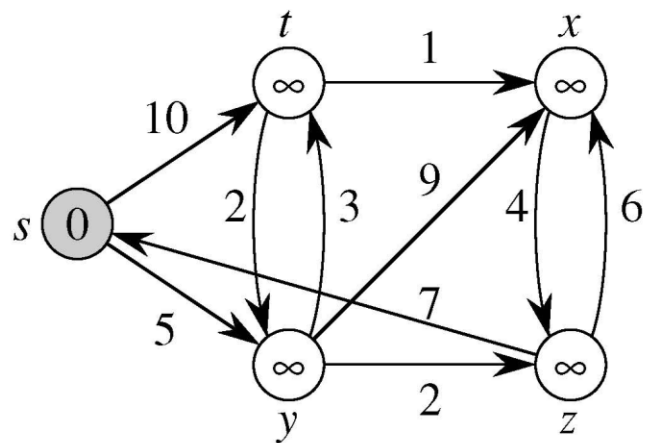


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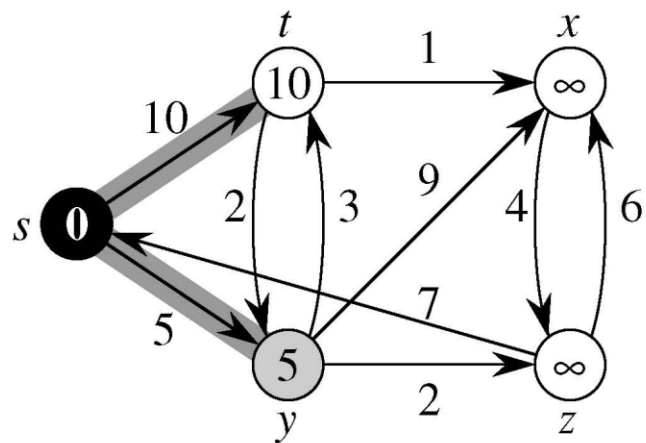


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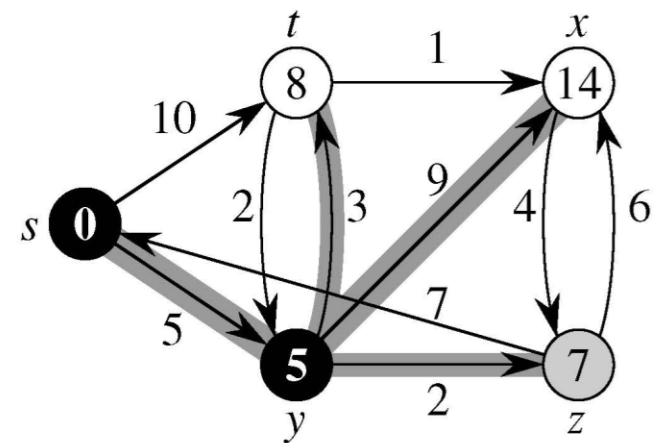




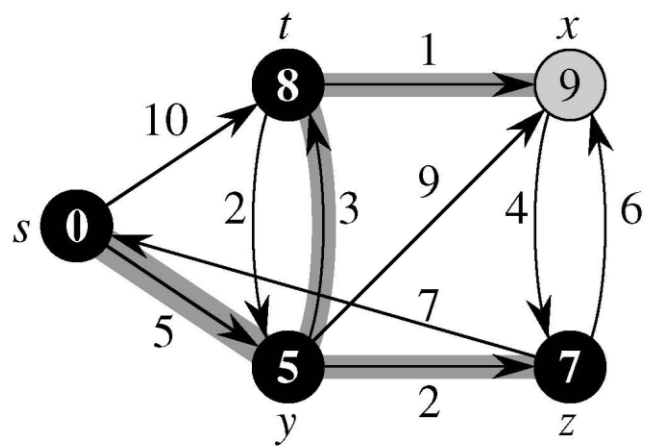
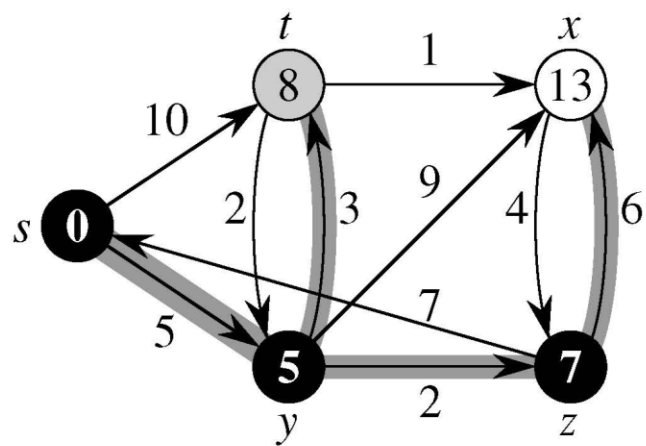
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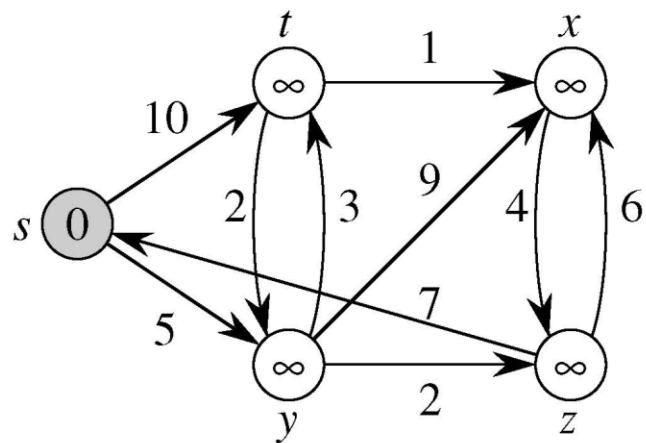


