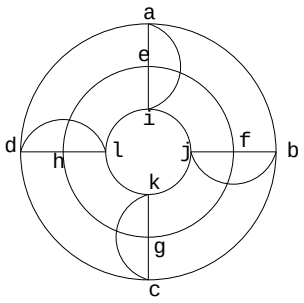
CS 310
Homework Assignment No. 5
Due on Tue 2/25/2003

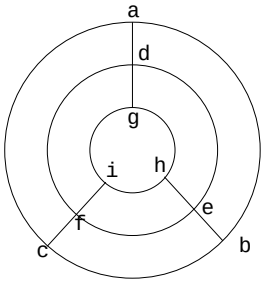
1. Assume that the 26 (capital) letters of the English alphabet

{A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z}

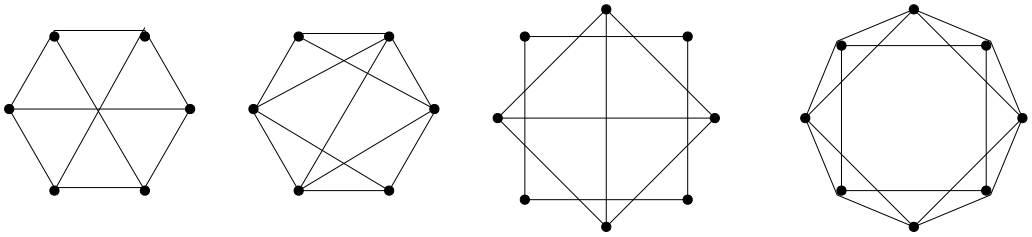
are represented as graphs with a vertex at each endpoint, corner or intersection point. Classify them by homeomorphism. How many classes of graph-homeomorphic letters are there?

2. For each of the following graphs find an Euler cycle and a Hamiltonian cycle, or prove that there is none.





3. For each of the following graphs draw a planar representation or show that it has a subgraph homeomorphic to K_5 or $K_{3,3}$:



4. In each of the following cases draw a connected simple planar graph with the given characteristics, or prove that none exists:
(a) 4 vertices all of degree 3, 4 faces.
(b) 4 vertices, 6 edges, 5 faces.
(c) 4 vertices all of degree 4.
(d) 6 vertices all of degree 3, 5 faces.

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5. Write the adjacency matrix and the incidence matrix of the following graph: