Assignment 14

9.3

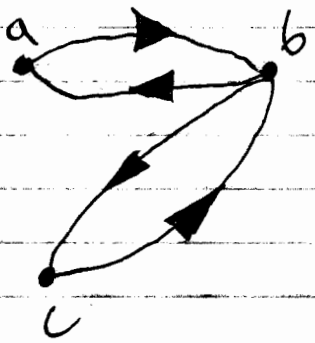
2)

vertex	adjacent vertices
a	b, d
b	a, d, e
c	d, e
d	a, b, c
e	b, c

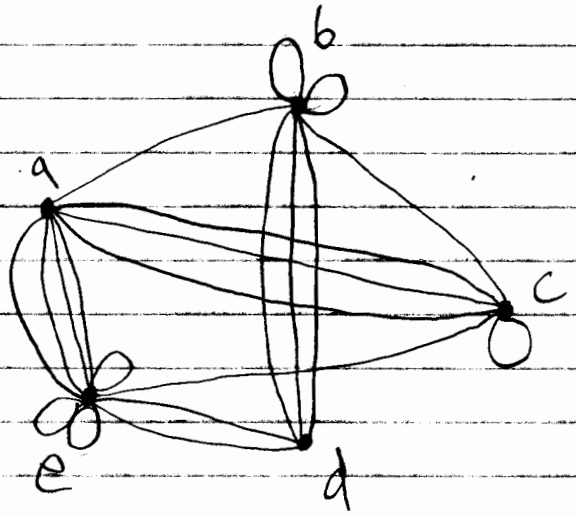
4)

initial vertex	terminal vertices
a	b, d
b	a, c, e, d
c	c
d	a, e
e	c, e

10)



18)



26) Ex.1

	(a,b)	(a,d)	(a,c)	(b,d)	(c,d)
a	1	1	1	0	0
b	1	0	0	1	0
c	0	0	1	0	1
d	0	1	0	1	1

→

Ex. 2

	(a,b)	(a,d)	(b,d)	(b,e)	(c,d)	(c,e)
a	1	1	0	0	0	0
b	1	0	1	1	0	0
c	0	0	0	0	1	1
d	0	1	1	0	1	0
e	0	0	0	1	0	1

28) deg(v) : the number of edges the vertex has.

deg+(v) : the out-degree of the vertex.

54) a) 2 graphs b) 4 graphs c) 11 graphs

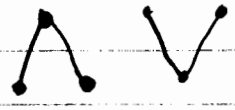
9.4

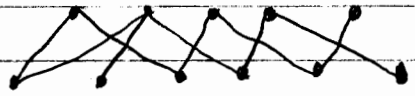
2) a) Simple path of length 4. Simple, not a circuit

b) Path of length 4. not simple, not a circuit

4) Not a path

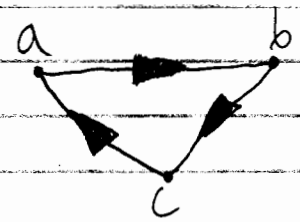
d) Not a path

6) Ex. 3) 3 connected components 

Ex. 4) 1 connected component 

Ex. 5) 2 connected components 

10/ When that actor and Kevin Bacon have worked together in a movie or when that actor has worked with another actor who has worked with Kevin Bacon.

16/ 

So, if you can get from a to b and b to a, and a directed path from a to b passes through c, then you can get to a to c.

26/ BC. Graph with 1 vertex has 0 edges.

IH. Let n be a positive integer and suppose any connected graph with n vertices has atleast $n-1$ edges.

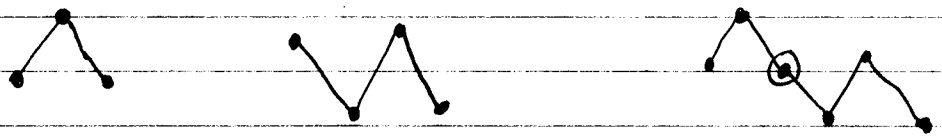
RC. Let G be a connected graph with $n+1$ vertices and v be a vertex of G. Remove v and all incident edges to v from G. The resulting graph, G' has say s components where $1 \leq s \leq n$. For each component, if the component has n vertices then it has atleast $n-1$ edges. Thus G' has atleast $n-s$ edges. For each component in G' there must be an edge from v to a vertex since G was connected. Thus there must be atleast s more edges in G tha in G'.

So edges $= (n-s)+s = n$

$n = (n+1)$ So, edges $= n-1$

38| Ex. 7|

40| G_1 G_2 $G_1 \cup G_2$



So, it G_1 and G_2 are seperate graphs then $G_1 \cup G_2$ has to have one common vertex in order for the result to be connected. If they didn't have a common vertex then the result couldn't be connected.