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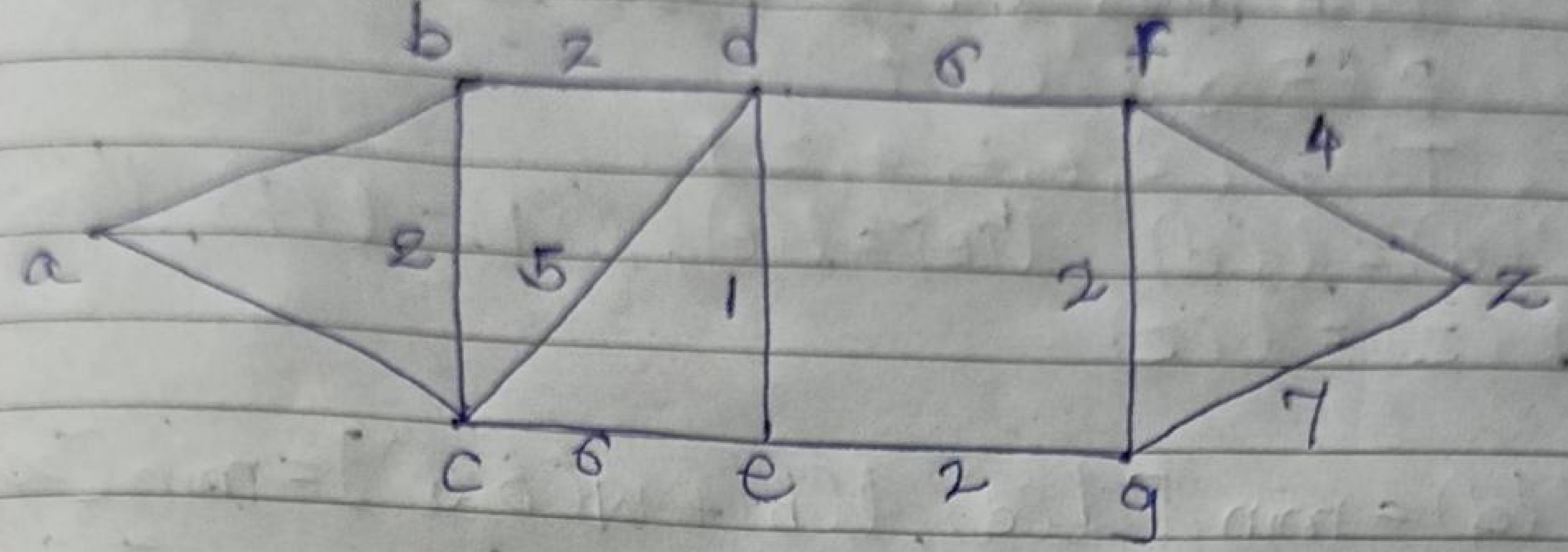
Q1 Find the shortest paths between a & z.



Ans. : $P = \{a\}$

$T = \{b, c, d, e, f, g, z\}$

$l(c) = W(a, c) = 2$
$l(b) = W(a, b) = 5$
$l(d) = W(a, d) = \infty$
$l(e) = W(a, e) = \infty$
$l(f) = W(a, f) = \infty$
$l(g) = W(a, g) = \infty$
$l(z) = W(a, z) = \infty$

iteration 1 :

$l(c)$ has lowest index.

$P' = \{a, c\}$

$T' = \{b, d, e, f, g, z\}$

$l(b) = l'(b),\ l(d) = l'(d),\ l(e) = l(e)',$
$l(f) = l'(f),\ l(g) = l'(g),\ l(z) = l'(z)$

$l'(b) = \min[l(b), l(c) + W(c, b)] = \min[5, (2+2)] = 4$
$l'(d) = \min[l(d), l(c) + W(c, d)] = \min[\infty, (2+5)] = 7$
$l'(e) = \min[l(e), l(c) + W(c, e)] = \min[\infty, (2+6)] = 8$
$l'(f) = \min[l(f), l(c) + W(c, f)] = \min[\infty, (2+\infty)] = \infty$
$l'(z) = \min[l(z), l(c) + W(z, c)] = \min[\infty, 2+\infty] = \infty$

iteration 2:

$l(b)$ has the lowest inden

$P' = \{a, c, b\}$

$T' = \{d, e, f, g, z\}$

$l'(d) = l(d)$, $l'(e) = l(e)$, $l'(f) = l(f)$, $l'(g) = l(g)$

$l'(z) = l(z)$.

$l'(d) = \min[l(d), l(b) + w(b,d)] = \min[\infty, 4+2]$
$= 6.$

$l'(e) = \min[l(e), l(b) + w(b,e)] = \min[\infty, 4+\infty] = \infty$

$l'(f) = \min[l(f), l(b) + w(b,f)] = \min[\infty, 4\infty] = \infty$

$l'(g) = \min[l(g), l(b) + w(b,g)] = \min[\infty, 4+\infty] = \infty.$

iteration 3:

$l(d)$ has lowest inden

$P' = \{a, c, d\}$

$T' = \{e, f, g, z\}$

$l'(e) = l(e)$, $l'(f) = l(f)$, $l'(g) = l(g)$,

$l'(z) = l(z)$

$l'(e) = \min[l(e), l(d) + w(d,e)] = \min[\infty, 6+1]$
$= 7$

$l'(f) = \min[l(f), l(d) + w(d,f)] = \min[\infty, 6+6]$
$= 12.$

$l'(g) = \min[l(g), l(d) + w(d,g)] = \min[\infty, 6+\infty)$
$= \infty$

$l'(z) = \min[l(z), l(d) + w(d,z)] = \min[\infty, 6+\infty)$
$= \infty$

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iteration 4 :

$l(e)$ has the lowest index.

$P' = \{a, c, e\}$

$T' = \{f, g, z\}$

$l'(f) = l(f)$, $l'(g) = l(g)$; $l'(z) = l(z)$

$l'(f) = \min[l(f), l(e) + w(e,f)] = \min[\infty, 7+\infty]$
$= \infty$.

$l'(g) = \min[l(g), l(e) + w(e,g)] = \min[\infty, 7+2]$
$= 9$

$l'(z) = \min[l(z), l(e) + w(e,z)] = \min[\infty, 7+\infty]$
$= \infty$.

iteration 5 :

$l(g)$ has the lowest index

$P' = \{a, c, g\}$.

$T' = \{f, z\}$

$l'(f) = l(f)$, $l'(z) = l(z)$.

$l'(f) = \min[l(f); l(g) + w(g,f)] = \min[\infty, 9+2]$
$= 11$

$l'(z) = \min[l(z), l(g) + w(g,z)] = \min[\infty, 9+7]$
$= 16$.

iteration 6 :

$l(f)$ has lowest index.

$P' = \{a, c, f\}$.

$T' = \{z\}$

$l'(z) = l(z)$

$l'(z) = \min[l(z), l(f) + w(f,z)$
$= \min[\infty, 11+4)$
$= 15.$

Minimum distance between 'a' & 'z' is 15.

Shortest path is $(c, b, d, e, g, f, z\}$