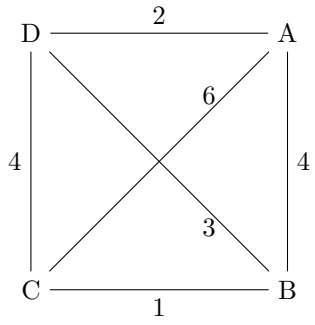
Exam #3 topics & sample questions

Euler & minimum duplication circuits

1. For each of the graphs on the other page, find an Euler circuit, or say if none exists.
2. For each of the graphs on the other page, find an Euler path, or say if none exists.
3. For each of the graphs on the other page, find a minimum duplication circuit (some may require no duplications).
4. For each of the graphs on the other page, find a minimum duplication path (some may require no duplications).

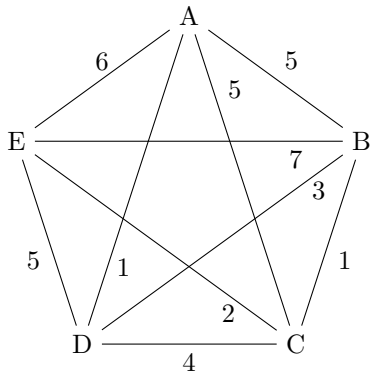
Hamilton circuits & traveling salesman problem

5. For each of the graphs on the other page, find a Hamilton circuit, or say if none exists.
6. Redraw the diamond-shaped graph on the other page, and indicate which edges, if any, must be used in any Hamilton circuit, and which cannot be used in any Hamilton circuit.
7. For this weighted complete graph:



   (a) Find the Hamilton circuit of minimal weight.
   (b) Find a good Hamilton circuit using the repeated nearest neighbor algorithm.
   (c) Find a good Hamilton circuit using the sorted edges algorithm.

8. For this weighted complete graph:



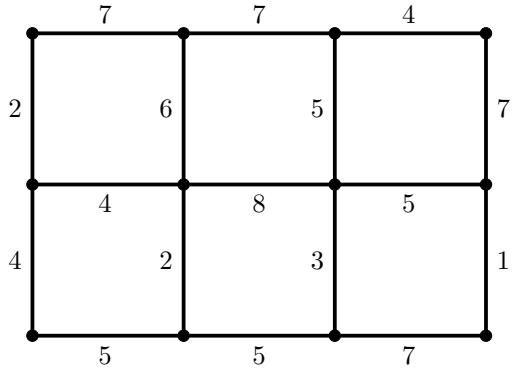
   (a) Find a good Hamilton circuit using the repeated nearest neighbor algorithm.

   (b) Find a good Hamilton circuit using the sorted edges algorithm.

Spanning trees

9. For each of the graphs on the other page, find a spanning tree, or say if none exists.

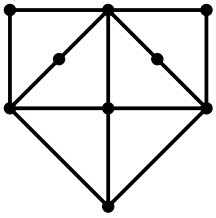
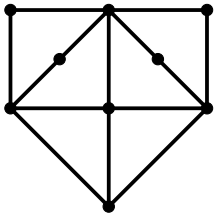
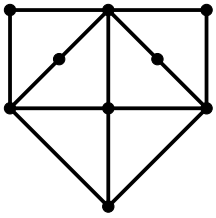
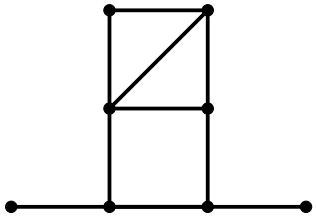
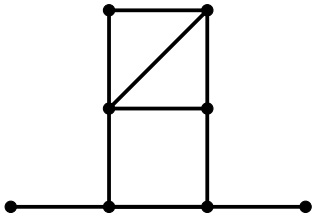
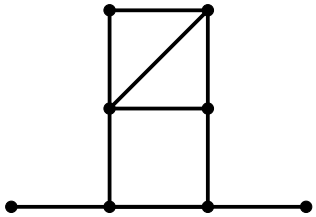
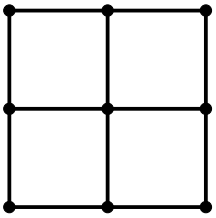
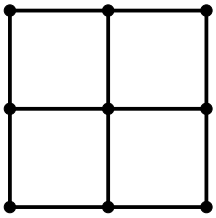
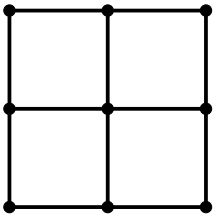
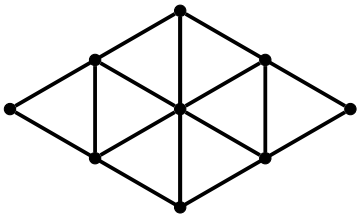
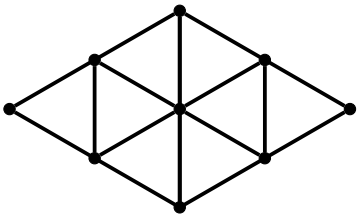
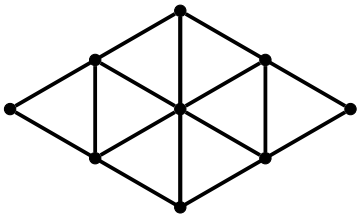
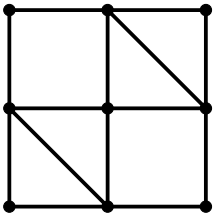
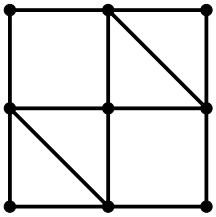
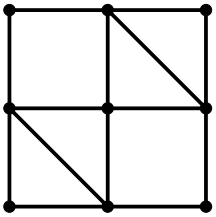
10. In this weighted graph, show what your partial spanning tree would look like after choosing the first 3 edges when using sorted edges, and (separately) using nearest neighbor starting at the lower-left corner.



11. Finish the above to find the minimum spanning tree using each method. (You'll get the same answer for the two methods.)

Misc

12. Be able to recognize real-world applications and decide whether they are about Euler circuits, Hamilton circuits, or spanning trees.

Euler circ.	Euler path	Min. dup. circ.
		
		
		
		
		

Min. dup. path	Ham. circ.	Spanning tree