Question 2

Not yet answered

Marked out of 1.00

Flag question

Consider the Fibonacci problem F for a given number n:

$$F(0) = 0$$

$$F(1) = 1$$

$$F(n) = F(n-1) + F(n-2)$$

A basic Brute-force algorithm solution for this problem can be implemented as follows:

```
function fib(n) {
        if n = 0 return 0 else
        if n = 1 return 1 else
                return fib(n – 2)
+ fib(n – 1)
}
```

1. What is time the complexity for the above algorithm
2. Rewrite this algorithm to reduce the time complexity using the dynamic algorithm approach
3. What is the time complexity for your algorithm in part 2

Question 16

Not yet answered

Marked out of 10.00

Flag question

Match between each algorithm and its Worst case Time complexity

Quick sort algorithm using median-of-three	Choose...
Binary search	Choose...
Greedy knapsack problem	Choose...
Prim's algorithm for matrix representation of graph	Choose...
Brute force Traveling Salesman algorithm	Choose...
Brute force Knapsack algorithm	Choose...
Merge sort algorithm	Choose...
Brute-force Fibonacci numbers algorithm	Choose...
Dynamic Programming Fibonacci numbers algorithm	Choose...

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Question 4

Not yet answered

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Flag question

Selecting a pivot is a basic step in:

Select one:

a. Quick Sort

b. Merge Sort Selection

c. Sort Bubble Sort

Previous page

Next page

Question 17

Not yet answered

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Flag question

What is the time complexity of the following for loop method used to compute the nth fibonacci term?

```
int fibo(int n)

    if n == 0

        return 0

    else

        prevFib = 0

        curFib = 1

        for i : 1 to n-1

            nextFib = prevFib + curFib

            prevFib = curFib

            curFib = nextFib

    return curFib
```

Select one:

- a. O(1)
- b. O(n)
- c. Exponential
- d. Quadratic

Question 3

Not yet answered

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Flag question

Q3. Create a text array (named **TA**) to use it for searching each element, consisting of randomly generated strings of length 3, array size = half of **SA**.

Maximum file size: 200MB, maximum number of files: 1

Files

Q4. Write a code to measure the execution time of each searching algorithm for finding all element from **TA** in **SA** array.

Example:

SA:

AAA	BBB	CCC	DDD	EEE	FFF	GGG	HHH	III	JJJ

TA:

MMM	AAA	DDD	LLL	UUU

Find all elements of TA (MMM, AAA, DDD, LLL, UUU) in **SA**, compute the execution time for both sequential search and binary search.

Question **20**

Not yet answered

Marked out of 1.00

Flag question

Binary Search can be categorized into which of the following?

Select one:

- a. Brute Force technique
- b. Divide and conquer
- c. Greedy algorithm
- d. Dynamic programming

Previous page

Finish attempt ...

ENG 17:34 03/05/2023

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Question 10
Not yet answered
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Flag question

What is the runtime Recurrence T(n) for the following foo function?

```
foo(n) {
  if (n > 0) {
    foo(n/2)
    foo(n/2)
    for (i=1 ; i<=n; i++)
        cout<<I;
  }
```

Select one:

- a. T(n) = T(n/2) + 2n
- b. T(n) = 2T(n/2) + n
- c. T(n) = T(n) + n
- d. T(n) = 2T(n) + 2n
- e. T(n) = T(n/2) + n/2

Previous page

Next page

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Question 15

Not yet answered

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Flag question

What does O(1) time complexity mean?

Select one:

a. The algorithm has a constant running time regardless of the input size.

b. The algorithm has a linear running time proportional to the input size.

c. The algorithm has a logarithmic running time proportional to the input size.

d. The algorithm has an exponential running time proportional to the input size.

