

Basics of Graph Theory

Exercise 10:

In a social network, friends share common interests with each other. If **A** shares the same interests as **B**, and **B** shares the same interests as **C**, then **A** also shares the same interests as **C**. The following table represents for each person the friends with whom they share the same common interests.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Interest with	1,5	2,3,4	0	2,4	0	6,9,10	4,7,8	4	7	10	-	9,10	8,10,14	12	13

- Identify the groups of people who share common interests (Two individuals, **A** and **B**, belong to the same group if **A** shares the same interests as **B**, and vice versa.)?

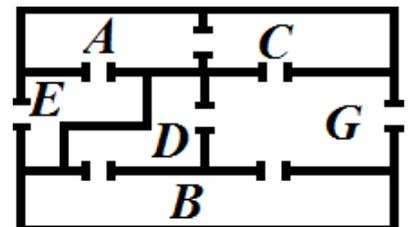
Exercise 11:

Draw a graph of order at least 5 that is:

1. Hamiltonian and Eulerian
2. Hamiltonian and non-Eulerian
3. Non-Hamiltonian and Eulerian
4. Non-Hamiltonian and non-Eulerian

Exercise 12:

An establishment has 6 rooms (**A**, **B**, **C**, **D**, **E**), and a guardian, who is stationed in room **G**, must visit all the rooms and inspect each door exactly once.



1. Model this scenario using a graph.
2. State the condition required for the guardian to inspect all the doors and return to room **G**.
3. State the condition required for the guardian to inspect all the doors without returning to room **G**.
4. Can the guardian start from room **G**, inspect all the doors, and return to **G**? Why?
5. Propose a walk for the guardian to follow.

Exercise 13:

Is it possible to draw a continuous curve, without lifting the pencil that crosses each of the 16 segments in the figure exactly once?

