Capacity of an s-t cut $(S, T)$

$$c(S, T) = \sum_{u \in S} \sum_{v \in T} c(u, v)$$

Flow across $(S, T)$

$$f(S, T) = \sum_{u \in S} f(u, v) - \sum_{u \in T} f(u, v)$$
For any cut \( (S, T) \),

\[ f(S, T) \leq c(S, T) \]

0 1 2 3 4 5 6 7 8 10....

<table>
<thead>
<tr>
<th>flows</th>
<th>cuts ((S, T))</th>
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<tbody>
<tr>
<td>( f )</td>
<td>( c(S, T) )</td>
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</table>
1 iteration of FF is $O(E)$ time

How many iterations?

Assume caps are ints
Each iteration sends $\geq 1$ unit of flow

$f^* = \max \text{flow}$

$|f^*| \text{ iterations}$
poly-time for flow

augment along a shortest path
$O(V^3E)$