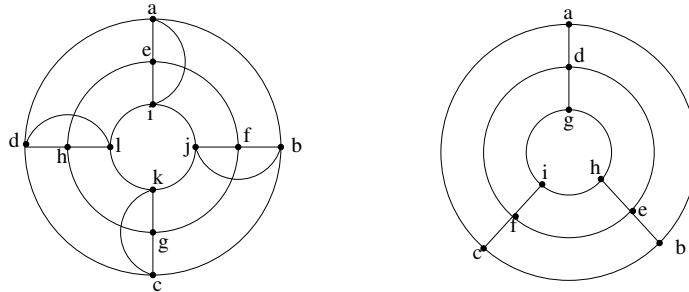
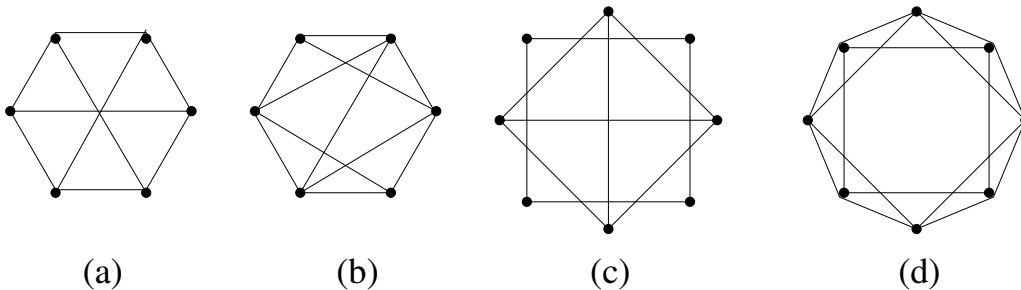


CS 310
Homework Assignment No. 6
 Due on Tue 5/18/2005

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



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



3. 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.
4. Nine coins are identical in appearance, but one is heavier than the others, which all weigh the same. Draw a decision tree that gives an algorithm that identifies the bad coin using only a pan balance.
5. Make a binary search tree for the following set of data in lexicographic order:

MAKE A BINARY SEARCH TREE FOR THE FOLLOWING SET OF DATA IN
 LEXICOGRAPHIC ORDER

(next page →)

6. Find the optimal Huffman code for the following table of symbols:

character	frequency
<i>a</i>	5
<i>b</i>	10
<i>c</i>	13
<i>d</i>	14
<i>e</i>	25
<i>f</i>	33

In order to avoid multiple solutions (and make things easier for the grader), after constructing the binary tree associated to the optimal Huffman code assign always “1” to the branch that goes from a vertex to a children with lower frequency and “0” to the branch connecting to the children with higher frequency.