10.1

Exercise 4

this graph has undirected edges, and no loop
so this graph is a multigraph

Exercise 6

this graph has undirected edges, and no loop
so this graph is a multigraph

Exercise 8

this graph has directed edges,and it have loop
so that graph is a directed multigraph

Exercise 12

R=(u,v)
let $(b, a) \in R$ first ,because that is undirected so wecan get an edge (b,a)$\in R$
that shown R is symmetric.
and $(a, a) \in R$ is also available for this graph, so that is reflexive
so R is summetric and reflexive

Exercise 24

three calls from 555-0011 to 555-8888

two calls from 555-8888 to 555-0011

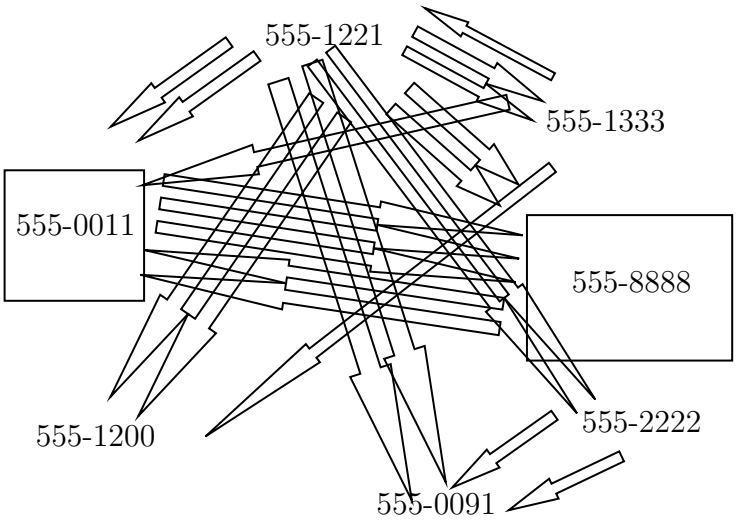
two calls from 555-2222 to 555-0091

two calls from 555-1221 to each other number

one call from 555-1333 to 555-0011

one call from 555-1333 to 555-1221

one call from 555-1333 to 555-1200



10.2

Exercise 4

the sum=2 * number of edges

a)

deg(a)=2,deg(b)=4,deg(c)=1,deg(d)=0,deg(e)=2,deg(f)=3

so the sum is 6*2=12

b)

deg(a)=4+2(loop)=6,deg(b)=6,deg(c)=4+2(loop)=6,deg(d)=5,deg(e)=3

so the sum is 2*13=26

c)

deg(a)=3,deg(b)=2,deg(c)=4,deg(d)=0,deg(e)=6,deg(g)=4,deg(h)=2,deg(i)=3,deg(f)=0

so the sum is 2*12=24

Exercise 10

the sum of the in = the sum of the out = the number of egdes of the graph.

a)

in(a)=3,out(a)=1

in(b)=1,out(b)=2

in(c)=2,out(c)=1

in(d)=1,out(d)=3

in(sum)=7,out(sum)=7

so the number of edges of the graph=7

b)
in(a)=2,out(a)=2
in(b)=3,out(b)=4
in(c)=2,out(c)=1
in(d)=1,out(d)=1
in(sum)=8,out(sum)=8
so the number of edges of the graph=8

c)
in(a)=6,out(a)=1
in(b)=1,out(b)=5
in(c)=2,out(c)=5
in(d)=4,out(d)=2
in(e)=0,out(e)=0
in(sum)=13,out(sum)=13
so the number of edges of the graph=13

Exercise 26

K_n n=1 and n=2
C_n n be the even number
W_n no values n
Q_n all number bigger than 2

Exercise 28

a)

V_1=Zamora,Agraharam,Smith,Chou.Macintyre

V_2=Planning,Publicity,Sales,Marketing,Development,Industry relations

E=(Zamora,Planning),(Zamora,Sales),(Zamora,Marketing),(Zamora,Industry relations),(Agraharam,Planning), (Agraharam,Development),(Smith,Sales),(Smith,Publicity),(Smi relations),(Chou,sales),(Chou,Publicity) (Chou,Industry relations),(Macintyre,Planning),(Macintyr relations)

b)

Zamora-Marketing

Agraharam-Development

Smith-Publicity

Chou-Sales

Macintyre-Planning

but the match can be vary

c)

the answer of (b) is the complete matching, and max matching

becasue the complete matching always be the max matching

10.3

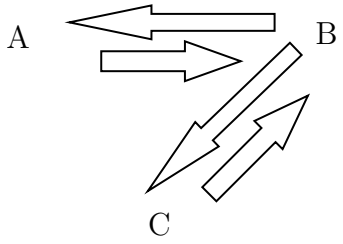
Exercise 6

$$\begin{bmatrix} 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 & 1 \\ 1 & 1 & 1 & 0 & 0 \\ 0 & 1 & 1 & 0 & 0 \end{bmatrix}$$

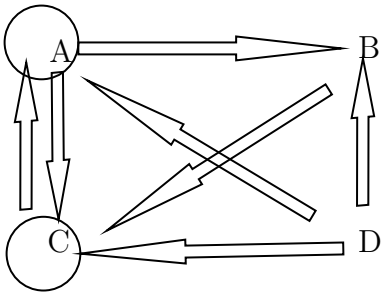
Exercise 8

$$\begin{bmatrix} 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 & 1 \\ 0 & 1 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & 1 \end{bmatrix}$$

Exercise 10



Exercise 12



Exercise 26

a)

number of edges= 5, the vertices number=6

so that is $\frac{5*2}{6*5} = \frac{10}{30} = \frac{1}{3}$

b)

number of edges= 24, the vertices number=16

so that is $\frac{2*24}{16*15} = \frac{48}{240} = \frac{1}{5}$

c)

number of edges=12 , the vertices number=8

so that is $\frac{12*2}{8*7} = \frac{24}{56} = \frac{3}{7}$