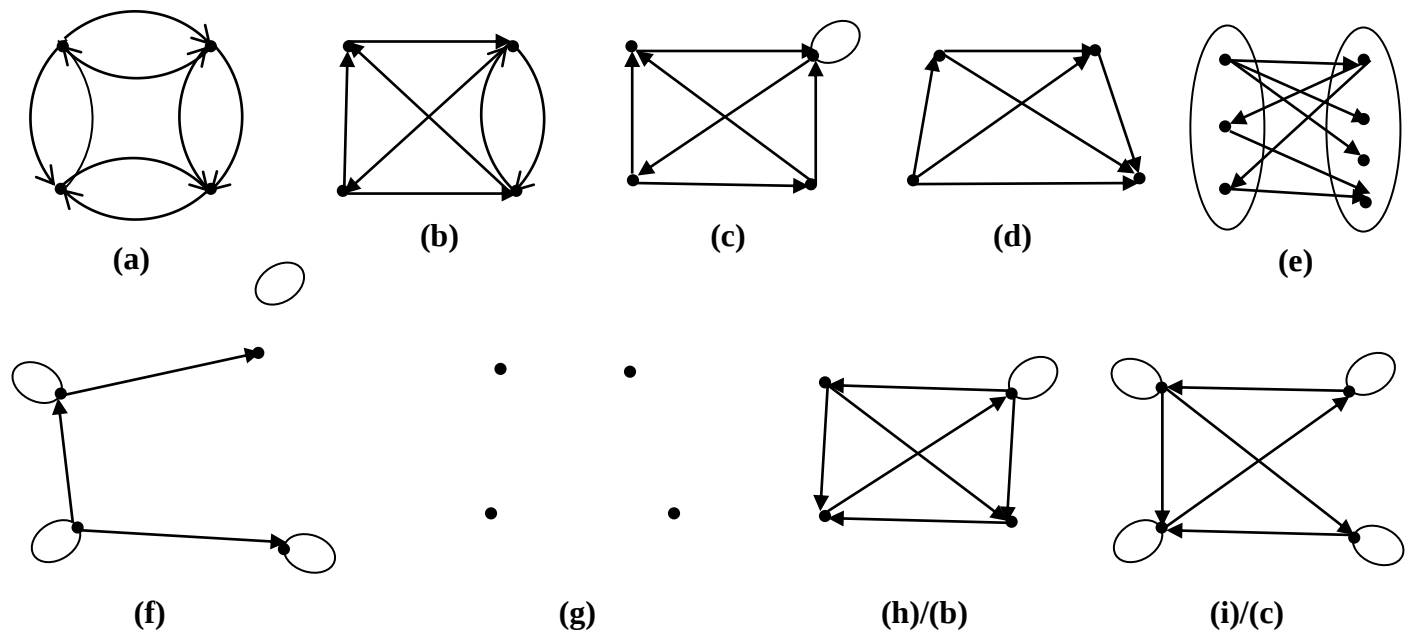


TUTORIALS - SERIES NO. 03

EXERCISE N° 01

Study the characteristics of each of the graphs below:



EXERCISE N° 02

Let the graph $G(X, U)$ be such that:

$$X = \{1, 3, 5, 12, 20, 9, 15, 24, 36, 90\}$$

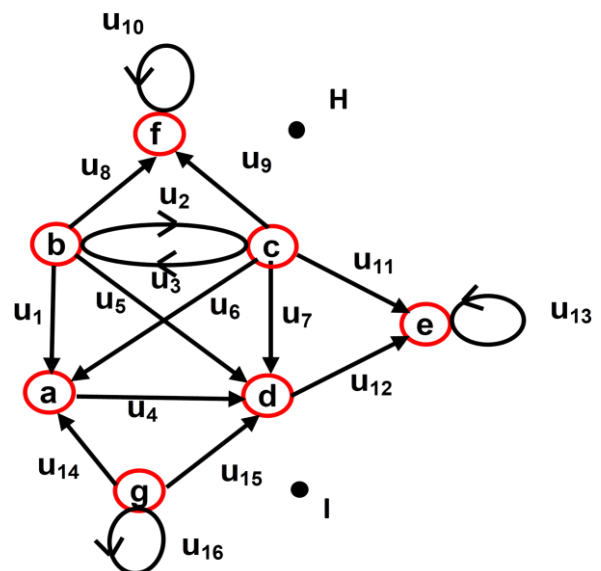
$$U = \{ (x, y) / (x, y) \in U \text{ if } x \text{ is multiple of } y \}$$

1. Plot the graph G .
2. Study the characteristics of G
3. What can be said about the “multiple” relationship?
4. Are there any circuits in G ?

EXERCISE N° 03

Given the following graph $G(X, U)$:

1. Represent the graph using a dynamic methods following:
 - a) Dynamic list of vertices
 - b) Dynamic list of arcs
2. Is the graph G simply connected?
Is it strongly connected?
3. Give the simply connected components SCC of G
4. Give the strongly connected components Str.CC of G



EXERCISE N° 04

A company directors' board is composed of nine (09) members: Mrs. A, B, C, D, E, F and Ms. G, H and I. Each of these people influences a certain number of their colleagues as shown in the table below:

Mr or Mrs	Influence
HAS	B, C, F
B	C, E, I
C	E, G, D
D	A, B, E, F, G, I
E	None
F	THIS
G	A, B, E
H	A, C, E
I	G, H

1. Represent the influence game within this council using a graph
2. Give the adjacency matrix of the resulting graph.

EXERCISE N° 05

Let the following two matrices defined as follows:

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

	u1	u2	u3	u4	u5	u6	u7	u8	u9	u10	u11	u12
1	+1	+1	+1	0	0	0	0	0	0	0	0	0
2	-1	0	0	+1	0	-1	+1	0	0	0	0	0
3	0	-1	0	-1	+1	0	0	0	2	0	+1	0
4	0	0	-1	0	-1	+1	0	-1	0	0	0	0
5	0	0	0	0	0	0	-1	+1	0	2	0	0
6	0	0	0	0	0	0	0	0	0	0	-1	2

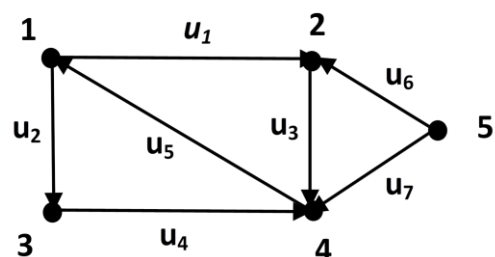
1. Plot the graphs corresponding to the previous matrices
2. Are the resulting graphs connected? Are they strongly connected?

EXERCISE N° 06

Let $G(X, U)$ be a graph with:

$X = \{1, 2, 3, 4, 5\}$; $U = \{u_1, u_2, u_3, u_4, u_5, u_6, u_7\}$

1. Give the adjacency matrix $M(G)$
2. Give the path length matrix: $M^{(2)}$
3. Give the distance matrix D



GOOD LUCK