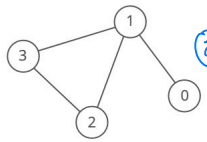
13) For each of the graph below, give its representation as an *edge list*, a *collection of adjacency lists*, and an *adjacency matrix*.

a)



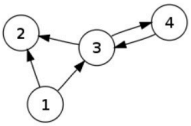
② $|E| = \{(0,1),(1,0),(1,2),(1,3),(2,1),(2,3),(3,1),(3,2)\}$

0 → [1]
1 → [0] → [2] → [3]
2 → [1] → [3]
3 → [1] → [2]

	0	1	2	3
0	0	1	0	0
1	1	0	1	1
2	0	1	0	1
3	0	1	1	0

✓ symmetric

b)

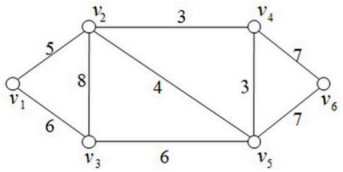


⑥ $|E| = \{(1,2),(1,3),(3,2),(3,4),(4,3)\}$

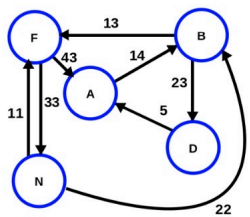
1 → [2] → [3]
2 →
3 → [2] → [4]
4 → [3]

	1	2	3	4
1	0	1	1	0
2	0	0	0	0
3	0	1	0	1
4	0	0	1	0

c)



d)



undirected (E2)

(c) $|E| = \{(v_1, v_2, 5), (v_1, v_3, 6), (v_2, v_3, 8), (v_2, v_4, 4), (v_3, v_5, 6), (v_4, v_6, 7), (v_5, v_6, 7), (v_5, v_4, 3)$

	1	2	3	4	5	6
1	0	5	6	0	0	0
2	5	0	8	3	4	0
3	6	8	0	0	6	0
4	0	3	0	0	3	7
5	0	4	6	3	0	7
6	0	0	0	7	7	0

v_1: $v_2(5)$, $v_3(6)$
v_2: $v_1(5)$, $v_3(8)$, $v_4(3)$, $v_5(4)$
v_3: $v_1(6)$, $v_2(8)$, $v_5(6)$
v_4: $v_2(3)$, $v_5(3)$, $v_6(7)$
v_5: $v_2(4)$, $v_3(6)$, $v_4(3)$, $v_6(7)$
v_6: $v_4(7)$, $v_5(7)$

(d) $|E| = \{(A, B, 14), (B, D, 23), (B, F, 13), (D, A, 5), (F, A, 43), (F, N, 33), (N, F, 11), (N, B, 22)\}$

	A	B	D	F	N
A	0	14	0	0	0
B	0	0	23	13	0
D	5	0	0	0	0
F	43	0	0	0	33
N	0	22	0	11	0