

CSE 2321 WorkSheet 7

(Prof. Baha Alzalg)

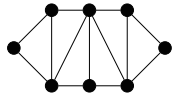
April 20, 2022

Question 1.

[5 points] In the classroom, we mentioned that having the same number of vertices, the same number of edges, the same degree lists, and the same number of connected components is not a guarantee that two graphs will be isomorphic. Draw two non-isomorphic graphs that support this claim.

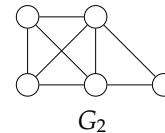
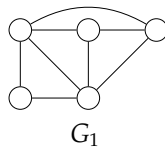
Question 2.

[2 points] Find a spanning tree for the following graph so that no vertex has a degree of 4.



Question 3.

[4 points] Are the graphs G_1 and G_2 shown below isomorphic? Why or why not?



Question 4.

[1+2+2 points] Determine whether each of the following sequences is a degree sequence of a graph? Answer by 'yes' or 'no' and justify your answer.

1. (1, 2, 3, 3, 4, 5, 5).

2. (0, 0, 1, 1, 1, 1, 4, 4).

3. (0, 2, 2, 2, 2, 4, 4, 4).

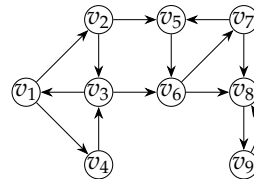
Question 5.

[3 points] Give an undirected graph with 5 vertices, all of which must be at least degree 3. It must have an Eulerian cycle and a Hamiltonian cycle. Can you give another undirected graph?

Question 6.

[4 points]

Find the strongly connected components of the di-graph shown to the right.

**Question 7.**

[5 points] Consider the following statement:

“Any graph with a vertex of degree d is $d + 1$ -colorable”.

Is this statement true or false? If it is false, explain why.