Multistage Graph.

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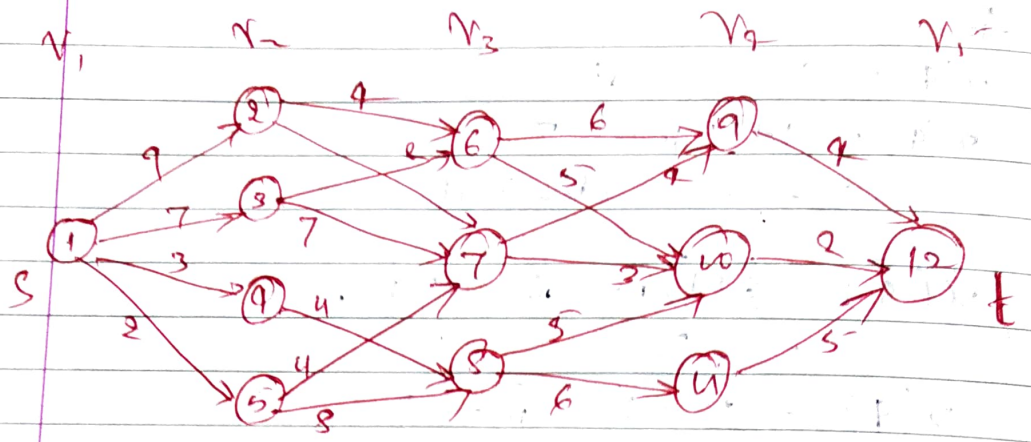

- Total k-2 decisions
- s will be in first stage
- t will be in last stage

cost (i, j) ← minimum
↑ represents distance from j^{th} node in i^{th} stage to "t".

$$cost(i,j) = \min_{\substack{l \in V_{i+1} \\ (j,l) \in E}} \{ c(j,l) + cost(i+1, l) \}$$

ie

cost (3, 6) : find the minimum cost path from node 6 in stage 3 to destination node 12.

find the node having direct edge from 6. they are (6,9) and (6,10)

Now find minimum cost path from 9 to 12 and minimum cost path from 10 to 12

and assign the minimum one to cost(3,6).

4th stage.

cost(4,9) = 4

cost(4,10) = 2

cost(4,11) 5

3rd stage.

cost(3,6) = {c(6,9)+cost(4,9), c(6,10)+cost(9,10)}

= {6+4, 5+2}

= {10, 7} = 7//

cost(3,7) = {c(7,9)+cost(4,9), c(7,10)+cost(9,10)}

= {5+4, 3+2} = {9,5} = 5//

cost(3,8) = {c(8,10)+cost(9,10), c(8,11)+cost(9,11)}

= {5+2, 6+5} = {9, 11} = 7//

2nd stage.

cost(2,2) = {c(2,6)+cost(3,6), cost(2,7)+cost(3,7), c(2,8)+cost(3,8)}

= {4+7, 2+5, 1+9} = 7//

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$cost(2,3) = \min\{c(3,6) + cost(3,6), c(3,7) + cost(3,7)\}$

$= \{2+7, 7+5\} = 9$ //

$cost(2,4) = \min\{c(4,8) + cost(3,8)\}$

$= \{11+7\} = 18$

$cost(2,5) = \min\{c(5,7) + cost(3,7), c(5,8) + cost(3,8)\}$

$= \{11+5, 8+7\} = 15$

$cost(1,1) = \min\{c(1,2) + cost(2,2), c(1,3) + cost(2,3), c(1,4) + cost(2,4), c(1,5) + cost(2,5)\}$

$= \{9+7, 7+9, 3+18, 2+15\}$

$= \{16, 16, 21, 17\}$

$= 16$ //

Let, $d(i,j)$ be the node number which minimized $cost(i,j)$

$d(4,9) = 9$ $d(4,10) = 10$ $d(4,11) = 11$

$d(3,6) = 10$ $d(3,7) = 10$ $d(3,8) = 10$

$d(2,2) = 7$, $d(2,3) = 6$ $d(2,4) = 8$

$d(2,5) = 8$

$d(1,1) = 2$

New path is $d(1,1) = 2$. $\therefore$ 2nd node is 2.

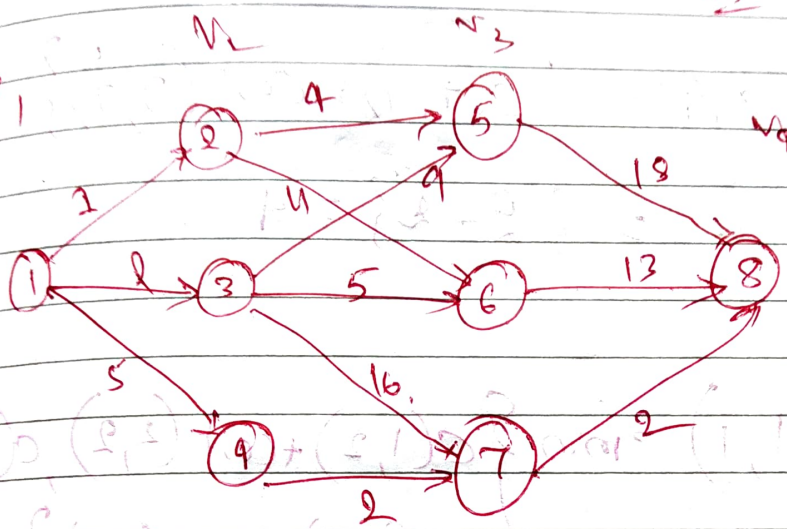
$d(2,2) = 7$ 3rd node in 3rd stage.

$d(3,7) = 10$. 4th node in 4th stage.

$\therefore$ path is $1 - 2 - 7 - 10 - 12$

$q \quad 2 \quad 3 \quad 2$

$= 16.$



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Stage 3

cost (3,5) = 18

cost (3,6) = 13

cost (3,7) = 2.

Stage 2

cost (2,2) = min{ c(2,5) + cost(3,5), c(2,6) + cost(3,6) }

= {4+18, 11+13} = {22, 24} = 22//

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$$cost(2,3) = \min\{c(3,5)+cost(3,5),\ c(3,6)+cost(3,6),\ c(3,7)+cost(3,7)\}$$

$$= \min\{9+18,\ 5+13,\ 16+2\}$$

$$= \min\{27,\ 18,\ 18\} = 18.$$

$$cost(2,4) = \{c(4,7)+cost(3,7)\}$$

$$= \{2+2\} = 4.$$

$$cost(1,1) = \min\{c(1,2)+cost(2,2),\ c(1,3)+cost(2,3),\ c(1,4)+cost(2,4)\}$$

$$= \{1+22,\ 2+18,\ 5+4\}$$

$$= \{23,\ 20,\ 9\} = 9 //$$

$d(1,1) = 4.$

$d(2,4) = 7.$

$d(3,7) = 8 //$

$\therefore$ path $1-4-7-8$ & cost $= 9.$