Started on	Wednesday, 13 December 2023, 10:00 AM
State	Finished
Completed on	Wednesday, 13 December 2023, 10:10 AM
Time taken	10 mins 35 secs
Grade	**5.00** out of 7.00 (**71**%)

Question **1**

Complete

Mark 0.50 out of 0.50

Which of the following statements is/are false:

a. When dynamic programming is applied to a problem, it takes far less time as compared to other methods that don’t take advantage of overlapping subproblems.

b. None of these

c. A greedy algorithm can be used to solve all the dynamic programming problems.

d. Both of these

The correct answer is:

A greedy algorithm can be used to solve all the dynamic programming problems.

Question **2**

Complete

Mark 0.50 out of 0.50

In a conflict where two activities overlap, which one does the greedy algorithm select?

a. The activity with the higher priority.

b. The activity with the earlier start time.

c. The activity with the shorter duration.

d. The activity with the later end time.

e. None of these

The correct answer is:

The activity with the earlier start time.

Question **3**

Complete

Mark 0.50 out of 0.50

Consider the brute force implementation of the rod cutting problem

in which all the possible cuts are found and the maximum value is calculated.

What is the time complexity of this brute force implementation?

a. none of these

b. O(n^3)

c. O(n log(n))

d. O(n^2)

e. O(2^n)

The correct answer is:

O(2^n)

Question **4**

Complete

Mark 0.00 out of 0.50

Breadth First Search (BFS) is started on a binary tree beginning from the root vertex.

There is a vertex t at a distance 5 from the root. If t is the n-th vertex in this BFS traversal,

then the maximum possible value of n is

a. 33

b. 64

c. 32

d. 63

e. None of these

The correct answer is:

63

Question **5**

Complete

Mark 0.50 out of 0.50

Which of the following is a correct time complexity to solve the 0/1 knapsack problem

where n and w represents the number of items and capacity of knapsack respectively?

Knapsack Problem:

Given n items where each item has some weight and profit associated with it and also given a bag with capacity w,

[i.e., the bag can hold at most w weight in it].

The task is to put the items into the bag such that the sum of profits associated with them is the maximum possible.

a. O(n)

b. none of these

c. O(nw)

d. O(n+w)

e. O(w)

The correct answer is:

O(nw)

Question **6**

Complete

Mark 0.50 out of 0.50

Which of the following is/are property/properties of a dynamic programming problem?

a. Optimal substructure

b. Both optimal substructure and overlapping subproblems

c. None of these

d. Overlapping subproblems

e. Greedy approach

The correct answer is:

Both optimal substructure and overlapping subproblems

Question **7**

Complete

Mark 0.50 out of 0.50

Which of the following statements best defines a greedy algorithm?

a. It makes the locally optimal choice at each step, assuming it leads to the global optimum.

b. It breaks down a problem into smaller, overlapping subproblems.

c. It explores all possible solutions before choosing the best one.

d. It always guarantees the optimal solution.

e. None of these

The correct answer is:

It makes the locally optimal choice at each step, assuming it leads to the global optimum.

Question **8**

Complete

Mark 0.00 out of 0.50

In Breadth First Search, how many times a node is visited?

a. none of these

b. Once

c. Equivalent to number of indegree of the node. (Indegree: the number of connections that it has to other nodes)

d. Twice

e. Thrice

The correct answer is:

Equivalent to number of indegree of the node. (Indegree: the number of connections that it has to other nodes)

