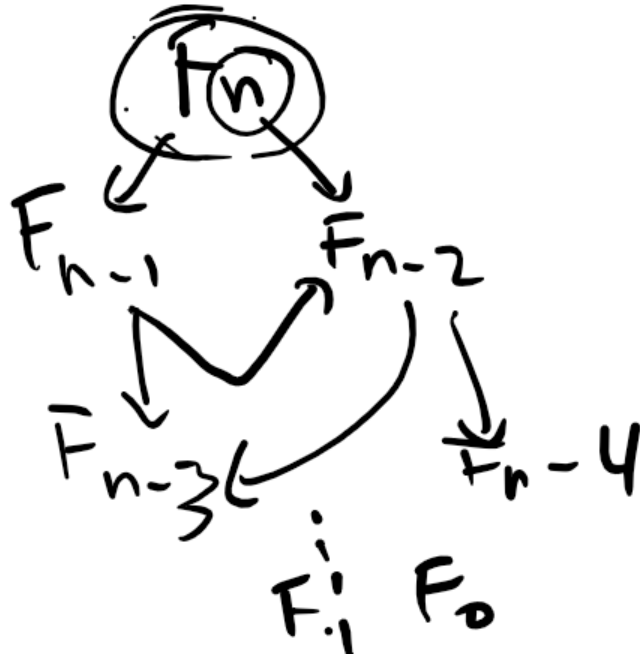


```

fib(n):
  if n < 2:
    return n
  return fib(n-1) + fib(n-2)

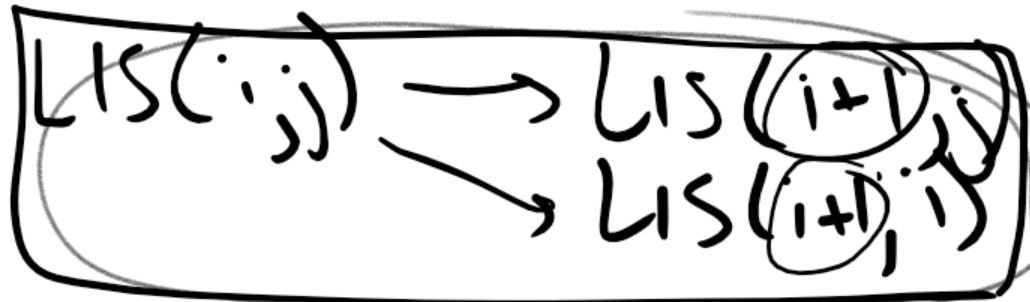
```



```

F = array[0..n]
F[0] = 0
F[1] = 1
for i = 2 to n:
  F[i] = F[i-1] + F[i-2]
return F[n]

```



```

LIS[1..n][1..n]
for i = n to 1
  for j = 1 to n
    LIS[i][j] = ...
  
```

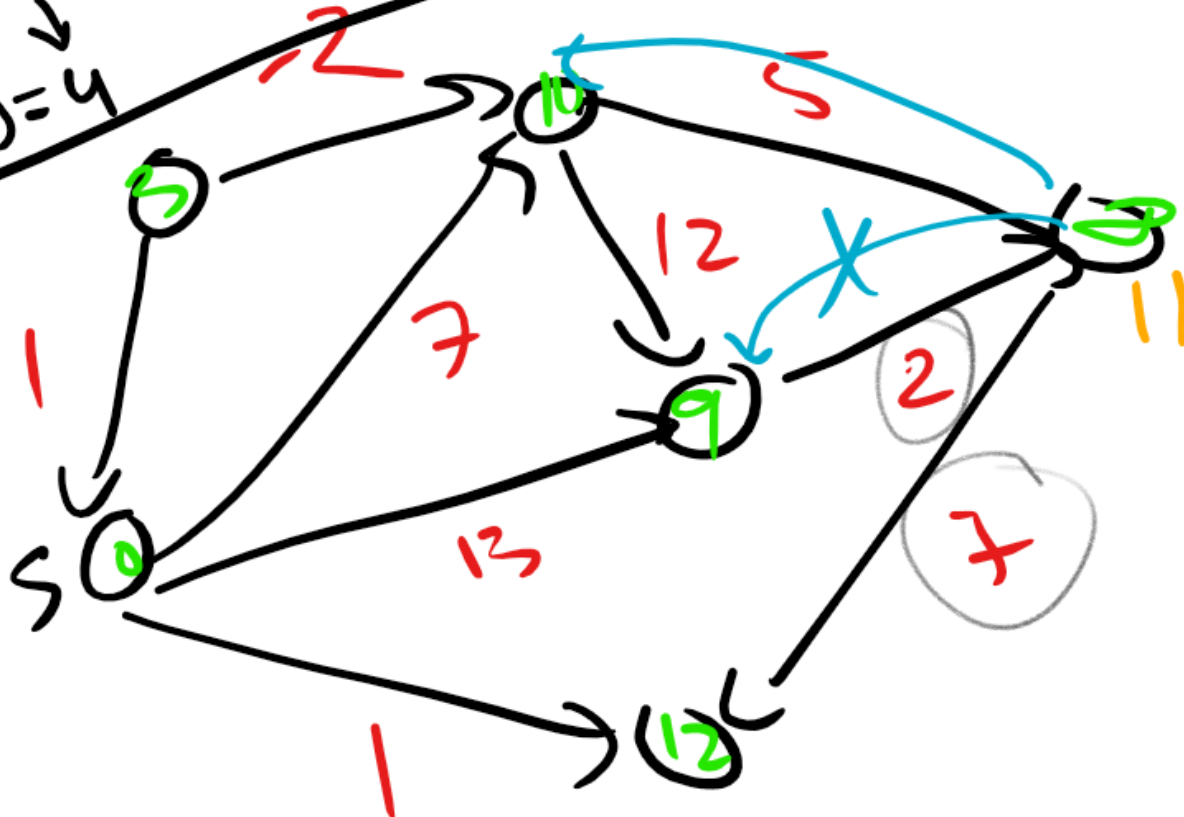
$LIS(S, k) =$ longest inc subsequence \rightarrow