Previous page

Next page

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Question 9

Not yet answered

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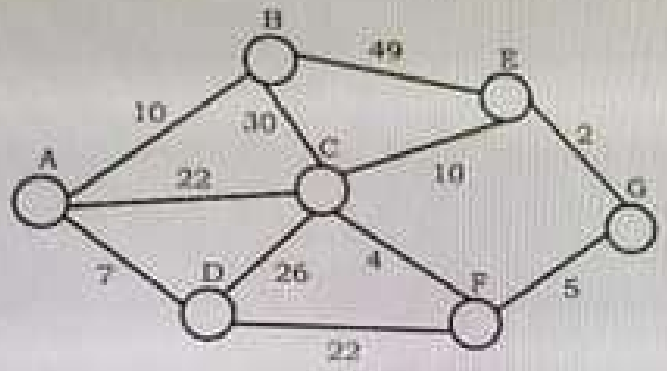
Q9

Using Prim's algorithm to construct a minimum spanning tree starting with node A, which one of the following sequences of edges represents a possible order in which the edges would be added to construct the minimum spanning tree?



a) (E, G), (C, F), (F, G), (A, D), (A, B), (A, C)
b) (A, D), (A, B), (A, C), (C, F), (G, E), (F, G)
c) (A, B), (A, D), (D, F), (F, G), (G, E), (F, C)
d) (A, D), (A, B), (D, F), (F, C), (F, G), (G, E)

Select one:

a.

