

Homework – 3

(Solution - Set)

Homework for Notes 16 - 17

21.1

	0	1	2	3	4	5
0	*	*	*	2.236	4.472	*
1	2.236	*	*	*	*	*
2	*	*	*	3.162	*	*
3	*	*	*	*	3	2.236
4	*	*	3.61	*	*	*
5	*	3.61	2.236	*	*	*

21.2

0	8.082	0-3-5-1	6.708	0-3-5-2	2.236	0-3	4.472	0-4	4.472	0-3-5
2.236	1-0	10	8.944	1-0-3-5-2	4.472	1-0-3	6.708	1-0-4	6.708	1-0-3-5
11.244	2-3-5-1-0	9.008	2-3-5-1	20	3.162	2-3	6.162	2-3-4	5.398	2-3-5
8.082	3-5-1-0	5.846	3-5-1	4.472	3-5-2	3	3	3-4	2.236	3-5
14.854	4-2-3-5-1-0	12.618	4-2-3-5-1	3.61	4-2	6.772	4-2-3	4	9.008	4-2-3-5
5.846	5-1-0	3.61	5-1	2.236	5-2	5.398	5-2-3	8.398	5-2-3-4	5

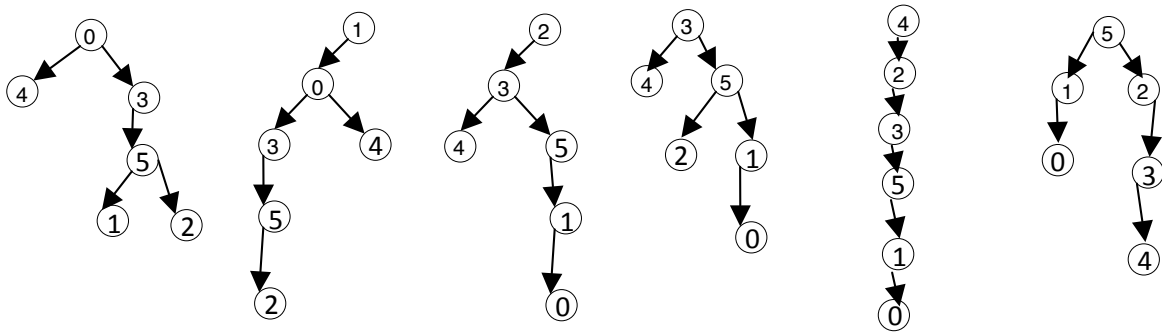
21.11

	P	W	NL	N		P	W	NL	N
P	-	53	54	48	P	-	W	NL	N
W	53	-	18	30	W	P	-	NL	NL
NL	54	18	-	12	NL	P	W	-	N
NL	48	30	12	-	NL	P	NL	NL	-

21.14

109	0	0	0	0	0	0	0	0	0	1
110	-	-	-	-	-	-	-	-	-	-
111	1	0	0	0	1	1	1	0	0	1
112	0	1	0	0	1	0	0	0	0	1
113	0	0	1	0	1	0	1	0	0	1
114	0	0	0	1	0	0	0	1	1	0
115	0	0	0	0	1	0	0	0	0	1
116	0	0	1	0	1	1	0	0	0	1
117	0	0	0	0	1	0	1	0	0	1
118	0	0	0	0	0	0	0	1	1	0
119	0	0	0	0	0	0	0	0	1	0
120	0	0	0	0	0	0	0	0	0	1
121	-	-	-	-	-	-	-	-	-	-
122										

