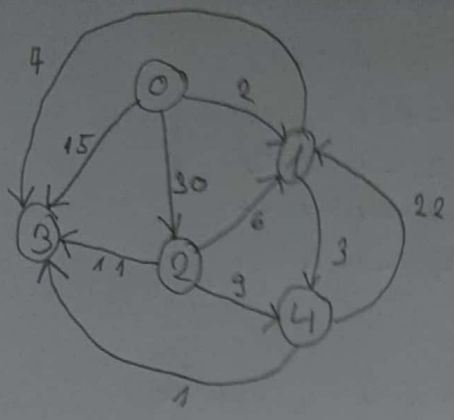
Example1.txt



W_i = weight matrices

P_i = path matrices

$k=0$ → using vertex 0 as an intermediate vertex

$$W_0 = \begin{pmatrix} 0 & 2 & 30 & 15 & \infty \\ \infty & 0 & \infty & 7 & 3 \\ \infty & 6 & 0 & 11 & 9 \\ \infty & \infty & \infty & 0 & \infty \\ \infty & 22 & \infty & 1 & 0 \end{pmatrix} \qquad P_0 = \begin{pmatrix} -1 & 0 & 0 & 0 & -1 \\ -1 & -1 & -1 & 1 & 1 \\ -1 & 2 & -1 & 2 & 2 \\ -1 & -1 & -1 & -1 & -1 \\ -1 & 4 & -1 & 4 & -1 \end{pmatrix}$$

$k=1$ → using vertex 1 as an intermediate vertex

$$W_1 = \begin{pmatrix} 0 & 2 & 30 & \boxed{9} & \boxed{5} \\ \infty & 0 & \infty & 7 & 3 \\ \infty & 6 & 0 & 11 & 9 \\ \infty & \infty & \infty & 0 & \infty \\ \infty & 22 & \infty & 1 & 0 \end{pmatrix} \qquad P_1 = \begin{pmatrix} -1 & 0 & 0 & \boxed{1} & \boxed{1} \\ -1 & -1 & -1 & 1 & 1 \\ -1 & 2 & -1 & 2 & 2 \\ -1 & -1 & -1 & -1 & -1 \\ -1 & 4 & -1 & 4 & -1 \end{pmatrix}$$

$k=2$ → using vertex 2 as an intermediate vertex

$$W_2 = \begin{pmatrix} 0 & 2 & 30 & 9 & 5 \\ \infty & 0 & \infty & 7 & 3 \\ \infty & 6 & 0 & 11 & 9 \\ \infty & \infty & \infty & 0 & \infty \\ \infty & 22 & \infty & 1 & 0 \end{pmatrix} \qquad P_2 = \begin{pmatrix} -1 & 0 & 0 & 1 & 1 \\ -1 & -1 & -1 & 1 & 1 \\ -1 & 2 & -1 & 2 & 2 \\ -1 & -1 & -1 & -1 & -1 \\ -1 & 4 & -1 & 4 & -1 \end{pmatrix}$$

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$k = 3 \rightarrow$ using vertex 3 as an intermediate vertex

$$W_3 = \begin{pmatrix} 0 & 2 & 3 & 9 & 5 \\ \infty & 0 & \infty & 7 & 3 \\ \infty & 6 & 0 & 11 & 9 \\ \infty & \infty & \infty & 0 & \infty \\ \infty & 22 & \infty & 1 & 0 \end{pmatrix} \qquad P_3 = \begin{pmatrix} -1 & 0 & 0 & 1 & 1 \\ -1 & -1 & -1 & 1 & 1 \\ -1 & 2 & -1 & 2 & 2 \\ -1 & -1 & -1 & -1 & -1 \\ -1 & 4 & -1 & 4 & -1 \end{pmatrix}$$

