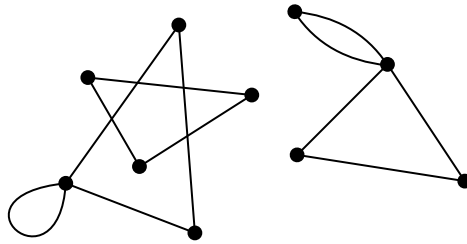
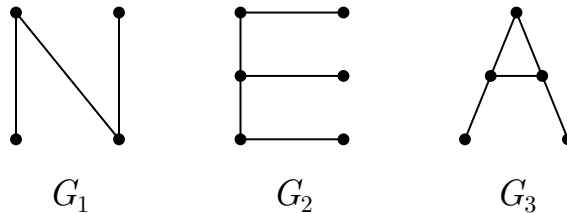


2. CONNECTIVITY

1. Determine whether the following multigraph is connected or not. (If not, give the number of components.)



2. Which of the following graphs are isomorphic to their complement?



3. G is a graph with degree sequence $1, 1, 1, 2, 2, 2, 5$. How many edges does \bar{G} have? (\bar{G} denotes the complement of G .)
4. In a graph G precisely two vertices have odd degree. Prove that there exists a path between these vertices in G .
5. Prove that G or \bar{G} is connected, for any graph G .
6. Prove that if G has $2n$ vertices and every vertex of G has degree at least n , then G is connected.
7. Prove that in a connected graph two longest paths always have a common vertex.
8. Prove that if in a graph G every vertex has degree at least 2, then G contains a cycle.
- 9.⁺ Prove that if in a graph G every vertex has degree at least 3, then G contains an even cycle.