Algorithm :

Input : A connected weighted graph which contained with positive weight.

output : $L(z)$, the length of a sortest path from a to z.

step 1 : set $L(a) = 0$

step 2 : for all vertices $x \neq a$, do $L(x) = \infty$

step 3 : set $T = V$, where T = set of vertices having temporary vertex.
and V = set of vertex of G.

step 4 : Let 'v' be a vertex in 'T'.
i.e $(v \in T)$ for which $L(v)$ is minimum & hence the permanent label of v.

step 5 : $T = T - \{v\}$

step 6 : for every edge, $e = (v, u)$ adj'acent to v, change $L(u)$ to $\min\{\text{old } L(x), L(v) + w(e)\}$

step 7 : If $v = z$ stop, otherwise go to step 2.

step 8 : End.

Solution: It's initial labelling is given by:

vertex v	A	B	C	D	E
$L(v)$	0	∞	∞	∞	∞
T	$\{A,$	$B,$	$C,$	$D,$	$E\}$

Iteration 1: Let $U = A$ has $L(U) = 0$

$\therefore T = T - \{a\}$

Since there are three edges adjacent with A.

i.e, AB, AC, AE where $B, C, E \in T$

$$\therefore L(B) = \min\{\text{old } L(B), L(A) + w(AB)\}$$
$$= \min\{\infty, 0+9\}$$
$$= 9$$

$$\therefore L(C) = \min\{\text{old } L(C), L(A) + w(AC)\}$$
$$= \min\{\infty, 0+5\}$$
$$= 5$$

$$\therefore L(E) = \min\{\text{old } L(E), L(A) + w(AE)\}$$
$$= \min\{\infty, 0+2\}$$
$$= 2$$

Hence the minimum label is $L(E) = 2$

Now we have to modify the table,

Vertex v	A	B	C	D	E
$L(v)$	0	9	5	∞	2
T	$\{$	B	C	D	$E\}$

Iteration 2 : Let $U = E$ has $L(U) = 2$

$$\therefore T = T - \{E\}$$

Since there are two edges adjacent with E.

i.e, EC and ED where $c, d \in T$

$$\therefore L(C) = \min\{\text{old } L(C), L(E) + w(EC)\}$$

$$= \min\{5, 2 + 12\}$$

$$= 5$$

$$\therefore L(D) = \min\{\text{old } L(D), L(E) + w(ED)\}$$

$$= \min\{\infty, 2 + 4\}$$

$$= 6$$

Hence the minimum label is $L(C) = 5$

Now we have to modify the table :

vertex (v)	A	B	C	D	E
L(v)	0	9	5	6	2
T	{	B	C	D	}

Iteration 3: Let $U = C$ has $L(U) = 5$

$$\therefore T = T - \{C\}$$

Since there are two edges adjacent with C.

i.e, CB, CD where $B, D \in T$

$$\therefore L(B) = \min\{\text{old } L(B), L(C) + w(CB)\}$$

$$= \min\{9, 5+3\}$$

$$= 8$$

$$\therefore L(D) = \min\{\text{old } L(D), L(C) + w(CD)\}$$

$$= \min\{6, 5+6\}$$

$$= 6$$

Hence the minimum label is $L(D) = 6$

Now we have to modify the table:

vertex (v)	A	B	C	D	E
L(v)	0	8	5	6	2
T	{	B		D	}

Iteration 4: Let $U = D$ has $L(U) = 5$

$\therefore T = T - \{D\}$

Since D doesn't have any non visited neighbours, so, we don't need to check anything. We mark it as visited and modify the table:

vertex(v)	A	B	C	D	E
L(v)	0	8	5	6	2
T	{	B			}

Iteration 5: Let $U = B$ has $L(U) = 8$

$\therefore T = T - \{B\}$

Since B doesn't have any non-visited neighbours, so we don't need to check anything. Therefore we stop the iteration. Finally we get the following shortest path tree.