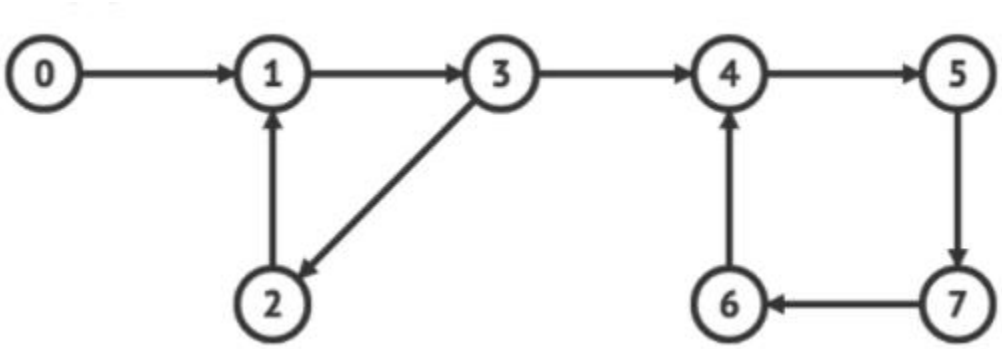
20125038 -Lê Nguyễn Quang Minh

3.1. Assignment 1 – Paper assignment

1. Given the following graph:

a. Write down the adjacency-matrix representation.



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

b. Write down the edge-list representation.

0 -1

1-3

2-1

3-2

3-4

4-5

5-7

7-6

6-4

c. Write down the adjacency-list representation.

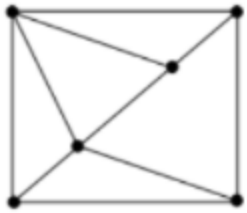
0 : {1}
1 : {3}
2 : {1}
3 : {2, 4}
4 : {5}
5 : {7}
6 : {4}
7 : {6}

2. Give an adjacency-list representation for a complete binary tree on 7 vertices. Give an equivalent adjacency-matrix representation. Assume that vertices are numbered from 1 to 7 as in a binary heap.

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

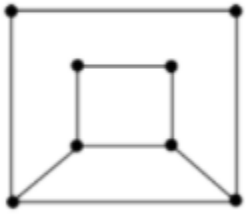
3. For each of the following graphs, either find an Eulerian circuit or prove that there is not One

G_1



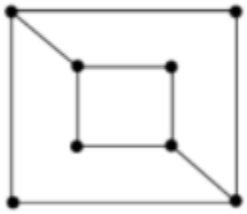
It is not Eulerian circuit because we can find some vertices having odd degree.

G_2



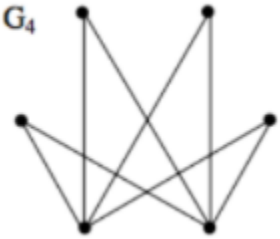
It is not Eulerian circuit because we can find some vertices having odd degree

G_3



It is not Eulerian circuit because we can find some vertices having odd degree

G_4

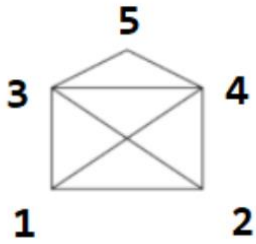


It is Eulerian circuit

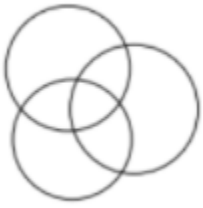
4. Find out if the following figures can be drawn without lifting the pencil from the paper and without repeating any line.

It is not Eulerian Circle so we can not be drawn without lifting the pencil from the paper and without repeating any line.

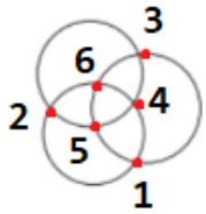
It is Eulerian Circle because It has only 2 odd degree so we can be drawn without lifting the pencil from the paper and without repeating any line.



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



It is an Eulerian circle so we can draw



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