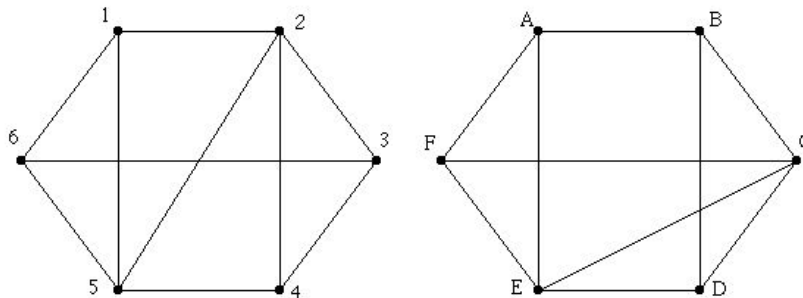


p.672, icon at Example 9

#1. Determine whether the following graphs are isomorphic.



**Solution:**

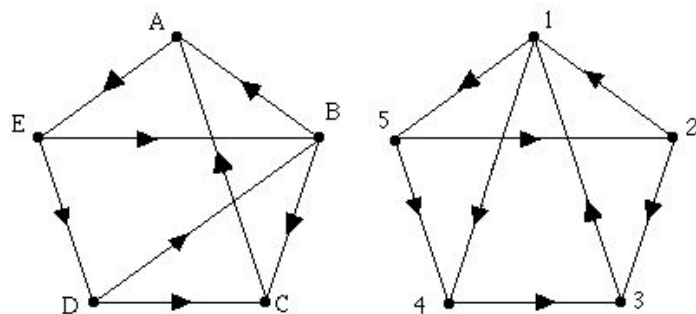
The graphs are isomorphic. In the graph on the left, only vertices 2 and 5 have degree four. In the graph on the right, only vertices  $C$  and  $E$  have degree four. Therefore, if the two graphs are to be isomorphic, we must have 2 and 5 correspond to  $C$  and  $E$  as either 2- $C$ , 5- $E$ , or as 2- $E$ , 5- $C$ . Either correspondence gives rise to an isomorphism:

$$1-F, 2-C, 3-B, 4-D, 5-E, 6-A.$$

$$1-D, 2-E, 3-A, 4-F, 5-C, 6-B.$$

p.672, icon at Example 9

#2. Determine whether the following digraphs are isomorphic.



**Solution:**

Even though the graphs have many features in common (such as the same number of vertices, the same number of edges, matching in-degrees and out-degrees), the digraphs are not isomorphic.

Here is one reason: Vertex  $B$  must correspond to vertex 1 because they are the only vertices with in-degree 2

and out-degree 2. Vertices  $D$  and  $E$  each have in-degree 1 and out-degree 2. If the two graphs are to be isomorphic, then  $D$  and  $E$  must correspond to 2 and 5 (in some order). Because there is an edge from  $E$  to  $D$ , there must be a corresponding edge in the digraph on the right — this forces  $D$  to correspond to 2 and  $E$  to correspond to 5. However in the left graph there is an edge from  $E$  to  $B$ , but no edge from 5 to 1 (the vertices corresponding to  $B$  and  $E$ ) in the right graph. Therefore, the two digraphs are not isomorphic.

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