Question 8

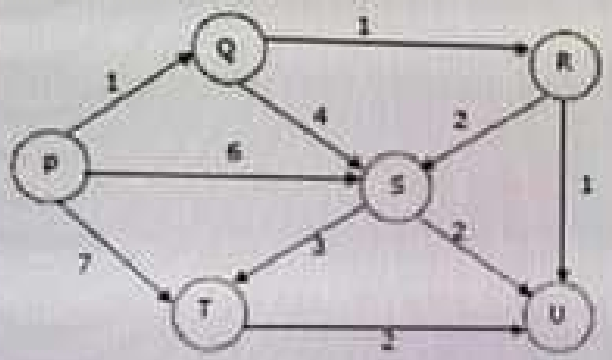
Not yet answered

Marked out of 1.00

Flag question

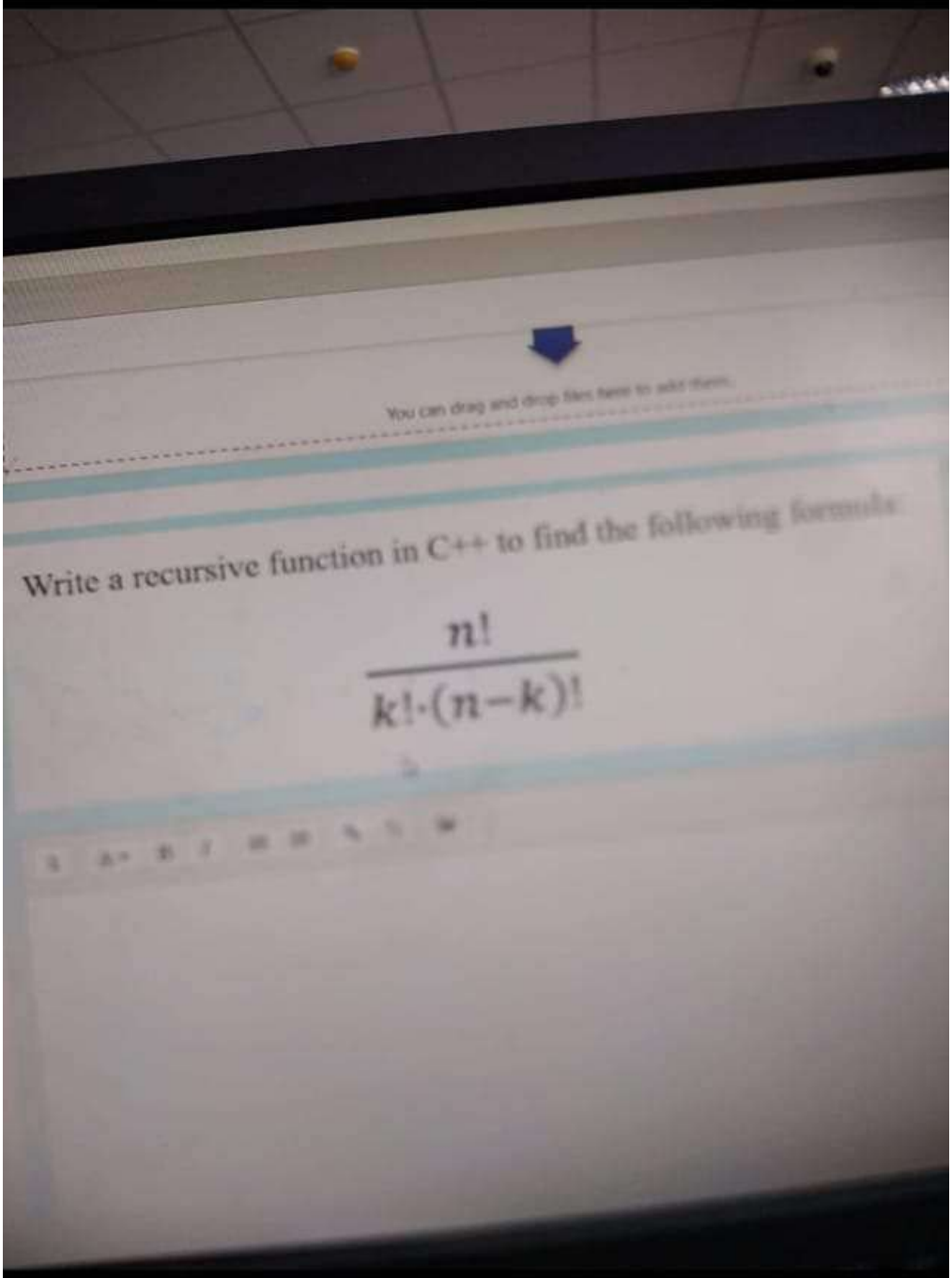
Q5

Suppose we run Dijkstra's single source shortest-path algorithm on the following edge weighted directed graph with vertex P as the source. In what order do the nodes get included into the set of vertices for which the shortest path distances are finalized?



a) P, Q, R, S, T, U
b) P, Q, R, U, S, T
c) P, Q, R, U, T, S
d) P, Q, T, R, U, S

Select one:


You can drag and drop files here to add them.
Write a recursive function in C++ to find the following formula:
$$\frac{n!}{k!\cdot(n-k)!}$$

Match between each algorithm and its Worst case Time complexity

Quick sort algorithm using median-of-three	O(n^2)	✗
Binary search	O(Log n)	✓
Greedy knapsack problem	O(n Log n)	✓
Prim's algorithm for matrix representation of graph	O(n^2)	✓
Brute force Traveling Salesman algorithm	O(n)	✗
Brute force Knapsack algorithm	O(n Log n)	✗
Merge sort algorithm	O(n Log n)	✓
Brute-force Fibonacci numbers algorithm	O(2^n)	✓
Dynamic Programming Fibonacci numbers algorithm	O(n)	✓

a. *

b. *

c. *

d. *

Question 7

Not yet answered

Marked out of 1.00

Flag question

Q4

Consider the polynomial p(x) = a0 + a1x + a2x^2 +a3x^3, where ai != 0, for all i. The minimum number of multiplications needed to evaluate p on an input x is:

a) 4	b) 6
c) 3	d) 9

Select one:

a. *

b. *

c. *

d. *

Question 8

Q5

d. *

Question 12

Not yet answered

Marked out of 1.00

Flag question

Qs

Which of the followinq is correct reourence for worst case of Binary Search?

a) T(n) = 2T(n/2) + O(1) and T(1) = T(0) = O(1)
b) T(n) = T(n-1) + O(1) and T(1) = T(0) = O(1)
c) T(n) = T(n/2) + O(1) and T(1) = T(0) = O(1)
d) T(n) = T(n-2) + O(1) and T(1) = T(0) = O(1)

Select one:

a. *

b. *

c. *

d. *

Question 13

Not yet answered

out of

Closest-Pair Algorithm complexity time can be reduced by Divide and Conquer algorithm

c. O(Log n)

d. O(n+m)

Question 4

Not yet answered

Marked out of 1.00

Flag question

You are given a knapsack that can carry a maximum weight of 60. There are 4 items with weights {20, 30, 40, 70} and values {70, 80, 90, 200}. What is the maximum value of the items you can carry using the knapsack?

