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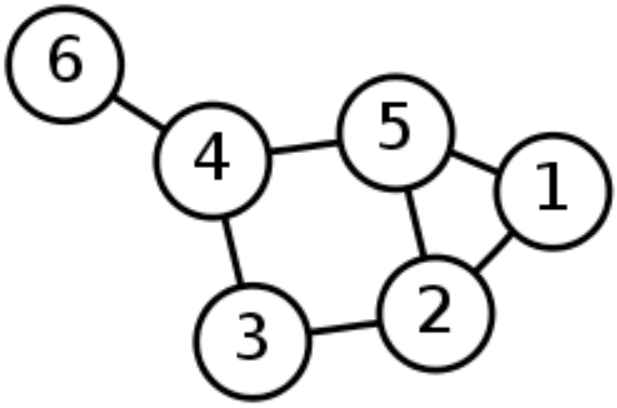
Homework Submission 8
02/23/2016

CST 370
Homework (Graphs)

1. Consider the graph shown below.



Represent the graph by
a) an adjacency matrix
b) an edge list

a.

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

Edge list as shown by Code School Video

b.

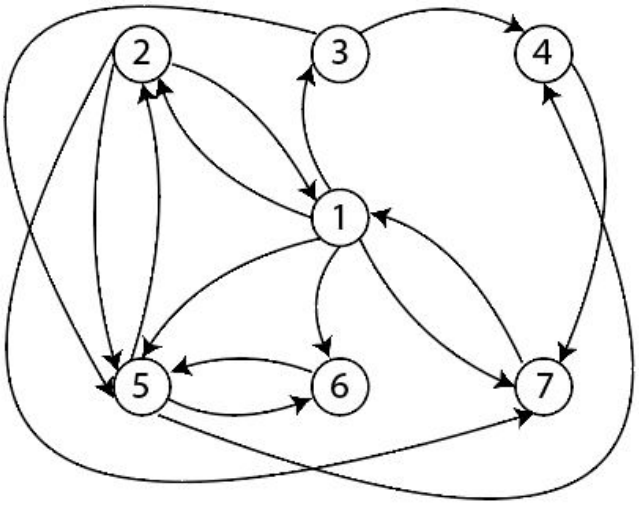
1	2
1	5
2	3
2	5
5	4
4	3
4	6

Edge list as shown on Coursera Video

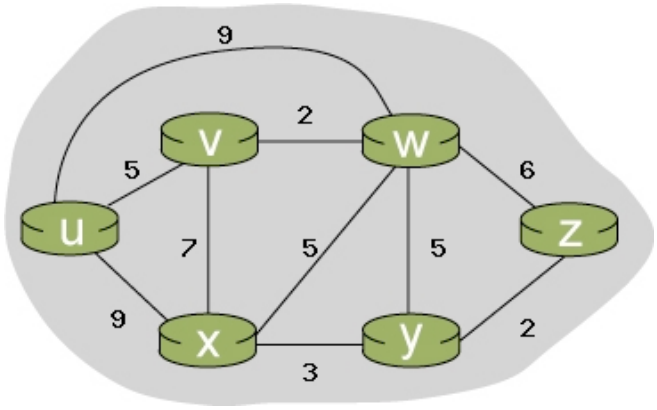
1 -> 2 -> 5
2 -> 1 -> 3 -> 5
3 -> 2 -> 4
4 -> 3 -> 5 -> 6
5 -> 1 -> 2 -> 4
6 -> 4

2. Consider the adjacency matrix given below. Draw the graph based on the adjacency matrix.

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



3. Consider the graph shown below.



Determine the shortest paths from

a) U to all other nodes in the network using Dijkstra's algorithm. Clearly show all the steps of the algorithm.

	From u ->	v	w	x	y	z
step 1	u	5u	9u	9u	∞	∞
step 2	v	5u	7v	9u	∞	∞
step 3	w	5u	7v	9u	12w	13w
step 4	x	5u	7v	9u	12w	13w
step 5	y	5u	7v	9u	12w	13w
step 6	z	5u	7v	9u	12w	13w

b) V to all other nodes in the network using Dijkstra's algorithm. Clearly show all the steps of the algorithm.

	from v ->	u	w	x	y	z
step 1	v	5v	2v	7v	∞	∞
step 2	w	5v	2v	7v	7w	8w
step 3	u	5v	2v	7v	7w	8w
step 4	x	5v	2v	7v	7w	8w
step 5	y	5v	2v	7v	7w	8w
step 6	z	5v	2v	7v	7w	8w