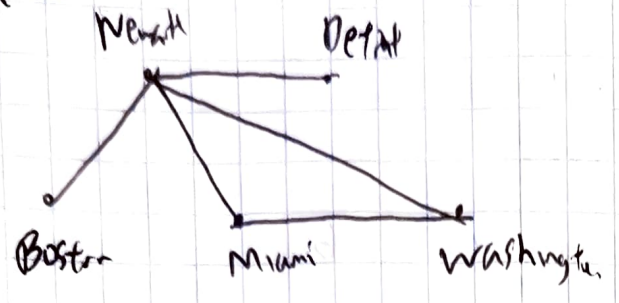
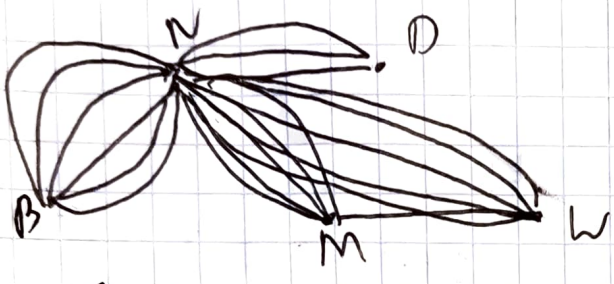
Homework 10.1-10.5 Graphs

Owen Yin

1. a.

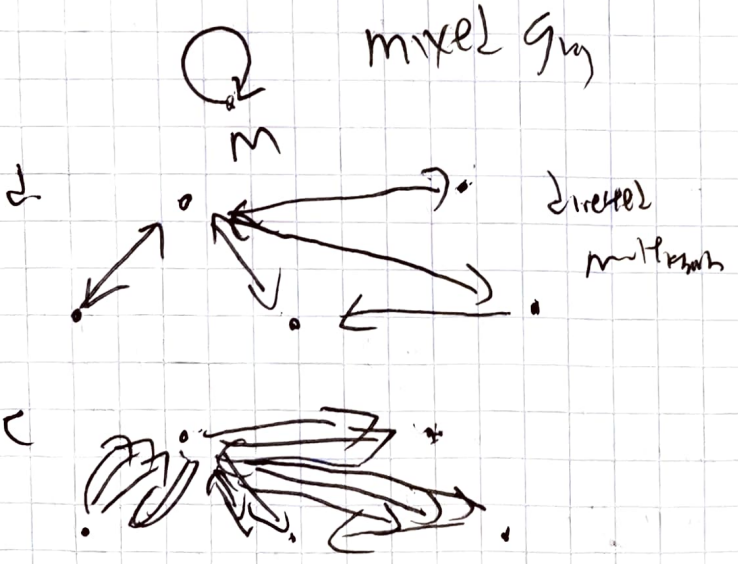


Psuedograph



Psuedograph

c. Same thing but mixed graph



directed multigraph

2. Directed, no loops, no multi edges

3

Undirected edges

~~loops~~

~~Psuedo graph~~ Simple graph

4. Undirected edges

loops

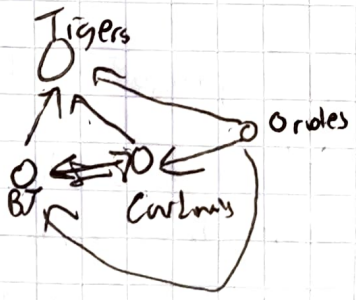
multi edges

Psuedograph

5. Psuedograph

6. multigraph

21.



David Yang

10.2

1.

6 vertices

6 edges

a: 2, b: 4, c: 1

d: 0, e: 2, f: 3

Isolated: d

Pendant: c

2.

5 vertices

13 edges

a: 6, b: 6, c: 6

d: 5, e: 3

no isolated or pendant

3.

9 vertices

11 edges

a: 3, b: 2, c: 4

d: 0, e: 6, f: 0, i: 3,

h: 2, g: 4.

Isolated: d, f.

4.

2+4+1+2+3 = 12

2·6 = 12

6+6+6+5+3 = 26

2·13 = 26

3+2+4+6+3+2+4 = 22

11·2 = 22

18.

It's impossible to have

N-1 and 0 degrees.

