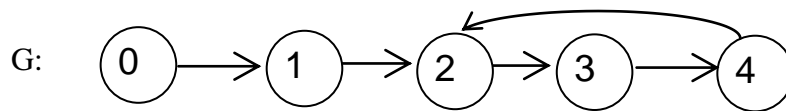


Homework 6

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Due May 28

1. (a) Write a program that finds a depth-first spanning tree of a connected graph.
(b) Write a program that finds a breadth-first spanning tree of a connected graph.
2. Write a program that finds all the connected components of a graph.
3. The 3 leftmost columns of the table below is an adjacency matrix representation of the following graph G.



Fill out the blank columns with T or F as the Warshall's algorithm would do. Circle T's that is changed from F to make it clearly visible.

i	j	A[i,j]	i	k	j	A[i,j]	i	k	j	A[i,j]	i	k	j	A[i,j]	i	k	j	A[i,j]	i	k	j	A[i,j]
0	0	F	0	0	0		0	1	0		0	2	0		0	3	0		0	4	0	
0	1	T	0	0	1		0	1	1		0	2	1		0	3	1		0	4	1	
0	2	F	0	0	2		0	1	2		0	2	2		0	3	2		0	4	2	
0	3	F	0	0	3		0	1	3		0	2	3		0	3	3		0	4	3	
0	4	F	0	0	4		0	1	4		0	2	4		0	3	4		0	4	4	
1	0	F	1	0	0		1	1	0		1	2	0		1	3	0		1	4	0	
1	1	F	1	0	1		1	1	1		1	2	1		1	3	1		1	4	1	
1	2	T	1	0	2		1	1	2		1	2	2		1	3	2		1	4	2	
1	3	F	1	0	3		1	1	3		1	2	3		1	3	3		1	4	3	
1	4	F	1	0	4		1	1	4		1	2	4		1	3	4		1	4	4	
2	0	F	2	0	0		2	1	0		2	2	0		2	3	0		2	4	0	
2	1	F	2	0	1		2	1	1		2	2	1		2	3	1		2	4	1	
2	2	F	2	0	2		2	1	2		2	2	2		2	3	2		2	4	2	
2	3	T	2	0	3		2	1	3		2	2	3		2	3	3		2	4	3	
2	4	F	2	0	4		2	1	4		2	2	4		2	3	4		2	4	4	
3	0	F	3	0	0		3	1	0		3	2	0		3	3	0		3	4	0	
3	1	F	3	0	1		3	1	1		3	2	1		3	3	1		3	4	1	
3	2	F	3	0	2		3	1	2		3	2	2		3	3	2		3	4	2	
3	3	F	3	0	3		3	1	3		3	2	3		3	3	3		3	4	3	
3	4	T	3	0	4		3	1	4		3	2	4		3	3	4		3	4	4	
4	0	F	4	0	0		4	1	0		4	2	0		4	3	0		4	4	0	
4	1	F	4	0	1		4	1	1		4	2	1		4	3	1		4	4	1	
4	2	T	4	0	2		4	1	2		4	2	2		4	3	2		4	4	2	
4	3	F	4	0	3		4	1	3		4	2	3		4	3	3		4	4	3	
4	4	F	4	0	4		4	1	4		4	2	4		4	3	4		4	4	4	

4. What does the following list look like after the first iteration of radix sort's outer loop?

class, leaks, every, other, refer, embed, array

5. If we are using Mergesort, what will the following array look like right before the *last* merge

35 57 53 26 50 15 22 21 25 14 11 2

6. If we are using Quicksort, what will the result be if we pivot on 35? Assume that the first element of a list or sublist to be sorted is always chosen at the pivot. (Show the progress of sorting by presenting the result of each level of recursion.)

35 57 53 26 50 15 22 21 25 14 11 2

7. Heapify the following list, placing the maximum on top.

35 57 53 26 50 15 22 21 25 14 11 2

8. Beginning with the following array, what is the result of running the heapsort procedure (take max put it on the end of the heap, re-heapify) after four iterations?

57 50 53 26 35 15 22 21 25 14 11 2