Let us suppose s_A, s_B, s_{AB}, s_O denote the supply & d_A, d_B, d_{AB}, d_O → demand.

We can construct our graph $G = (V, E)$ as follows

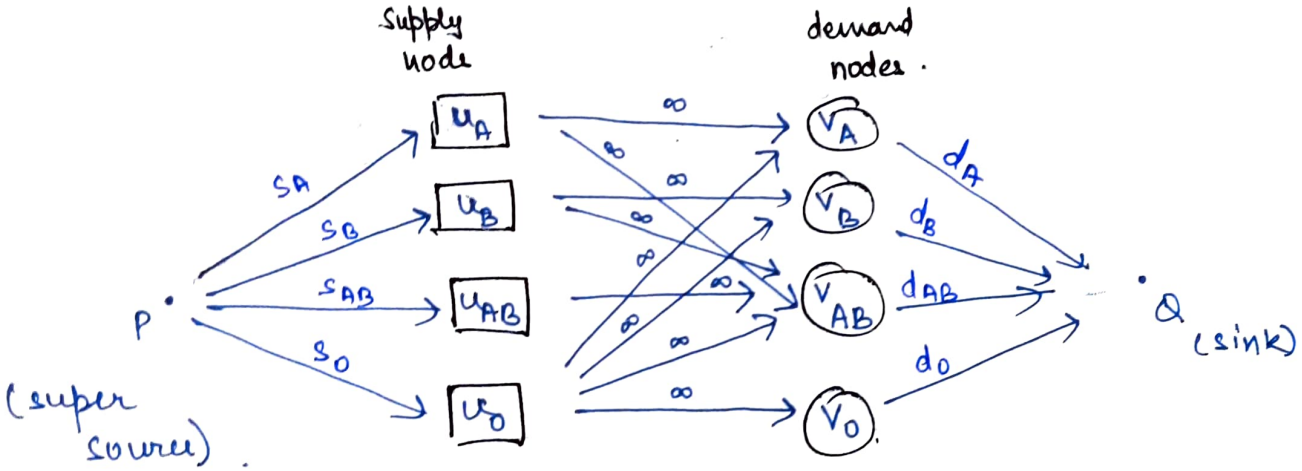
Vertices

1. One super source and one super sink (P and Q resp.)
2. 4 supply nodes (u_A, u_B, u_{AB}, u_O) & 4 demand nodes (v_A, v_B, v_{AB}, v_O)

Edges.

1. $(P, u_i) \in E$ $\quad cap(P, u_i) = s_i$ where $i \in \{A, B, AB, O\}$
2. $(v_i, Q) \in E$ $\quad cap(v_i, Q) = d_i$ where $i \in \{A, B, AB, O\}$
3. $(u_i, v_j) \in E$ where type j can reciem from type i $\quad cap(u_i, v_j) = \infty$

The graph can be visualised as :-



GRAPH G.

Our problem is to evaluate if current supply would suffice for projected demand. Thus

Theorem ~~There~~ The current supply is sufficient for projected demand if and only if edges from demand node to sink are all saturated (i.e. $f(e) = c(e)$, for $e \in (k, Q)$, $\forall k$) in the resulting max-flow of graph G.

$f(e)$ = flow of edge e
$c(e)$ = cap of edge e
Q → sink node.