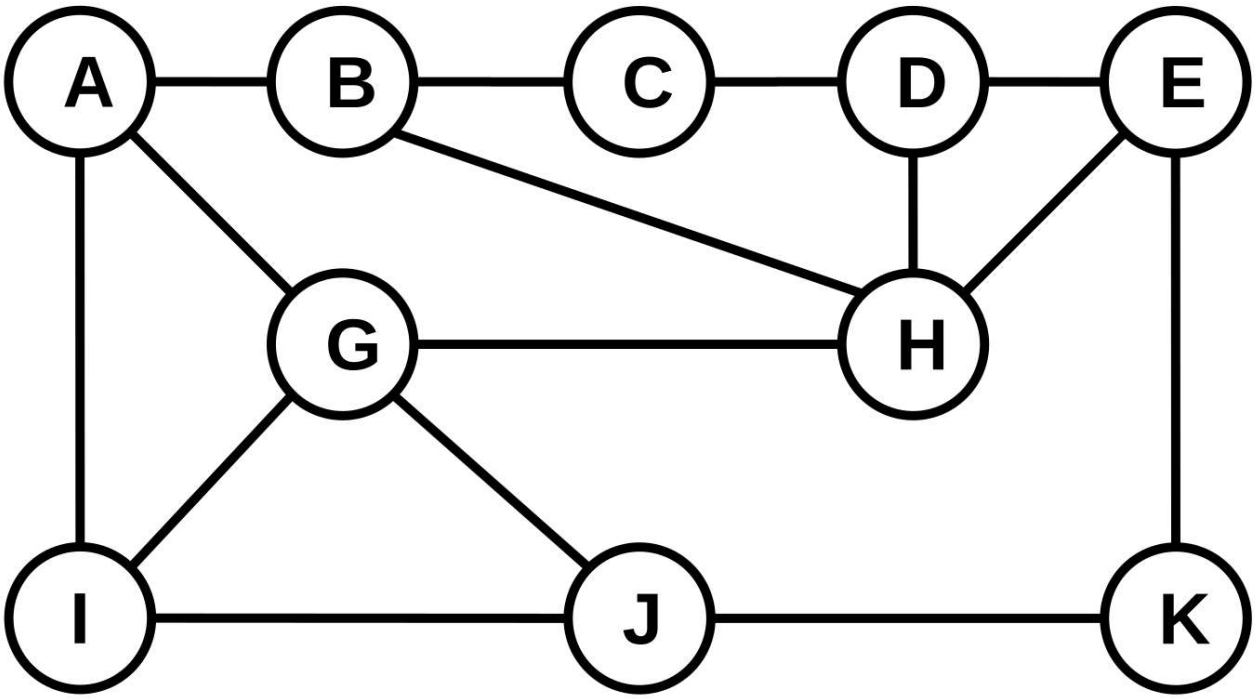
Question **9**

Complete

Mark 0.50 out of 0.50

Apply Breadth First Search traversal of the above graph.

Which of the following traversal is possible if start vertex is G? (Assume lexicographic ordering)



a. GAHJIBCDEK

b. GAHJIBCEKD

c. GAHIJBDEKC

d. None of these

e. GAHJIBCDEK

The correct answer is:

GAHIJBDEKC

Question **10**

Complete

Mark 0.00 out of 0.50

What is an optimal Huffman code for alphabet a of the following set of

frequencies a: 05, b:48, c:07, d:17, e:10, f:13 ?

a. 1001

b. 1010

c. 0101

d. none of these

e. 1100

The correct answer is:

1010

Question **11**

Complete

Mark 0.50 out of 0.50

What is the time complexity of the Fibonacci sequence using dynamic programming?

a. O(n*n)

b. O(log n)

c. O(n)

d. O(1)

The correct answer is:

O(n)

Question **12**

Complete

Mark 0.00 out of 0.50

Consider the matrices P, Q, R and S which are 20 x 15, 15 x 30, 30 x 5 and 5 x 40 matrices respectively.

What is the minimum number of multiplications required to multiply the four matrices?

a. 6050

b. 7570

c. None of these

d. 12000

e. 7750

The correct answer is:

7750

Question **13**

Complete

Mark 0.50 out of 0.50

Which of the following statements about the Longest Common Subsequence (LCS) problem is FALSE?

a. The LCS of two strings can always be found in linear time (O(n)).

b. The LCS of two strings is a subsequence of both the original strings.

c. The LCS of two strings is not unique, there can be multiple sequences of maximum length.

d. The LCS problem can be solved efficiently using dynamic programming.

e. None of these

The correct answer is:

The LCS of two strings can always be found in linear time (O(n)).

Question **14**

Complete

Mark 0.50 out of 0.50

Consider the strings “PQRSTPQRS” and “PRATPBRQRPS”.

What is the length of the longest common subsequence?

a. 8

b. 7

c. 6

d. 9

e. none of these

The correct answer is:

7

◄ Midterm

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