$k = 4 \rightarrow$ using vertex 4 as an intermediate vertex

$$W_4 = \begin{pmatrix} 0 & 2 & 3 & \boxed{6} & 5 \\ \infty & 0 & \infty & \boxed{4} & 3 \\ \infty & 6 & 0 & \boxed{10} & 9 \\ \infty & \infty & \infty & 0 & \infty \\ \infty & 22 & \infty & 1 & 0 \end{pmatrix} \qquad P_4 = \begin{pmatrix} -1 & 0 & 0 & \boxed{4} & 1 \\ -1 & -1 & -1 & \boxed{4} & 1 \\ -1 & 2 & -1 & \boxed{4} & 2 \\ -1 & -1 & -1 & -1 & -1 \\ -1 & 4 & -1 & 4 & -1 \end{pmatrix}$$

$W_4(1,2) = \infty \Rightarrow$ there is no walk from 3 to 2

$W_4(0,3) = 6 \Rightarrow$ there is a walk from 0 to 3, having a cost of 6

$4 = 3$, $P_4(0,3) = 4$, $P_4(0,4) = 1$, $P(0,1) = 0$

$0 \xrightarrow{2} 1 \xrightarrow{3} 4 \xrightarrow{1} 3$

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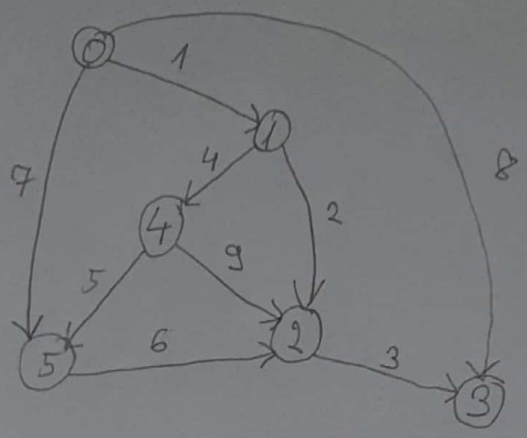
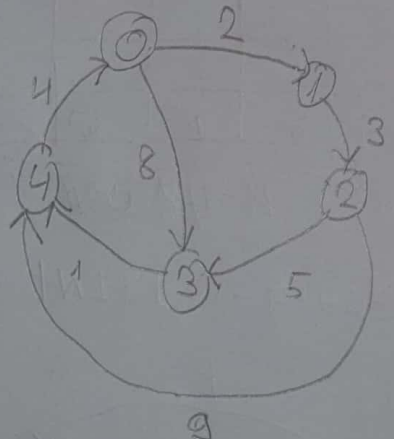
Example2.txt



6

$$W=\begin{pmatrix} 0 & 1 & 3 & 6 & 5 & 7 & \infty \\ \infty & 0 & 2 & 5 & 4 & 9 & \infty \\ \infty & \infty & 0 & 3 & \infty & \infty & \infty \\ \infty & \infty & \infty & 0 & \infty & \infty & \infty \\ \infty & \infty & 9 & 12 & 0 & 5 & \infty \\ \infty & \infty & 6 & 9 & \infty & 0 & \infty \\ \infty & \infty & \infty & \infty & \infty & \infty & 0 \end{pmatrix} \qquad P=\begin{pmatrix} -1 & 0 & 1 & 2 & 1 & 0 & -1 \\ -1 & -1 & 1 & 2 & 1 & 4 & -1 \\ -1 & -1 & -1 & 2 & -1 & -1 & -1 \\ -1 & -1 & -1 & -1 & -1 & -1 & -1 \\ -1 & -1 & 4 & 2 & -1 & 4 & -1 \\ -1 & -1 & 5 & 2 & -1 & -1 & -1 \\ -1 & -1 & -1 & -1 & -1 & -1 & -1 \end{pmatrix}$$

Example3.txt



$$W=\begin{pmatrix} 0 & 2 & 5 & 8 & 9 \\ 13 & 0 & 3 & 8 & 9 \\ 10 & 12 & 0 & 5 & 6 \\ 5 & 7 & 10 & 0 & 1 \\ 4 & 6 & 9 & 12 & 0 \end{pmatrix} \qquad P=\begin{pmatrix} -1 & 0 & 1 & 0 & 3 \\ 4 & -1 & 1 & 2 & 3 \\ 4 & 0 & -1 & 2 & 3 \\ 4 & 0 & 1 & -1 & 3 \\ 4 & 0 & 1 & 0 & -1 \end{pmatrix}$$

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