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Chinese Postman Problem using Fleurys and Djikstras

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1) Example 1 – Graph with Euler Circuit

```
Number of vertices: 5
Number of edges: 6

Enter vertex pairs with edge in between : Eg. (0 1 w) -> Edge between V0 and V1 with weight w
Edge1 :0 1 2
Edge2 :0 3 4
Edge3 :0 2 5
Edge4 :0 4 1
Edge5 :1 2 4
Edge6 :3 4 3
Number of odd degree vertices : 0
Graph contains Eulerian circuit and hence miniumun cost path is given by sum of all edge weights.
Minimun weight path for the Chinese postman problem has cost :19
```

2) Example 2 – Graph with Euler Path

```
Number of vertices: 5
Number of edges: 5

Enter vertex pairs with edge in between : Eg. (0 1 w) -> Edge between V0 and V1 with weight w
Edge1 :0 1 1
Edge2 :0 2 2
Edge3 :1 2 3
Edge4 :0 3 4
Edge5 :3 4 5
Number of odd degree vertices : 2
Graph contains Eulerian path and hence miniumun cost path is given by sum of all edge weights + min cost between the two odd
 vertices.

Minimun cost between the two odd degree vertices: 9
Path=4<-0
Minimun weight path for the Chinese postman problem has cost :24
0 -- 1 1 -- 2 2 -- 0 0 -- 3 3 -- 4 4 -- 0
PS C:\Users\sansk\Desktop\Sanskriti\College\GraphTheory\ChinesePostman>
```

3)Example 3 – Cyclic Graph

```
Number of vertices: 4
Number of edges: 4

Enter vertex pairs with edge in between : Eg. (0 1 w) -> Edge between V0 and V1 with weight w
Edge1 :0 1 2
Edge2 :1 2 4
Edge3 :2 3 5
Edge4 :3 0 6
Number of odd degree vertices : 0
Graph contains Eulerian circuit and hence miniumun cost path is given by sum of all edge weights.
Minimun weight path for the Chinese postman problem has cost :17
0 -- 1 1 -- 2 2 -- 3 3 -- 0
```

Example 4 – Non Eulerian Graph

```
Number of vertices: 5
Number of edges: 6

Enter vertex pairs with edge in between : Eg. (0 1 w) -> Edge between V0 and V1 with weight w
Edge1 :1 3 1
Edge2 :1 0 2
Edge3 :0 3 3
Edge4 :0 2 4
Edge5 :1 2 5
Edge6 :3 4 6
Number of odd degree vertices : 4
Graph contains neither Eulerian path or circuit and hence miniumun cost path is given by sum of all edge weights + min cost
between the edges added to make graph eulerian.
Odd degree vertices are :
0 1 3 4
Odd Vertex Possible Pairings with respective costs are :
Minimun cost between the two odd degree vertices: 2
Path=1<-0
(0 , 1) with cost 2
Minimun cost between the two odd degree vertices: 3
Path=3<-0
(0 , 3) with cost 3
Minimun cost between the two odd degree vertices: 9
Path=4<-0
(0 , 4) with cost 9
Minimun cost between the two odd degree vertices: 1
Path=3<-0<-1
(1 , 3) with cost 1
Minimun cost between the two odd degree vertices: 7
Path=4<-0<-1
(1 , 4) with cost 7
Minimun cost between the two odd degree vertices: 6
Path=4<-0<-3
(3 , 4) with cost 6
```