

ECE 250  
Data Structures and Algorithms  
QUIZ 5  
2006-12-04

The quiz is out of 21 marks.

No questions, no aides.

If you are unsure about a question, write down your assumptions and continue.

This examination has two pages of questions.

Extra graphs are provided for the two graph algorithms (Prim's and Dijkstra's).

<b>Surname, Given Name</b>	<b>Student ID</b>

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Sign here to indicate that you have read the above instructions.

1. [3] Perform one iteration of quick sort, stopping before quick sort is recursively applied to both halves. Place your answer in the 2<sup>nd</sup> row and use the in-place algorithm covered in class.

5	12	7	3	4	9	10	1	6	11	2	13	8

You may use the following tables for your intermediate step(s).


2. [3] To perform a radix sort on the following numbers,

1023 0103 1011 2030 1003 3031 0230 3333 2020 1030

it is necessary to sort four times: once for each digit. Place the intermediate steps in the following tables. Step 4 results in a sorted list, so it is provided for you.

Step 1.

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Step 2.

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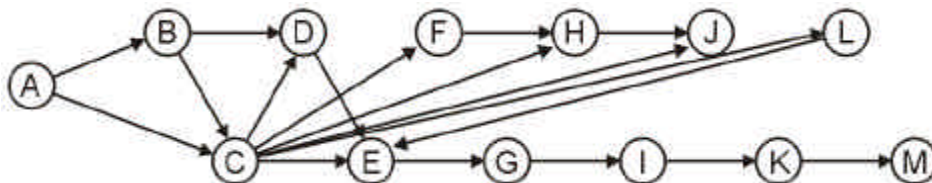
Step 3.

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Step 4.

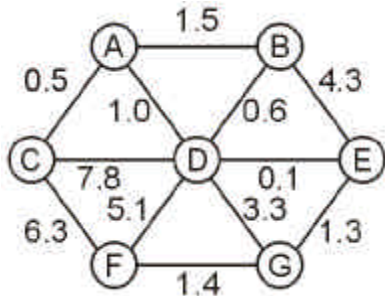
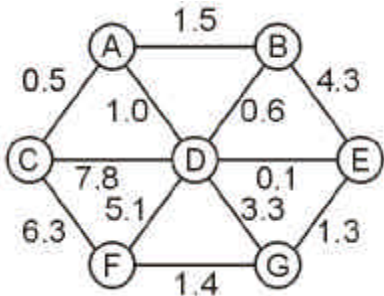
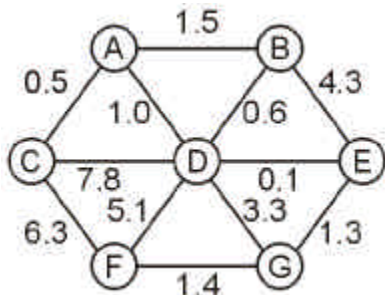
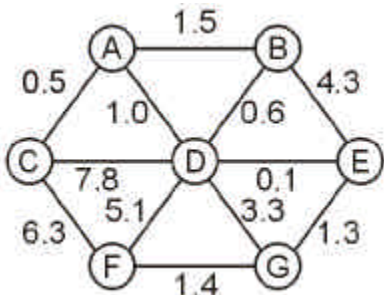
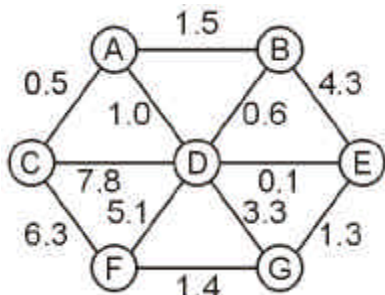
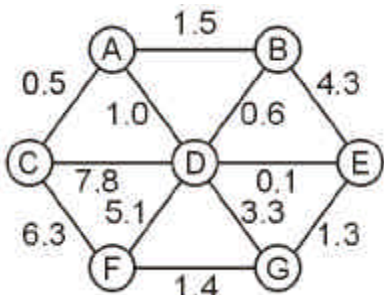
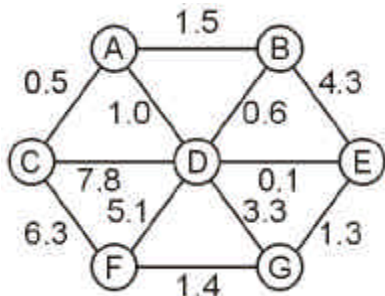
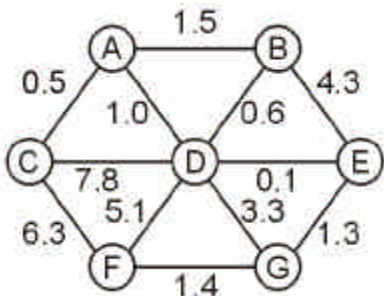
0103	0230	1003	1011	1023	2020	2030	2031	3031	3333
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3. [3] Perform a topological sort on the following DAG. Write your answer in the given table.

