

Outliers = $(a_{38}, a_{39}, \dots, c_{41}, c_{42})$ all = $(a_{38}, a_{39}, \dots, c_{41}, c_{42})$

1. Queue = $\{ \langle [e, z], (a_{38}, \dots, c_{42}) \rangle \}$
2. Vectors = $\langle [e=0, z=0] \rangle$ (*Sorted list of dist. vectors*)
3. $\langle V, Neighbors \rangle = \langle [e=0, z=0], Neighbors = all = (a_{38}, a_{39}, \dots, c_{41}, c_{42}) \rangle$
- 3.1 Queue = ϕ
- 3.2 Neighbors \cap Outliers = ~~some~~ ϕ (*they are the same*)

3.2.1 $\because S \in Neighbors \cap outliers \therefore S = a_{38}$

3.2.2 New-pairs $\leftarrow \phi$ (*to be added to queue*)

3.2.3 for each $t \in Neighbors$

$t = a_{38}$ {
 3.2.3.1 $V_{a_{38}, a_{38}} = [0, 0]$ g.to
 3.2.3.2 ~~no~~ new-pairs = ϕ next
 3.2.3.3 new-pairs = ϕ g.to
 3.2.3.4 $dist_{a_{38}, a_{38}} = 1$, do nothing next

$t = a_{39}$ {
 3.2.3.1 $V_{a_{38}, a_{39}} = [0, 1]$
 3.2.3.2 new-pairs = ϕ , try next
 3.2.3.3 $s = a_{38}$
 3.2.3.4 new-pairs = $\{ \langle [0, 1], \{t=a_{39}\} \rangle \}$

$t = a_{40}$ {
 3.2.3.1 $V_{a_{38}, a_{40}} = [0, 2]$ g.to
 3.2.3.2 $\exists (V, tuples) \in new_pairs$ such that $V_{s,t} \leq V$... ~~try~~ next
 3.2.3.3 $\exists (V, tuples) \in new_pairs$ such that $V < V_{s,t} = [0, 2]$
 then new-pairs = $\{ \langle [0, 2], \{a_{39}, a_{40}\} \rangle \}$ * after generalization $[0, 2], \{a_{39}, a_{40}\}$ is the same as $a_{38} = s$

~~your turn~~ $t = a_{41}$ {
 3.2.3.1 $V_{a_{38}, a_{41}} = [0, 2]$ i.e. =
 3.2.3.2 $\exists (V, tuples) \in new_pairs$ such that $V_{a_{38}, a_{41}} \leq V$ then
 new-pairs = $\{ \langle [0, 2], \{a_{39}, a_{40}, a_{41}\} \rangle \}$
 no 3.2.3.3 & 3.2.3.4 Comparable? new

$t = b_{38}$ {
 3.2.3.1 $V_{a_{38}, b_{38}} = [1, 0]$? $\geq [0, 2]$
 3.2.3.2 new-pairs = $\{ \langle [0, 2], \{a_{39}, a_{40}, b_{39}\} \rangle \}$
 or
 3.2.3.4 new-pairs = $\{ \langle [0, 2], \{a_{39}, a_{40}\} \rangle, \langle [1, 0], \{b_{38}\} \rangle \}$ which is correct?

Your turn discussion

$t = b_{39}$ {
 3.2.3.1 $V_{a_{38}, b_{39}} = [1, 1]$
 no 3.2.3.2
 3.2.3.3 new-pairs = $\{ \langle [0, 2], \{a_{39}, a_{40}\} \rangle, \langle [1, 1], \{b_{38}, b_{39}\} \rangle \}$ *
s = a38

$t = b41$ { 3.2.3.1 $V_{a38, b41} = [1, 2]$
 3.2.3.3 new-pairs = $\{ \langle [0, 2], \{a39, a40\} \rangle, \langle [1, 2], \{b38, b39, b41\} \rangle \}$

$t = b42$ { ~~3.2.3.1~~ $V_{a38, b42} = [1, 2]$
 new-pairs = $\{ \langle [0, 2], \{a39, a40\} \rangle, \langle [1, 2], \{b38, b39, b41, b42\} \rangle \}$

$t = c38$
 $c41$
 new-pairs = $\{ \langle [0, 2], \{a39, a40, a41\} \rangle, \langle [1, 2], \{b38, \dots, b41\} \rangle, \langle [1, 2], \{c38, \dots, c41\} \rangle \}$

3.2.4 queue = $\phi \cup \{ \downarrow \} = \text{new-pairs}$

go back to step 3
 3.1 $V = [0, 2]$ neighbors = $\{a39, a40, a41\}$ queue = $\{ \langle [1, 2], \{b38, \dots, b41\} \rangle, \langle [0, 2], \{c38, \dots, c41\} \rangle \}$

3.2 3.2.1 $S = a39 \in \text{outlier}$
 3.2.2 new-pairs = ϕ

$t = a40$ { 3.2.3.1 $V_{a39, a40} = [0, 2]$
 3.2.3.4 new-pairs = $\{ \langle [0, 2], \{a40\} \rangle \}$