21.41



21.42

opfw

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1 999.000000 0 999.000000 1 999.000000 2 2.236000 3 4.472000 4 999.000000 5
2 2.236000 0 999.000000 1 999.000000 2 999.000000 3 999.000000 4 999.000000 5
3 999.000000 0 999.000000 1 999.000000 2 3.162000 3 999.000000 4 999.000000 5
4 999.000000 0 999.000000 1 999.000000 2 999.000000 3 3.000000 4 2.236000 5
5 999.000000 0 999.000000 1 3.610000 2 999.000000 3 999.000000 4 999.000000 5
6 999.000000 0 3.610000 1 2.236000 2 999.000000 3 999.000000 4 999.000000 5
7 -----
8 999.000000 0 999.000000 1 999.000000 2 2.236000 3 4.472000 4 999.000000 5
9 2.236000 0 999.000000 1 999.000000 2 4.472000 0 6.708000 0 999.000000 5
10 999.000000 0 999.000000 1 999.000000 2 3.162000 3 999.000000 4 999.000000 5
11 999.000000 0 999.000000 1 999.000000 2 999.000000 3 3.000000 4 2.236000 5
12 999.000000 0 999.000000 1 3.610000 2 999.000000 3 999.000000 4 999.000000 5
13 999.000000 0 3.610000 1 2.236000 2 999.000000 3 999.000000 4 999.000000 5
14 -----
15 999.000000 0 999.000000 1 999.000000 2 2.236000 3 4.472000 4 999.000000 5
16 2.236000 0 999.000000 1 999.000000 2 4.472000 0 6.708000 0 999.000000 5
17 999.000000 0 999.000000 1 999.000000 2 3.162000 3 999.000000 4 999.000000 5
18 999.000000 0 999.000000 1 999.000000 2 999.000000 3 3.000000 4 2.236000 5
19 999.000000 0 999.000000 1 3.610000 2 999.000000 3 999.000000 4 999.000000 5
20 5.846000 1 3.610000 1 2.236000 2 8.082000 1 10.318000 1 999.000000 5
21 -----
22 999.000000 0 999.000000 1 999.000000 2 2.236000 3 4.472000 4 999.000000 5
23 2.236000 0 999.000000 1 999.000000 2 4.472000 0 6.708000 0 999.000000 5
24 999.000000 0 999.000000 1 999.000000 2 3.162000 3 999.000000 4 999.000000 5
25 999.000000 0 999.000000 1 999.000000 2 999.000000 3 3.000000 4 2.236000 5
26 999.000000 0 999.000000 1 3.610000 2 6.772000 2 999.000000 4 999.000000 5
27 5.846000 1 3.610000 1 2.236000 2 5.398000 2 10.318000 1 999.000000 5
28 -----
29 999.000000 0 999.000000 1 999.000000 2 2.236000 3 4.472000 4 4.472000 3
30 2.236000 0 999.000000 1 999.000000 2 4.472000 0 6.708000 0 6.708000 0
31 999.000000 0 999.000000 1 999.000000 2 3.162000 3 6.162000 3 5.398000 3
32 999.000000 0 999.000000 1 999.000000 2 999.000000 3 3.000000 4 2.236000 5
33 999.000000 0 999.000000 1 3.610000 2 6.772000 2 9.772000 2 9.008000 2
34 5.846000 1 3.610000 1 2.236000 2 5.398000 2 8.398000 2 7.634000 2
35 -----
36 999.000000 0 999.000000 1 8.082000 4 2.236000 3 4.472000 4 4.472000 3
37 2.236000 0 999.000000 1 10.318000 0 4.472000 0 6.708000 0 6.708000 0
38 999.000000 0 999.000000 1 9.772000 3 3.162000 3 6.162000 3 5.398000 3
39 999.000000 0 999.000000 1 6.610000 4 9.772000 4 3.000000 4 2.236000 5
40 999.000000 0 999.000000 1 3.610000 2 6.772000 2 9.772000 2 9.008000 2
41 5.846000 1 3.610000 1 2.236000 2 5.398000 2 8.398000 2 7.634000 2
42 -----
43 10.318000 3 8.082000 3 6.708000 3 2.236000 3 4.472000 4 4.472000 3
44 2.236000 0 10.318000 0 8.944000 0 4.472000 0 6.708000 0 6.708000 0
45 11.244000 3 9.008000 3 7.634000 3 3.162000 3 6.162000 3 5.398000 3
46 8.082000 5 5.846000 5 4.472000 5 7.634000 5 3.000000 4 2.236000 5
47 14.854000 2 12.618000 2 3.610000 2 6.772000 2 9.772000 2 9.008000 2
48 5.846000 1 3.610000 1 2.236000 2 5.398000 2 8.398000 2 7.634000 2
49 -----
50 Distance 10.318000 for 0 3 5 1 0
51 Distance 8.082000 for 0 3 5 1
52 Distance 6.708000 for 0 3 5 2
53 Distance 2.236000 for 0 3
54 Distance 4.472000 for 0 4
55 Distance 4.472000 for 0 3 5
56 Distance 2.236000 for 1 0
57 Distance 10.318000 for 1 0 3 5 1
58 Distance 8.944000 for 1 0 3 5 2
59 Distance 4.472000 for 1 0 3
60 Distance 6.708000 for 1 0 4
61 Distance 6.708000 for 1 0 3 5
62 Distance 11.244000 for 2 3 5 1 0
63 Distance 9.008000 for 2 3 5 1
64 Distance 7.634000 for 2 3 5 2
65 Distance 3.162000 for 2 3
66 Distance 6.162000 for 2 3 4
67 Distance 5.398000 for 2 3 5
68 Distance 8.082000 for 3 5 1 0
69 Distance 5.846000 for 3 5 1
70 Distance 4.472000 for 3 5 2
71 Distance 7.634000 for 3 5 2 3
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ggfw

