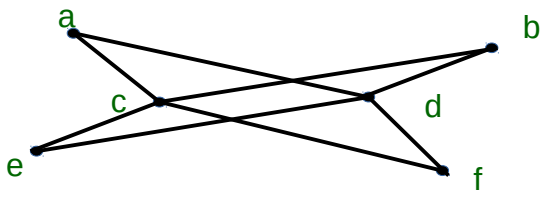
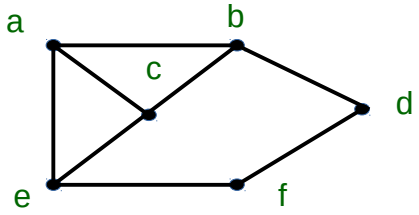
CSI 35 **Chapter 13 review** **ZyBooks**

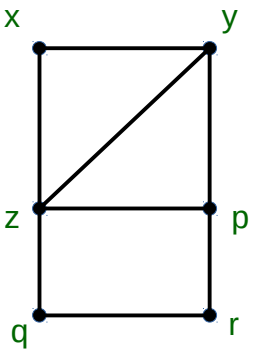
1. Consider the following graph:



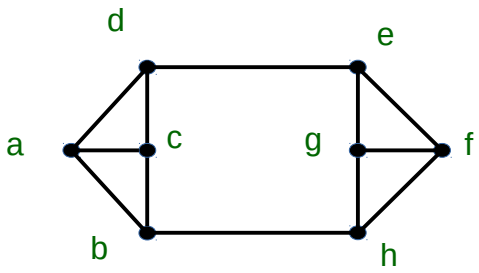
Is it possible to color the vertices with two colors, so that no two adjacent vertices have the same color?

2. Determine whether the given pair of graphs is isomorphic:

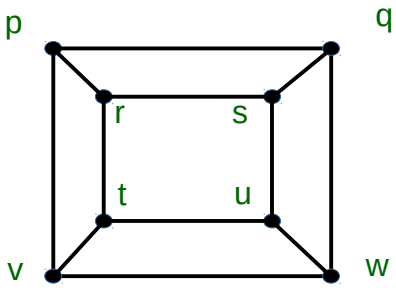




3. Determine whether the given pair of graphs is isomorphic. If they are, give an isomorphism.



G



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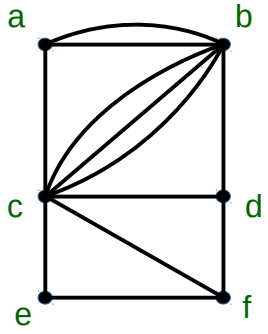
4. Two graphs, **G** and **H** are given by their matrix representations. Determine whether the graphs are isomorphic.

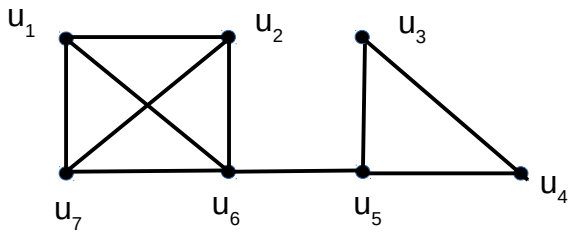
$$M_G = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 0 \end{bmatrix} \qquad M_H = \begin{bmatrix} 1 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \end{bmatrix}$$

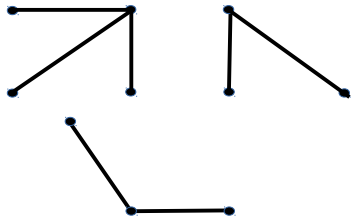
5. For the given undirected graph, give its:
- adjacency list representation, and
- matrix representation

to think about:
How to represent multiple edges?

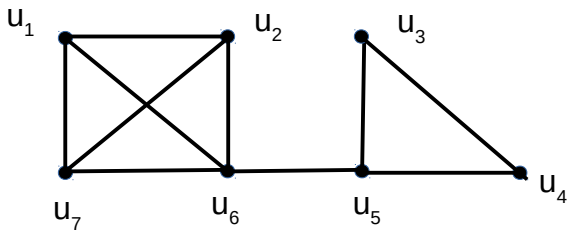


6. Determine whether the given undirected graphs are connected.

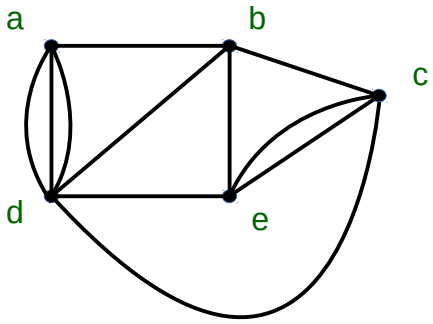




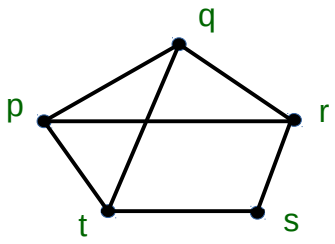
7. Determine whether the given undirected connected graph has a *cut vertex* (*articulation point*) and/or a *cut edge* (*bridge*).