Select one:

a. 160

b. 200

c. 170

d. 90

Question 5

Not yet answered

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Flag question

Q2

Which of the following is not a stable sorting algorithm in its typical implementation.

a) Insertion Sort	b) Merge Sort
c) Selection Sort	d) Quick Sort

Select one:

a. *

c. *

d. *

Question 13

Not yet answered

Marked out of 1.00

Flag question

Closest-Pair Algorithm complexity time can be reduced by Divide and Conquer algorithms

Select one:

True

False

Question 14

Not yet answered

Marked out of 1.00

Flag question

If an array is sorted in reverse order, it is _____ case

Select one:

a. Best

b. Average

c. hgh1

d. worst

Question 15

Quick sort is a special case of _____ if the pivot value is always

Question 6

Not yet answered

Marked out of 1.00

Flag question

Which of the following consider an Exhaustive Search approach?

Select one:

- a. Brute force algorithm
- b. Divide and Conquer algorithm
- c. Greedy algorithm
- d. Dynamic programming

Next page

Previous page

ENG 17:24 03/06/2023

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Question 8

Not yet answered

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Flag question

Which of the following divides the problem into two or more smaller subproblems and solves subproblems Independently in a recursive way?

Select one:

- a. Brute force algorithm
- b. Divide and Conquer algorithm
- c. Greedy algorithm
- d. Dynamic programming

Next page

Previous page

d. *

Question 10

Not yet answered

Marked out of 1.00

Flag question

Q7

Consider the following recursive function fun(x, y). What is the value of fun(4, 3)

```
int fun(int x, int y)
{
  if (x == 0)
    return y;
  return fun(x - 1,  x + y);
}
```

a) 13	b) 12
c) 9	d) 10

Select one:

a. *

b. *

c. *

d. *

Question 1

Not yet answered

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Flag question

Longest Common Subsequence: The Longest Common Subsequence (LCS) problem is as follows. We are given two strings: string S of length n, and string T of length m. Our goal is to produce their longest common subsequence: the longest sequence of characters that appear left-to-right (but not necessarily in a contiguous block) in both strings.

For example, consider:

S = ABAZDC

T = BACBAD

LCS = 4 → ABAD

The recursive algorithm for LCS is

```
LCS(S,n,T,m)
{
  if (n==0 || m==0) return 0;
  if (S[n] == T[m]) result = 1 + LCS(S,n-1,T,m-1); // no harm in matching up
  else result = max( LCS(S,n-1,T,m), LCS(S,n,T,m-1) );
  return result;
}
```

This algorithm needs $T(n) = 2T(n-1)+n$ time complexity.

Explain how can we reduce this time complexity?

Question **12**

Not yet answered

Marked out of 1.00

Flag question

Which of the following can be implemented using a lookup-table in a bottom-up approach?

Select one:

- a. Brute force algorithm
- b. Divide and Conquer algorithm
- c. Greedy algorithm
- d. Dynamic programming

Next page

Previous page

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answered

Question **18**

Not yet answered

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Flag question

You are given a knapsack that can carry a maximum weight of 60. There are 4 items with weights {20, 30, 40, 70} and values {70, 80, 90, 200}. What is the maximum value of the items you can carry using the knapsack?

Select one:

- a. 160
- b. 200
- c. 170
- d. 90

Previous page

Next page

ENG 17:33 03/06/2023

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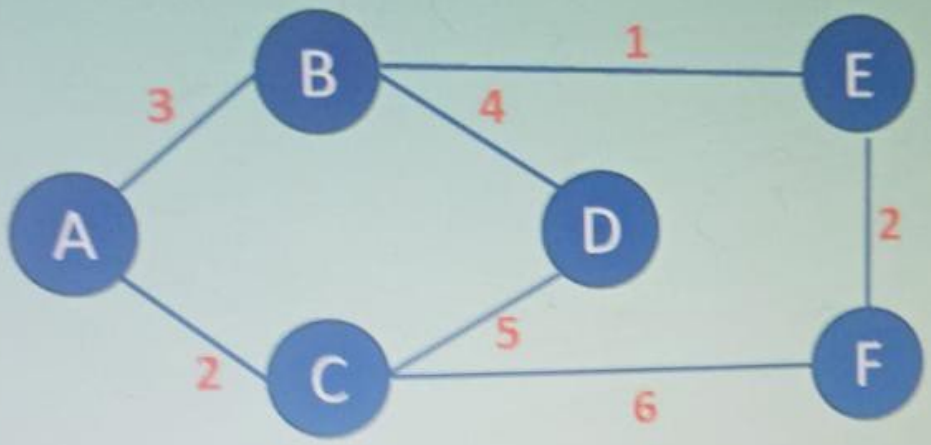
Question 13

Not yet answered

Marked out of 1.00

Flag question

Consider the following weighted graph:



Using Dijkstra's algorithm to find the minimum spanning tree (MST) of the above graph, what will be the total weight of the MST?

