Claim

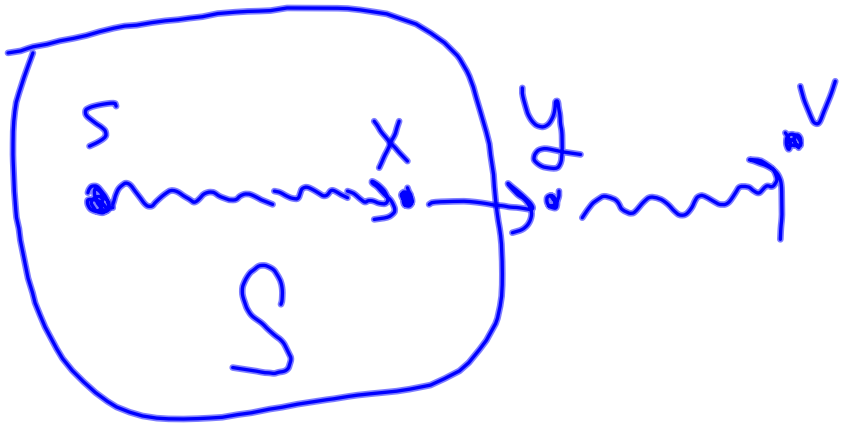
When v is put in S, $d(v) = \delta(v)$.

Pf

(We know $d(v) \geq \delta(v)$, because the alg does Relaxes.)

Assume fpoc that for some $d(v) > \delta(v)$ when v is put in S

(assume v is the first such vertex)



before v is put in S
∴ shortest path to v.

- $d(x) = \delta(x)$
- $d(y) = \delta(y)$ because (x,y) was relaxed when x added to S

paths might be empty

$$d(y) = \delta(y) \leq \delta(v) < d(v)$$

y before v on s.p. ↑ assumption

$d(y) < d(v)$ then alg will choose y instead of v in the Extract Min

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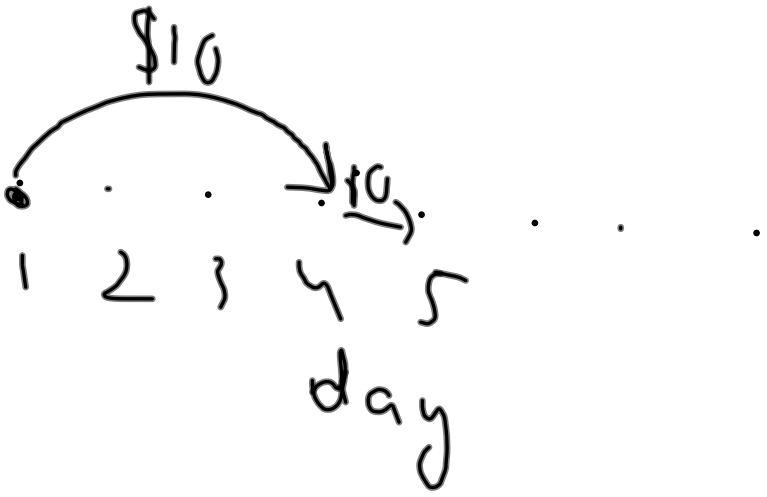

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