$t = a41$ { 3.2.3.1 $V_{a39, a41} = [0, 2]$
 3.2.3.2 new-pairs = $\{ \langle [0, 2], \{a40, a41\} \rangle, \langle [0, 2], \{a40, a41\} \rangle \}$

3.2.4 queue = $\{ \langle [1, 2], \{b38, \dots, b41, c38, \dots, c41\} \rangle, \langle [0, 2], \{a40, a41\} \rangle \}$

3.1 $V = [1, 2]$ neighbors = $\{b38, \dots, c41\}$ queue = $\{ \langle [0, 2], \{a40, a41\} \rangle \}$

3.2 3.2.1 $S = b38$
 $t = b39$ { 3.2.3.1 $V_{b38, b39} = [0, 1]$
 3.2.3.4 new-pairs = $\{ \langle [0, 1], \{b39\} \rangle \}$

$t = b40$ { 3.2.3.1 $V_{b38, b40} = [0, 2]$
 3.2.3.3 new-pairs = $\{ \langle [0, 2], \{b39, b40\} \rangle \}$

$t = b41$ { 3.2.3.3 new-pairs = $\{ \langle [0, 2], \{b39, b40, b41\} \rangle \}$
 $V_{b38, c38} = [1, 0]$

$t = c38$ new-pairs = $\{ \langle [0, 2], \{b39, b40, b41\} \rangle, \langle [1, 0], \{c38, c39\} \rangle \}$
 $t = c39$

$t = c40$ $V_{b38, c40} = [1, 2]$
 $t = c41$ 3.2.3.3 new-pairs = $\{ \langle [1, 2], \{b39, b40, b41, c40, c41\} \rangle, \langle [1, 0], \{c38, c39\} \rangle \}$

3.2.4 queue = $\{ \langle [0, 2], \{a40, a41\} \rangle, \downarrow \}$
 \downarrow neighbors

3.1 $V = [0, 2]$ neighbors = $\{a_{40}, a_{41}\}$ queue = $\{ \langle [1, 2], \{b_{39}, b_{40}, b_{41}, c_{40}, c_{41}\} \rangle, \langle [1, 0], \{c_{38}, c_{39}\} \rangle \}$

3.2 3.2.1 $S = a_{40}$
 $t = a_{41}$ { 3.2.3.1 $V_{a_{40}, a_{41}} = [0, 1]$
 3.2.3.4 new-pairs = $\{ \langle [0, 1], \{a_{41}\} \rangle \}$ its tuples is ~~is~~ singleton
 do not add this new-pairs because
 3.2.4 queue = \leftarrow

3.1 $V = [1, 2]$ neighbors = $\{b_{39}, b_{40}, b_{41}, c_{40}, c_{41}\}$ queue = $\{ \langle [1, 0], \{c_{38}, c_{39}\} \rangle \}$

3.2 ~~3.2.1~~ $S = b_{39}$
 $t = b_{40}$ { $V_{b_{39}, b_{40}} = [0, 2]$
 new-pairs = $\{ \langle [0, 2], \{b_{40}\} \rangle \}$
 $t = b_{41}$ { $V_{b_{39}, b_{41}}$
 new-pairs = $\{ \langle [0, 2], \{b_{40}, b_{41}\} \rangle \}$
 $t = c_{40}/c_{41}$ $V_{b_{39}, c_{40}} = [1, 2]$
 new-pairs = $\{ \langle [1, 2], \{b_{40}, b_{41}, c_{40}, c_{41}\} \rangle \}$
 queue = $\{ \langle [1, 0], \{c_{38}, c_{39}\} \rangle, \langle [1, 2], \{b_{40}, b_{41}, c_{40}, c_{41}\} \rangle \}$

3.1 $V = [1, 0]$ neighbors
 3.2 $S = c_{38}$
 $t = c_{39}$ $V_{c_{38}, c_{39}} = [0, 1]$
 new-pairs = $\{ \langle [0, 1], \{c_{39}\} \rangle \}$ do not add to the queue.

3.1 $V = [1, 2]$ neighbors = $\{b_{40}, b_{41}, c_{40}, c_{41}\}$ queue = \emptyset
 3.2 $S = b_{40}$
 $t =$ new-pairs = $\{ \langle [0, 1], \{b_{41}\} \rangle, \langle [1, 0], \{c_{40}\} \rangle \}$
 \times $\langle [1, 1], \{c_{40}, c_{41}\} \rangle$
 queue = $\{ \langle [1, 1], \{c_{40}, c_{41}\} \rangle \}$

3.1 $V = [1, 0]$ neighbors = $\{c_{40}, c_{41}\}$ queue = \emptyset
 3.2 $S = c_{40}$
 $t = c_{41}$ new-pairs = $\{ \langle [0, 1], \{c_{41}\} \rangle \}$
 queue = $\leftarrow \emptyset$