Select one:

- a. 11
- b. 12
- c. 13
- d. 14

Previous page

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Flag question

Which of the following problem can be solved by Finding the shortest Hamiltonian circuit in a weighted connected graph?

Select one:

- a. Closest-Pair Problem
- b. Traveling Salesman Problem
- c. Knapsack Problem
- d. The Assignment Problem

Next page

Previous page

ENG 17:23

Algorithm Sample Questions (HW1)

Q1) write a recursive algorithm using that accept a text and return whether it is a palindrome or not (**p("ABBA",0,3)**).

Palindrome is the text that reads the same backwards as forwards
Examples: ABBA, KARAK, aaabbaaa, ...

Q2) Sort the following array using Selection sort algorithm and analyze its time complexity. Show all the steps during the execution time.

5	2	6	7	2	1	0	3

Selection	Time Complexity

Q3) Write a recursive function to display the sum of all the numbers in a specific value: [7 marks]

Which of the following assumes that the given array is sorted:

Select one:

- a. Quick Sort
- b. Closest-Pair Problem
- c. Binary Search
- d. Merge Sort

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Question **7**

Not yet answered

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Flag question

Which of the following evaluates all potential solutions one by one in a systematic man

Select one:

- a. Brute force algorithm
- b. Divide and Conquer algorithm
- c. Greedy algorithm
- d. Dynamic programming

Previous page

Question **10**

Not yet answered

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Flag question

Which of the following start by finding the local optimal solution?

Select one:

- a. Brute force algorithm
- b. Divide and Conquer algorithm
- c. Greedy algorithm
- d. Dynamic programming

Next page

Previous page

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Question 7

Not yet answered

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Flag question

Which of the following evaluates all potential solutions one by one in a systematic manner?

Select one:

- a. Brute force algorithm
- b. Divide and Conquer algorithm
- c. Greedy algorithm
- d. Dynamic programming

Previous page

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Q1. Consider two searching algorithms, sequential search, and binary search:

Implement each of them in C++ as functions.

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Question **14**

Not yet answered

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Flag question

Consider the following set of coin denominations: [25, 10, 5, 1].

Using the greedy algorithm for the change-making problem, what is the minimum number of coins needed to make change for 37 cents?

Select one:

- a. 3
- b. 4
- c. 5
- d. 6

Next page

Previous page

ENG 17:33 03/06/2023

Question 1

Not yet answered

Marked out of 1.00

Flag question

Consider the following problem P for a given number n:

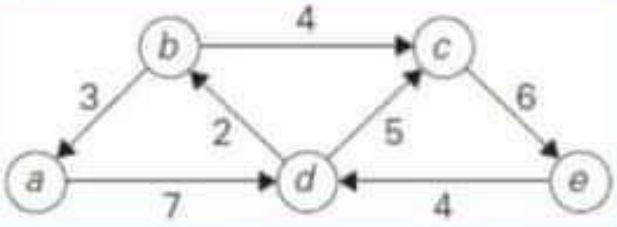
$P(n) = 1! + 2! + 3! + \ldots + (n-1)! + n!$

A basic Brute-force algorithm solution for this problem can be implemented as follows:

```
sum = 0.0
for i = 1 to n {
    factorial = 1
    for j = 1 to i        //compute
factorial
        factorial = factorial * j
    sum = sum + factorial
}
```

1. What is time the complexity for the above algorithm
2. Rewrite this algorithm to reduce the time complexity using the dynamic algorithm approach
3. What is the time complexity for your algorithm in part 2

1. Explain the concept of فسر مصطلح "single source shortest path" problem .
2. Consider this graph, apply Dijkstra's algorithm to solve the problem of single source shortest path problem starting from node **"a"**. Show a step-by-step solution. after finding the shortest path write a-b, a-b-c, etc.



