Multistage Graph
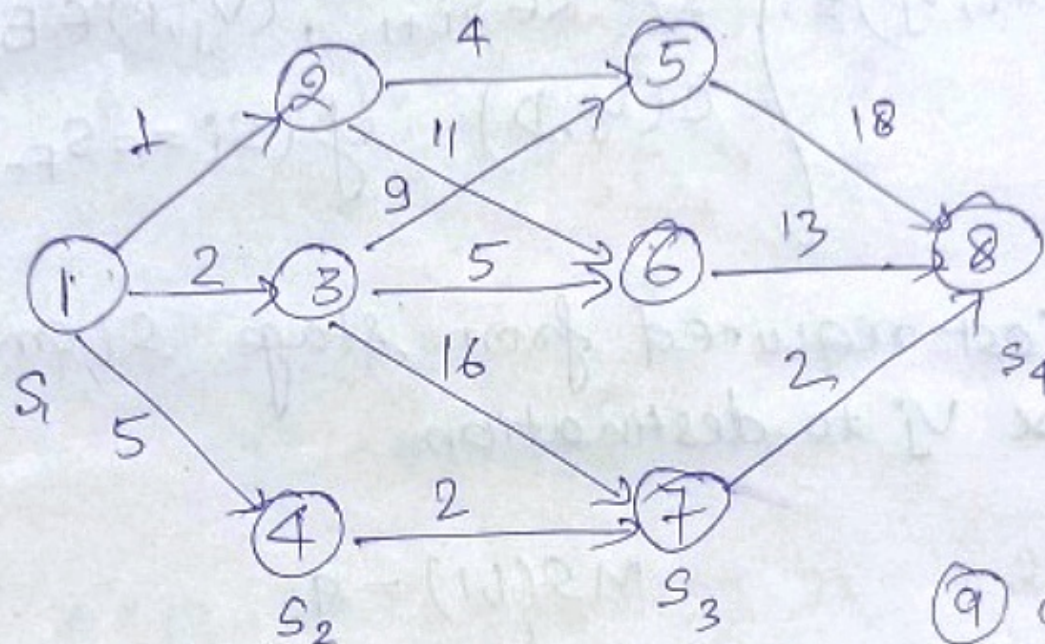

By Greedy Approach:

$$1 \xrightarrow{1} 2 \xrightarrow{4} 5 \xrightarrow{18} 8 \Rightarrow 23$$

By Dynamic Approach.

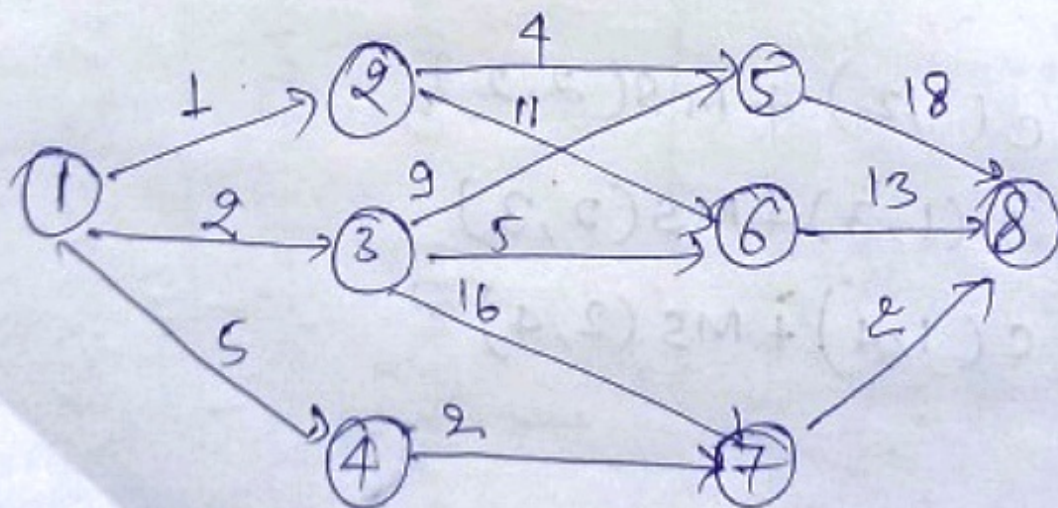$$\underset{\text{stage}}{\leftarrow} MS(1, 1) \underset{\text{vertex}}{\rightarrow} =$$

$$\min \begin{cases} c(1,2) + MS(2,2) \\ c(1,3) + MS(2,3) \\ c(1,4) + MS(2,4) \end{cases}$$

1

$$MS(S_i, v_j) = \begin{cases} \min\{ c(v_j, K) + MS(S_{i+1}, K) \\ \quad \forall\ K \in S_{i+1},\ (v_j, K) \in E \\ c(v_j, D) \quad \text{if } (S_i == S_{F-1}) \end{cases}$$

min cost required from stage S_i and vertex v_j to destination

$$MS(1,1) = 9$$

(22) $MS(2,2) + 1 = $ (23)   (18) $MS(2,3) + 2 = $ (20)   (4) $MS(2,4) + 5 = $ (9)

$MS(3,5)+4$ $MS(3,6)+11$ $MS(3,5)+9$ $MS(3,7)+16$ $MS(3,7)+2$

$MS(3,6)+5$

18   22   13   24   18   27   13   8   2   18   2   4

$$A[4] = C(4,7) + A[7]$$
$$= 2 + 2 = 4$$

$$A[3] = \begin{cases} C(3,5)^9 + A[5] = 27 \\ C(3,6)^5 + A[6] = 18 \\ C(3,7)^{16} + A[7] = 18 \end{cases}$$

$$A[2] = C(2,5) + A[5] = 22$$
$$= C(2,6) + A[6] = 24$$

$$A[1] = C(1,2) + A[2] \quad 22 \quad = 23$$
$$C(1,3) + A[3] = 18 \quad = 20$$
$$C(1,4) + A[4] = 4 \quad = 9$$

3