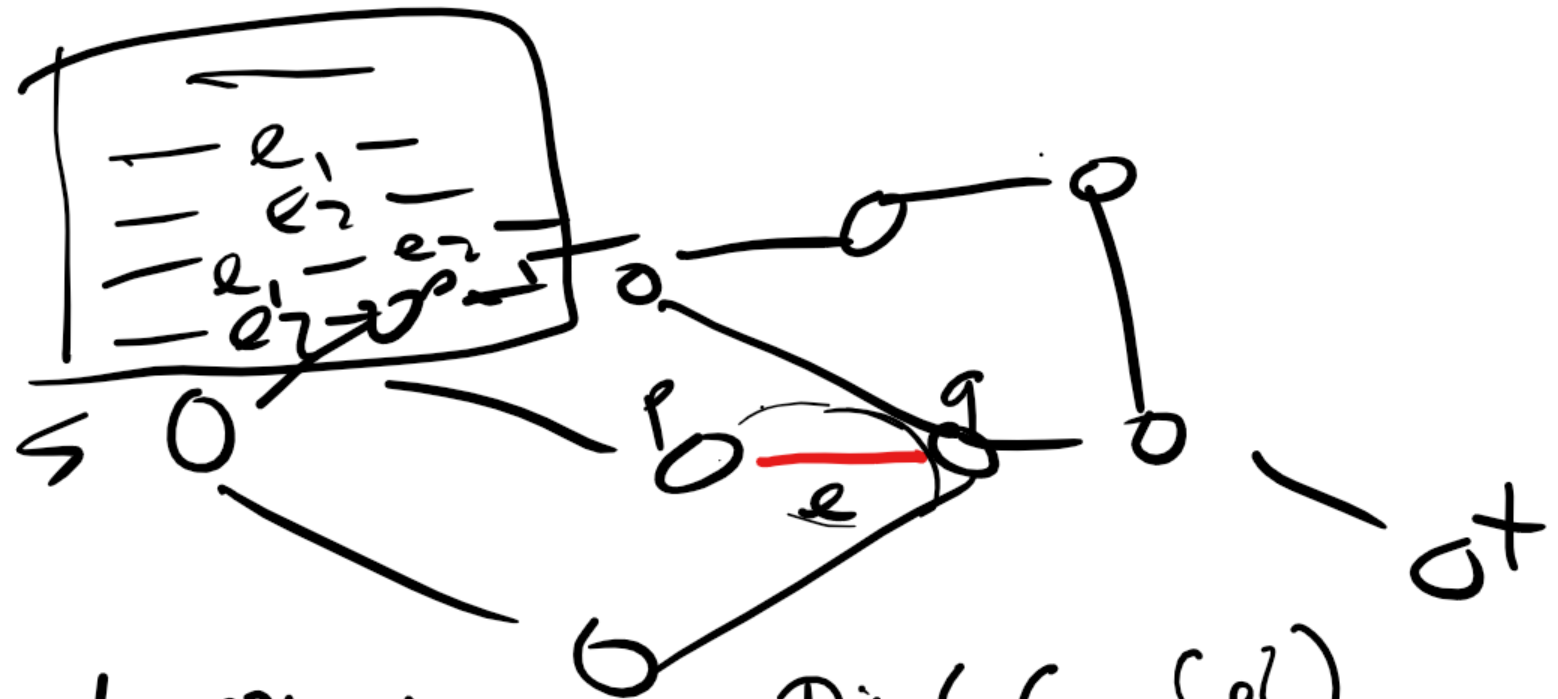
$$LIS(S, k) = \max \begin{cases} 1 + LIS(S[2..n], SE[j]) & \text{if } SE[j] > k \\ LIS[2..n], k \end{cases}$$

$LIS(i, j)$

$= LIS$ in $S[i..n] \rightarrow SE[j]$
 $LIS(1, -\infty) = LIS(S)$

for $u, v \in E$
 if $d(u) + 1(u, v) < d(v)$:
 $d(v) =$
 $\text{parent}(v) = u$





1. $e \notin SP(s, t)$
2. $e \in SP(s, t)$

$$\begin{aligned}
 & \rightarrow \text{Dij}(G - \{e\}) \\
 & SP(s, p) + SP(p, t) + l(e) \\
 & \text{Dij}(G, \{e\}) \quad SP(s, p) + D(G - \{e\}, q, t)
 \end{aligned}$$

$$\begin{array}{r}
 ab \times cd \\
 a10 + b \times (c10 + d)
 \end{array}$$

$$T(n) = 3T(n/2) + \Theta(n)$$

$$n \log n$$

$$ac \cdot 100 + (ad + bc) \cdot 10 + bd$$

$$ad + bc = (a + b) \cdot (c + d) - ac - bd$$

Karatsuba ($X_{[1..n]}$, $Y_{[1..n]}$):

$a = \text{Karatsuba}(X_{[1..n/2]}, Y_{[1..n/2]})$

$b = \text{Karatsuba}(X_{[n/2+1..n]}, Y_{[n/2+1..n]})$

$c = \text{Karatsuba}(X_{[1..n/2]} + X_{[n/2+1..n]}, Y_{[1..n/2]} + Y_{[n/2+1..n]})$

All b, c

$\Theta(b \cdot c)$