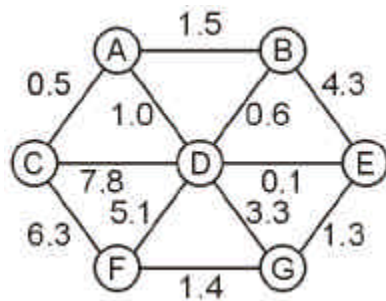
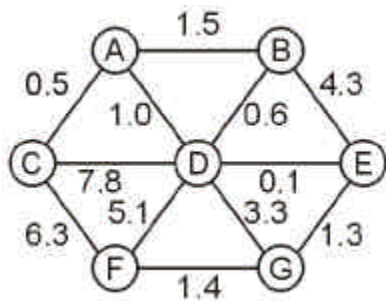
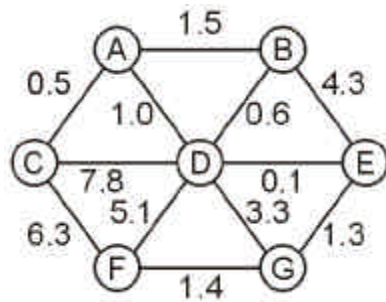
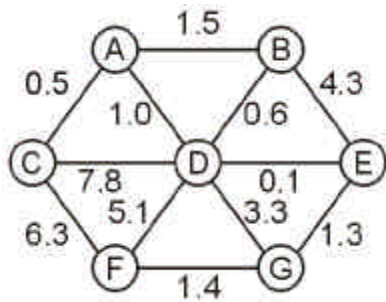
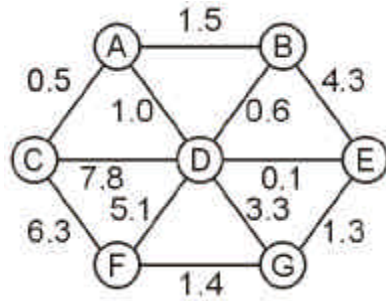
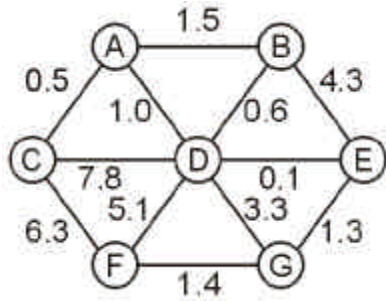
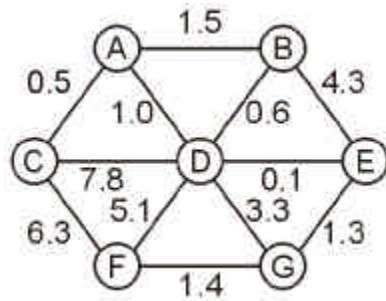
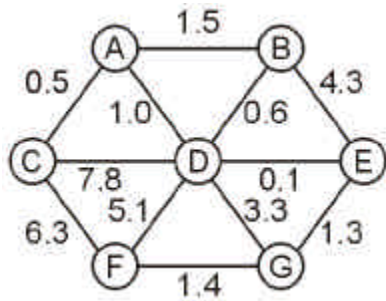


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4. [5] Use Dijkstra's algorithm on the following weighted undirected graph in order to find the path of minimum weight from vertex A to vertex G. Show each step by appropriately labeling the vertices of one of the graphs. Also show the appropriate pointers necessary to find the actual path with minimum weight.



5. [4] Use Prim's algorithm to find the minimum spanning tree of the following graph. Show each step of Prim's algorithm by appropriately labeling the vertices and by indicating which edge is being added to the minimum spanning tree.



6. [3] Explain why Prim's algorithm is greedy. Define what is the operation which is being maximized or minimized and why the choice is appropriate.