Algorithm : Maximal Matching of Bipartite Graph(Using Flow networks and Ford-Fulkersons

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1) Example 1

```
PS C:\Users\sansk\Desktop\Sanskriti\College\GraphTheory\MaximalMatching> ./a.exe
Considering Bipartite Graph K(m,n) enter the values of (M N): 5 5
Number of edges :10
Enter Edge(V1 V2) with V1 belonging to Vm and V2 belonging to Vn
Edge 1 :0 0
Edge 2 :0 1
Edge 3 :1 0
Edge 4 :2 0
Edge 5 :2 2
Edge 6 :3 2
Edge 7 :3 3
Edge 8 :3 4
Edge 9 :4 3
Edge 10 :4 4
Matrix representing graph edges :
1 1 0 0 0
1 0 0 0 0
1 0 1 0 0
0 0 1 1 1
0 0 0 1 1
Matching from Vm to Vn are :
1 -> 0
0 -> 1
2 -> 2
4 -> 3
3 -> 4
Maximum Matchings from Vm to Vn are : 5
```

2) Example 2 – Complete Matching

```
PS C:\Users\sansk\Desktop\Sanskriti\College\GraphTheory\MaximalMatching> ./a.exe
Considering Bipartite Graph K(m,n) enter the values of (M N): 4 4
Number of edges :7
Enter Edge(V1 V2) with V1 belonging to Vm and V2 belonging to Vn
Edge 1 :0 0
Edge 2 :0 1
Edge 3 :1 1
Edge 4 :1 2
Edge 5 :2 2
Edge 6 :2 3
Edge 7 :3 3
Matrix representing graph edges :
1 1 0 0
0 1 1 0
0 0 1 1
0 0 0 1
Matching from Vm to Vn are :
0 -> 0
1 -> 1
2 -> 2
3 -> 3
Maximum Matchings from Vm to Vn are : 4
```

3) Example 3

```
PS C:\Users\sansk\Desktop\Sanskriti\College\GraphTheory\MaximalMatching> ./a.exe
Considering Bipartite Graph K(m,n) enter the values of (M N): 5 4
Number of edges :8
Enter Edge(V1 V2) with V1 belonging to Vm and V2 belonging to Vn
Edge 1 :0 0
Edge 2 :1 0
Edge 3 :1 2
Edge 4 :2 1
Edge 5 :2 2
Edge 6 :2 3
Edge 7 :3 2
Edge 8 :4 2
Matrix representing graph edges :
1 0 0 0
1 0 1 0
0 1 1 1
0 0 1 0
0 0 1 0
Matching from Vm to Vn are :
0 -> 0
2 -> 1
1 -> 2
Maximum Matchings from Vm to Vn are : 3
```

4) **Example 4 – Makes Reassignments to improve efficiency**

```
PS C:\Users\sansk\Desktop\Sanskriti\College\GraphTheory\MaximalMatching> gcc MaximalMatching.c
PS C:\Users\sansk\Desktop\Sanskriti\College\GraphTheory\MaximalMatching> ./a.exe
Considering Bipartite Graph K(m,n) enter the values of (M N): 6 6
Number of edges :7
Enter Edge(V1 V2) with V1 belonging to Vm and V2 belonging to Vn
Edge 1 :0 1
Edge 2 :2 0
Edge 3 :2 3
Edge 4 :3 2
Edge 5 :4 2
Edge 6 :4 3
Edge 7 :5 5
Matrix representing graph edges :
0 1 0 0 0 0
0 0 0 0 0 0
1 0 0 1 0 0
0 0 1 0 0 0
0 0 1 1 0 0
0 0 0 0 0 1
Matching from Vm to Vn are :
2 -> 0
0 -> 1
3 -> 2
4 -> 3
5 -> 5
Maximum Matchings from Vm to Vn are : 5
```

5) Example 5

```
PS C:\Users\sansk\Desktop\Sanskriti\College\GraphTheory\MaximalMatching> ./a.exe
Considering Bipartite Graph K(m,n) enter the values of (M N): 4 3
Number of edges :5
Enter Edge(V1 V2) with V1 belonging to Vm and V2 belonging to Vn
Edge 1 :0 1
Edge 2 :1 1
Edge 3 :2 0
Edge 4 :2 2
Edge 5 :3 2
Matrix representing graph edges :
0 1 0
0 1 0
1 0 1
0 0 1
Matching from Vm to Vn are :
2 -> 0
0 -> 1
3 -> 2
Maximum Matchings from Vm to Vn are : 3
PS C:\Users\sansk\Desktop\Sanskriti\College\GraphTheory\MaximalMatching>
```