Therefore by pigeon hole principle

a graph of N nodes with N-1 choices

will have a duplicate

27.

by Hall's theorem every subset

of workers has more or equal neighbors

to jobs. Therefore it exists.

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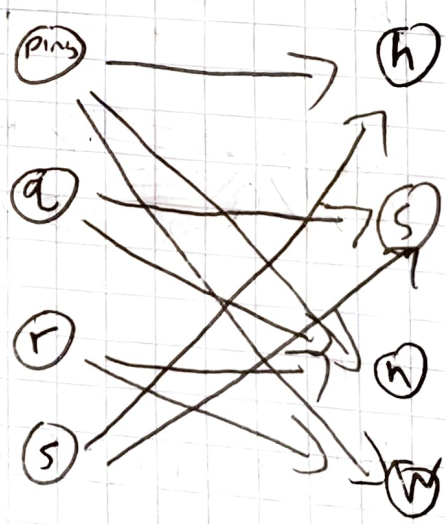


Dang Yang

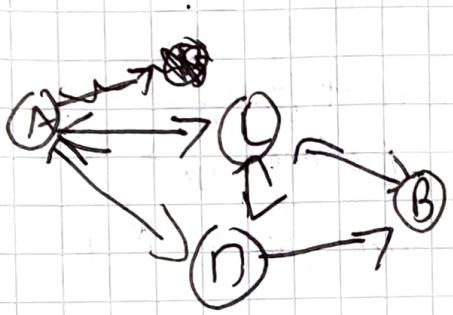
hw3

3:
a: a, b, c, d
b: d
c: a, b.
d: b, c, d

7. a b c d

	a	b	c	d
a	1	1	1	1
b	0	0	0	0
c	1	1	0	0
d	0	1	1	1

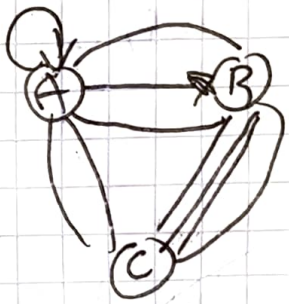
11.



13

	a	b	c	d	e
a	0	1	0	1	0
b	1	0	0	1	1
c	0	0	0	1	1
d	1	1	1		
e	0	1	1	0	0

16



24a

In an undirected graph, the sum of the entries in the column represents the number of edges connected to the node for the column

In a directed graph it represents how many ~~nodes~~ edges go to the column in that direction

c.

In left graph.

Degree 2: 2 nodes

In right graph

Degree 2: 3 nodes.

Therefore the two graphs are not isomorphic

Daniel Yang

10.4

1.

a. Yes. ~~Circuit~~. 5 len.

b. no. impossible to go from c→a

c. no, impossible. b→a impossible

d. Yes, Circuit, length 6.

4. Yes but my eyes hurt now

11. ~~no, yes~~

a. not strongly (a cannot go to d) but yes weakly

b. not strongly (c cannot go to b) but yes weakly

14.

a. abe, d, c

b. cde, b, a, f

21.

In graph H, there are 2 circuits with length 4.

G does not have any circuits of length 4.

Therefore G and H are not isomorphic

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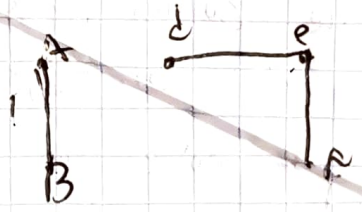
C is the only cut vertex.



David Yang

10.5

1. no ecircuit because b has an odd degree

epath no because abc all have 3 degree.

4.

no, there are odd degree

Yes.

ABCEDBFEAF

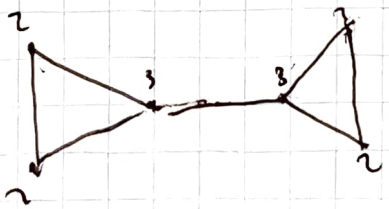
14

no circuit.

~~Yes~~ no PATH.

30

There is no circuit.



Since ▷ is a hamiltonian circuit. and a hamiltonian circuit cannot have smaller circuits, there is no

3. no ecircuit because a has degree 3.

Yes because all have degree 3 and the rest are even.

ABEBDCECA

B, Yes.

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Yes.

ABCFDE