# L-32 Shortest Path

Wednesday, April 20, 2022 10:00 AM

**Dijkstra's Algorithm :→** Let S be the source set

(i) Initially there is no Vertex in S

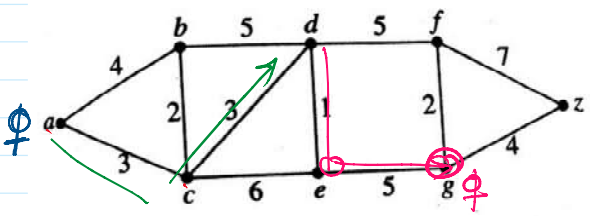
(ii) Include a source Vertex $V_s$ in S. Find all the path from $V_s$ to all other Vertices without going through any other Vertex — Direct path from $V_s$ to others

(iii) Include that Vertex in S which is nearest to $V_s$ and find shortest path to all the Vertices through this Vertex and update the Values

(IV) Repeate the step(iii) Untill (n-1) Vertices are not included in S If there are n Vertices in the graph

After Completion of process we get the Shortest path to all the Vertices from the source Vertex.

Find Shortest path b/w a & z



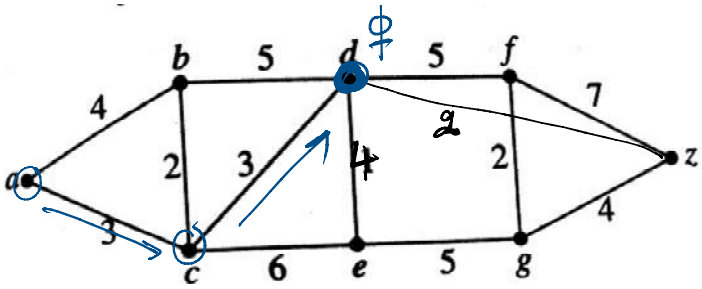


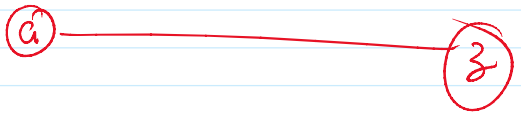
| Source | a | b | c | d | e | f | g | z |
|---|---|---|---|---|---|---|---|---|
| a | - | 4(a) | 3(a) | ∞ | ∞ | ∞ | ∞ | ∞ |
| a,c | - | 4(a) | - | 6(a,c) | 9(a,c) | ∞ | ∞ | ∞ |
| a,b | - | - | - | 6(a,c) | 9(a,c) | ∞ | ∞ | ∞ |
| acd | - | - | - | - | 7(acd) | 11(acd) | ∞ | ∞ |
| acde | - | - | - | - | - | 11(acd) | 12(acde) | ∞ |
| acdf | - | - | - | - | - | - | 12(acde) | 18(acdf) |
| acdeg | - | - | - | - | - | - | - | 16(acdeg) |

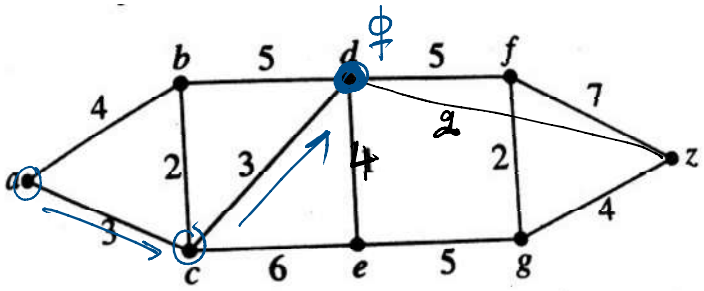
∴ the shortest path b/w a & z is

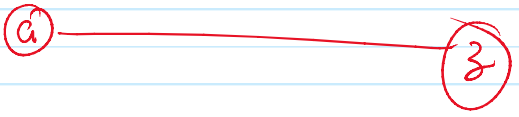
a—c—d—e—g—z

Length of path = 16

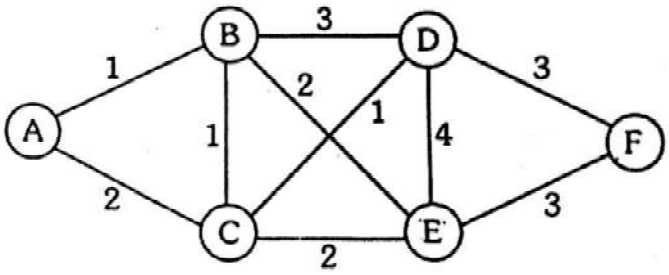





| Source | a | b | c | d | e | f | g | z |
|---|---|---|---|---|---|---|---|---|
| a | - | 4(a) | 3(a) | ∞ | ∞ | ∞ | ∞ | ∞ |
| a,c | - | 4(a) | - | 6(a,c) | 9(a,c) | ∞ | ∞ | ∞ |
| a,b | - | - | - | 6(a,c) | 9(a,c) | ∞ | ∞ | ∞ |
| acd | - | - | - | - | 10(acd) | 11(acd) | ∞ | 8(acd) |




Find the shortest path b/w A & F