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72 Distance 3.000000 for 3 4
73 Distance 2.236000 for 3 5
74 Distance 14.854000 for 4 2 3 5 1 0
75 Distance 12.618000 for 4 2 3 5 1
76 Distance 3.610000 for 4 2
77 Distance 6.772000 for 4 2 3
78 Distance 9.772000 for 4 2 3 4
79 Distance 9.008000 for 4 2 3 5
80 Distance 5.846000 for 5 1 0
81 Distance 3.610000 for 5 1
82 Distance 2.236000 for 5 2
83 Distance 5.398000 for 5 2 3
84 Distance 8.398000 for 5 2 3 4
85 Distance 7.634000 for 5 2 3 5
86
```

0-8	1-6	2-10	3-7	4-9	5-11
0-8	1-7	2-9	3-6	4-10	5-11
0-8	1-7	2-9	3-6	4-11	5-10
0-8	1-7	2-10	3-6	4-9	5-11

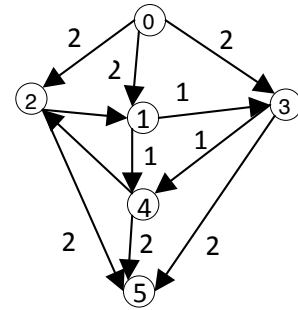
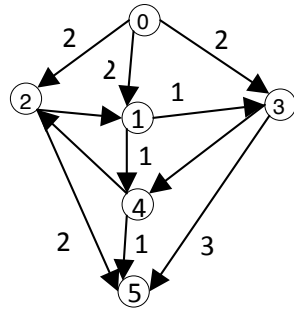
22.1

	Cap	Flow
0-1	2	2
0-2	3	3
0-3	2	2
1-2	1	-
1-3	1	1
1-4	1	1
2-4	1	1
2-5	2	2
3-4	2	-
3-5	3	3
4-5	2	2

Maxflow = 7 (only one flow is possible)

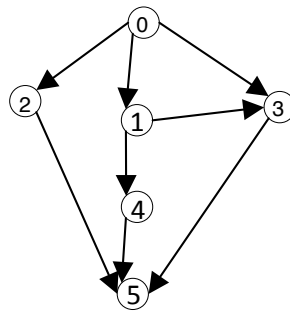
22.13

	Flow 1	Flow 2
0-1	2	2
0-2	2	2
0-3	2	2
1-3	1	1
1-4	1	1
2-1	-	-
2-5	2	2
3-4	-	1
3-5	3	2
4-2	-	-
4-5	1	2



Maxflow = 6

22.21



22.82

Matching with 5 edges will have too many solutions. We report only the matching with 6 edges here.

0-6	1-11	2-8	3-7	4-9	5-10
0-6	1-11	2-9	3-7	4-10	5-8
0-7	1-11	2-8	3-6	4-9	5-10
0-7	1-11	2-9	3-6	4-10	5-8
0-7	1-11	2-10	3-6	4-9	5-8
0-8	1-6	2-9	3-7	4-10	5-11