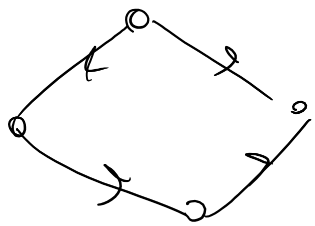
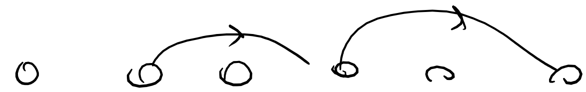
CSE 421 - Lecture 20

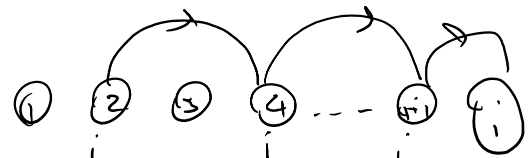
Friday, February 23, 2018 2:29 PM





$(i,j) \longrightarrow i<j$.

$OPT(i)$ = The length of longest path that ends at i.



$i_1, i_2, i_3, \dots, i_k, i$

OBS: $i_1 < i_2 < i_3 < \dots < i_k < i$.

OBS: $\underbrace{i_1 \dots i_k}_{\text{"}OPT(i_k)}$ is the longest path that ends at i_k.

$OPT(i) = 1 + OPT(i_k)$.

$$OPT(i) = \max_{\substack{(j,i) \\ \text{an edge}}} \left(1 + OPT(j)\right)$$

$OPT(i)$ LIS from $1, \dots, i$

$OPT(i,j)$ ~ for $i, \dots, j$.

$OPT(i,c)$

$OPT(i)$

$\underbrace{X_{i_1} < X_{i_2} < \dots}< X_{i_k}$

$OPT(i)$: LIS. for for $1, \dots, i$ that has i.

$OPT(i)$: LIS. for for $1, \ldots, i$ that has i.

~~Case 1: i is not in $OPT(i)$~~

~~$OPT(i) = OPT(i-1)$~~.

Case 2 i in $OPT(i)$

$$x_{i_1} < x_{i_2} < \cdots < x_{i_k} < x_i$$

$$OPT(i) = OPT(i_k) + 1$$

x_{i_k} x_i

11 12 7 10

Max $OPT(1)$ — $OPT(n)$.

$$OPT(i) = \left\{ 1 + \max_{\substack{j:\, x_j < x_i \\ j < i}} OPT(j) \right.$$

$OPT(v)$: cost shortest path from $s \to v$.

$$\underbrace{s \to v_1 \to v_2 \to \cdots v_{i-1}} \to v$$

$$OPT(v) = OPT(v_{i-1}) + c_{v_{i-1}, v}$$