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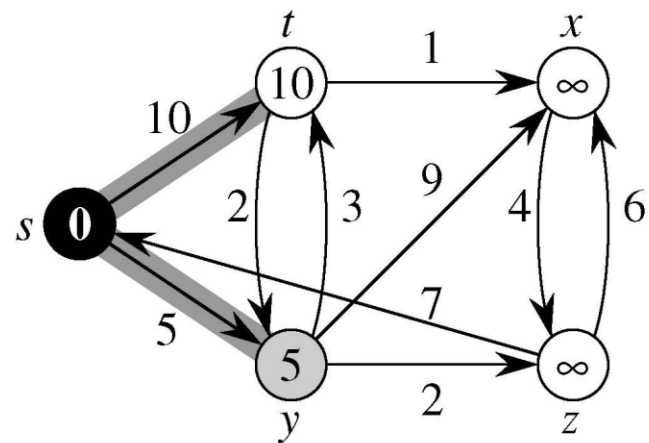


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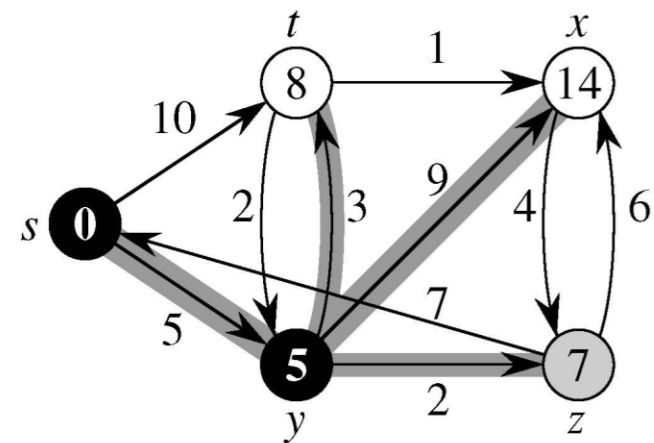




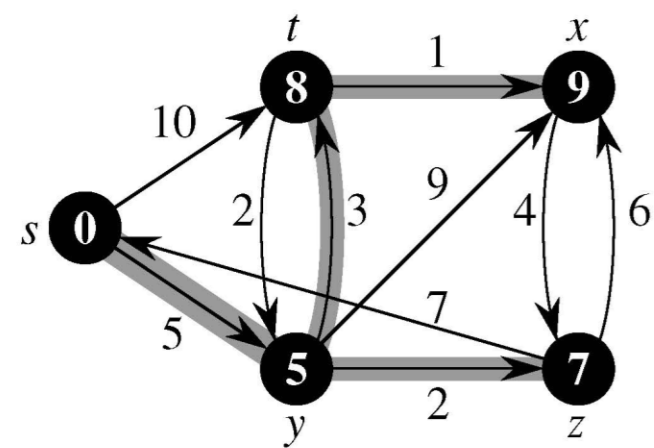
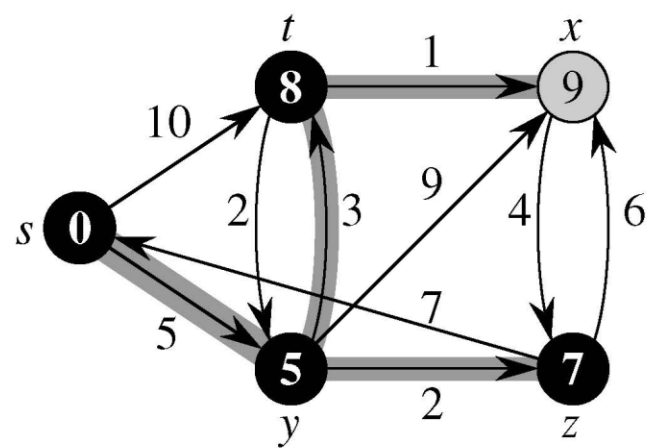
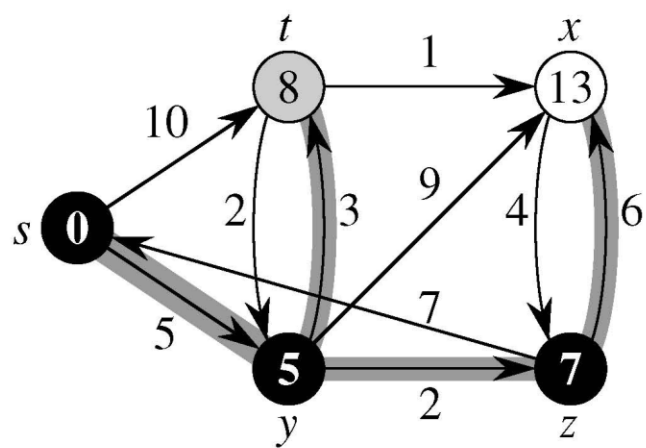
(a)



(b)



(c)



Korrektheitsbeweis