8. Determine whether the given connected undirected graph has Euler circuit? Euler trail?



9. Determine whether the given connected undirected graph has Hamilton cycle? Hamilton path?



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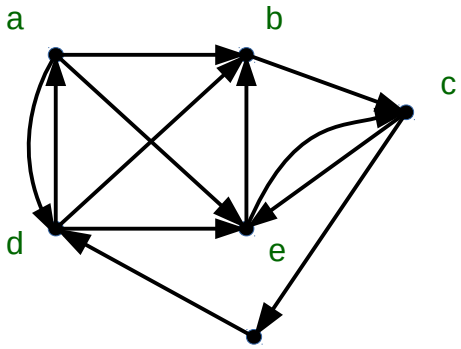
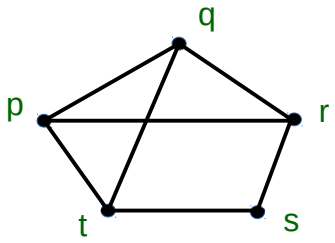
10. Determine whether the given connected directed graph has Hamilton cycle? Hamilton path?



11. Determine if the graph is planar. If it is not, does it have a planar representation?



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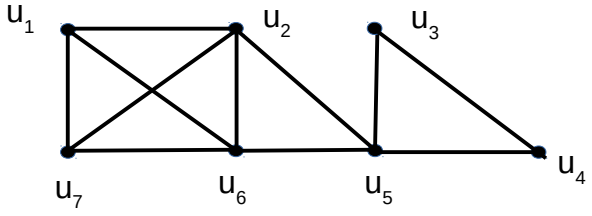
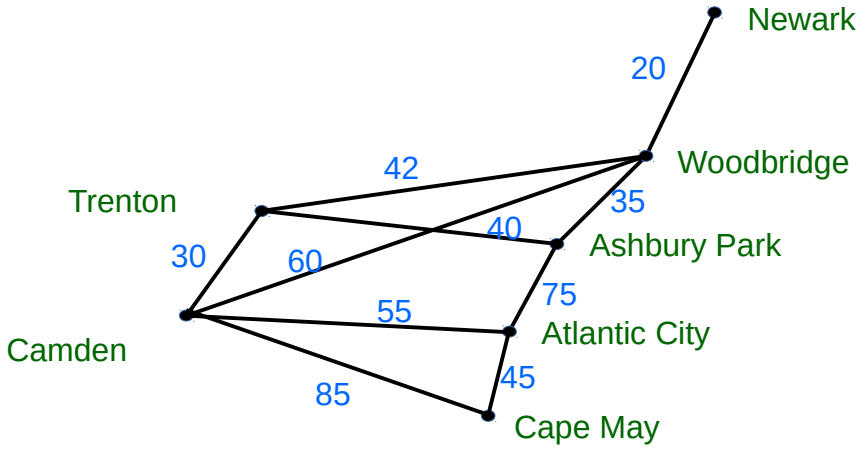
12. Find the chromatic number of the given graph G, $\chi(G)$.

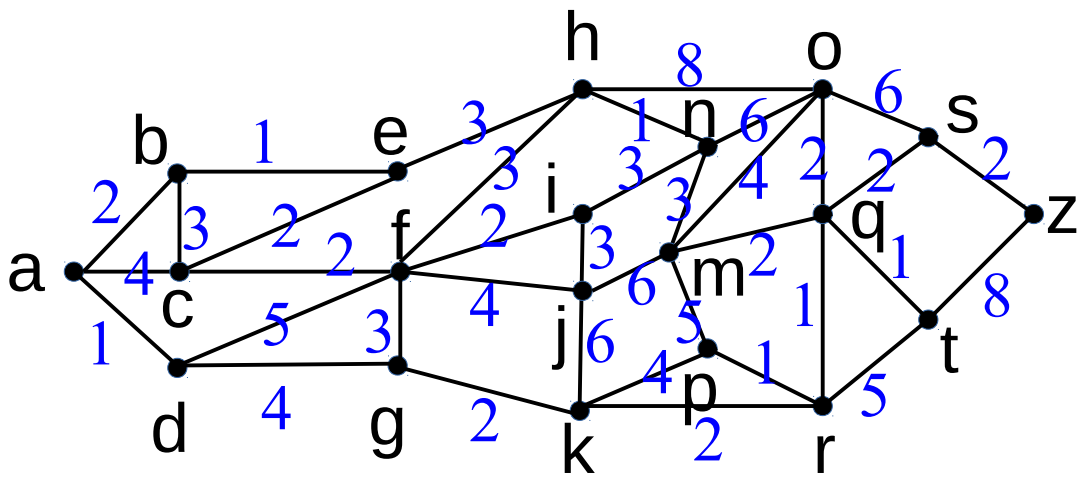


G

13. Find the shortest (in miles) route from Camden city to Newark city.



14. Find the shortest path from a to z in the given graph G., using Dijkstra's algorithm for weighted graphs.



G

15. How many edges are in K_5? Is K_5 a regular graph?

16. Is it possible to have a 3-regular graph with five vertices?
If such a graph is possible, draw an example. If such a graph is not possible, explain why not.

17. What is the longest possible walk in a graph with n vertices?

18. What is the longest possible cycle in a graph with n vertices?

19. Is K_6 planar?