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Pseudo Code :

Note: Start at Base case!

$L[i, s] = 0 \quad \forall\, i$

$L[0, v] = \infty \quad \forall\, v \in V - s$

for ($i = 1$ to $n-1$) { ← max # edges required is $n-1$ if no neg. cycles (see HW)

for ($v \in V - s$)

$$L[i, v] = \min\{\underbrace{L[i-1, v]}, \underbrace{\min_{(w,v)\in E} L[i-1, w] + \ell_{(w,v)}}\}$$

- Assume have inverse adjacency list $A'_G[v] = \{u : (u,v) \in E\}$
- Do for loop over $A'_G[w]$

}

Q: What is runtime of Bellman Ford? (Pick strongest bound)

A) $O(n^2)$ B) $O(mn)$ C) $O(n^3)$ D) $O(m^2)$

$$\sum_{i=1}^{n-1} \sum_{v} \left(1 + \sum_{(w,v)\in E} 1\right) = n\left(n + \underbrace{\sum_{v} \sum_{(w,v)\in E} 1}_{\#\text{ of edges}}\right)$$

$= n(n+m) = O(nm)$

($n < m$ if G is connected)