

Sep 17, 2014

Q3) How do we determine w's best unproposed man?

Q4) How do we know who m is engaged to?

Q5) How do we decide if $w' > w$ in L_m ?

A3) Array of length n. $Next[w] \rightarrow$ rank of next unproposed man.

Woman Pref $[w, Next[w]] \rightarrow$ best unproposed man for a

Init: $Next[w] = 1 \quad \forall w \rightarrow O(n)$

Query: ~~Read~~ $\rightarrow O(1)$

Update: $Next[w]++ \rightarrow O(1)$

A4) $Current[m] = \begin{cases} -1 & \text{if } m \text{ is not engaged} \\ w & (m, w) \text{ are engaged} \end{cases}$

Init: $Current[m] = -1 \quad \forall m \rightarrow O(n)$

Query: Read $Current[m] \rightarrow O(1)$

Update: ~~Set~~ $Current[m] = w$ if he accepts w 's proposal $\rightarrow O(1)$

A5) If only use d/s from above:

\rightarrow Scan Man Pref $[m, *]$ compute j' & j s.t. $ManPref[m, j'] = w'$ & $ManPref[m, j] = w$ } $O(n)$
 \rightarrow compare j' & j

Stitch in time saves nine.

$O(n^3)$
G-S implementation.

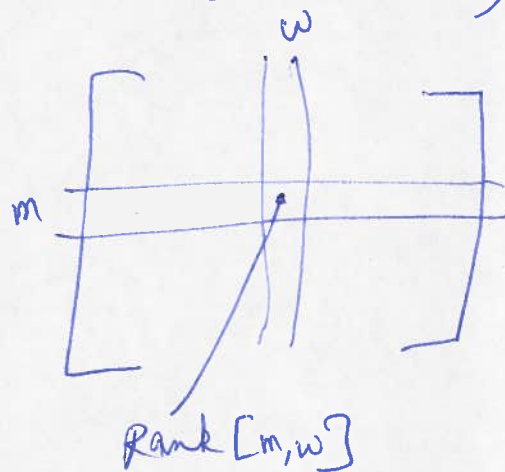
i.e. initialize some data structure in $O(n^2)$ time to get $O(1)$ query/update time.

AS) 2D-array Rank $[m, w] \rightarrow j$ s.t
 $\text{Max Pref}[m, j] = w$

Query: Check if $\text{Rank}[m, w'] > \text{Rank}[m, w] \rightarrow O(1)$

Update: n/a

Initiation: Rank $[m, *]$
 $\text{Max Pref}[m, *]$
 for $j = 1 \dots n$
 $\text{Rank}[m, \text{Max Pref}[m, j]] = j$
 $\Rightarrow O(n^2)$

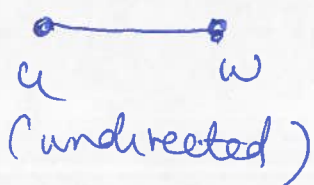


$\Rightarrow O(n^2)$ run time for G-S

$G = (V, E)$ $E \subseteq V \times V$
 set of vertices/nodes set of edges

By default: $n = |V|$; $m = |E|$

Def: G is undirected if for every $u, w \in V$
 $(u, w) \in E \iff (w, u) \in E$
 (o/w directed)



News entities: Directed
 Airline: Undirected
 Internet: Undirected
 Wikipedia: Directed

Facebook: Both.

By default: G is undirected.

No self-loops



Claim: Every undirected graph is directed.



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