Daffodil International University

Department of Computer Science and Engineering
Faculty of Science & Information Technology
Final Examination, Fall 2022

Course Code: CSE214 Course Title: Algorithm

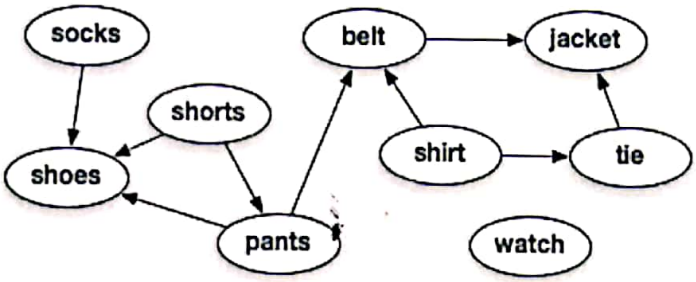
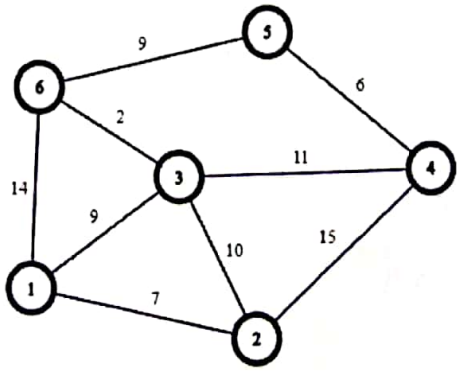
Level: 2 Term: 1 Batch: 58, 59, Old Syllabus

Time: 2 Hrs **Marks: 40**

Answer ALL Questions *[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]*

1.	a) Consider the following algorithm and the given array. Now run the algorithm on the array and demonstrate how the array will be updated at each iteration. **Construct** every single step.
	
	A[5] = {4, 7 ,2 ,6, 8, 3, 1, 5};
	
	for(j=0; j<8; j++){
	min = a[j];
	position = j;
	for(i=j+1; i < n; i++)
	{
	if(min>a[i])
	{
	min = a[i];
	position = i;
	}
	}
	temp = a[j];
	a[j] = a[position];
	a[position] = temp;
	}
		[6]	CO1

	b) **Analyze** the Big-Oh(O) complexity of the above code snippet.	**[2]**	
2.	You are given with the Adjacency Matrix of 3 graphs as follows. Now for each of the following graphs you need to **categorize** if the graph is: **(i)** Directed? **(ii)** Weighted? **(iii)** Connected? **(iv)** Tree? a) $\begin{bmatrix} 0 & 2 & 7 & 0 \\ 2 & 0 & 0 & 3 \\ 7 & 0 & 0 & 5 \\ 0 & 3 & 5 & 0 \end{bmatrix}$ b) $\begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix}$	**[8]**	CO2
3.	a) **Build** the tree for the call **fibonacci(5)** using both dynamic programming and divide and conquer approach.	**[4]**	CO3

	b) Suppose you have written the word **spire** while composing a document in a word processor. The spell checker has reported it as an invalid word and suggested the following replacement words: **1) expire** **2) sapphire** Your first task is to **construct** the Longest Common Subsequence of the two replacement words with **spire**. In other word you have to **construct** 2 LCS values: **1) spire, expire** **2) spire, sapphire**	**[6]**	
	c) Now based on the LCS values, you have to **choose** which one of the two replacement words is more likely to be the correct word?	**[2]**	
4.	a) Absent-minded Makhon has a problem when getting ready to go to work in the morning. He sometimes dresses out of order. For example, he might put his shoes on before putting the socks on, so he'll have to take the shoes off, put the socks on and then the shoes back on. There's also a shirt, tie, belt, shorts, pants, watch and jacket that have to be put on in a certain order. The order between different parts of clothing forms a graph. Shirt before tie means there's an edge from shirt to tie. Now help Makhon to find a complete order of clothing and getting ready for office. **Construct** the complete order.  	**[7]**	CO4
	b) What is the name of your algorithm in 4.a)?	**[1]**	
	c) Consider the following graph. Here each vertex denotes an airport and each edge denotes the duration of a flight between two consecutive airports. You have to determine the fastest route from airport 1 to 5. i. **Identify** the problem you are going to solve. ii. **Select** appropriate algorithm for solving this problem.  	**[4]**	