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Question 6

Not yet answered

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Flag question

Consider a graph G with n vertices. To represent G using Adjacency Matrix, we will need a Matrix of size:

Select one:

- a. n X n
- b. 2n X 2n
- c. 2n X n
- d. n X 2n

Previous page

Next page

ENG

3:18 PM ENG

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Question 17

Not yet answered

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Flag question

dynamic programming is based on

Select one:

- a. dividing the problem into dependent subproblmes
- b. dividing the problem into subproblem and solve each subproblem independently
- c. dividing the problem into subproblem and solve each subproblem with memorization
- d. dividing the problem into independent subproblem

Question 18

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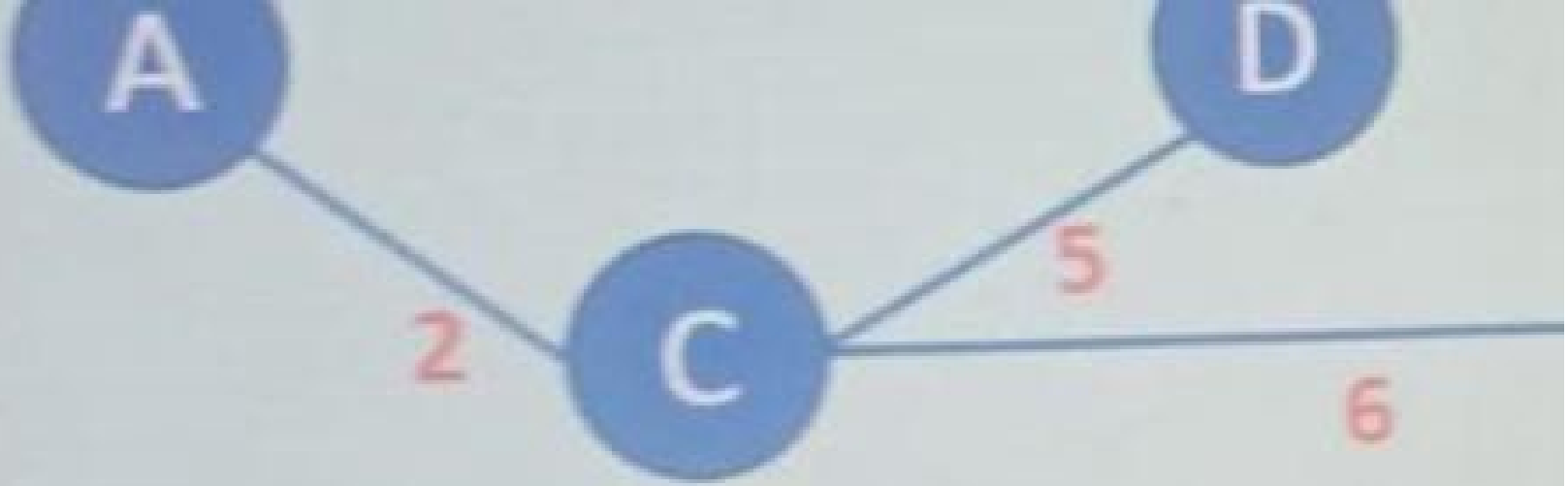
lag question

Use hamming distance, the distance between "01010" and "00011" is

Select one:

- a. 3
- b. 2
- c. 4
- d. 1



Using Dijkstra's algorithm to find the maximum spanning t

Select one:

- a. 11
- b. 12
- c. 13
- d. 14

Question **15**

Not yet answered

Marked out of 1.00

Flag question

Quick sort is a special case of _____ if the pivot value is always _____

Select one:

- a. merge, n
- b. merge, n/2
- c. selection, n
- d. selection, n/2

Question **16**

Not yet answered

Marked out of 1.00

Flag question

If a problem can be solved by combining optimal solutions to non-overlapping problems, the strategy is called

Select one:

- a. Dynamic programming
- b. Greedy
- c. Divide and conquer
- d. Recursion

○ d. *

Question 11
Not yet answered
Marked out of 1.00
Flag question

Q8

Which one of the following correctly determines the solution of the recurrence relation with T(1) = 1?
T(n) = 2T(n/2) + Logn

a) O(n²)	b) O(nlog n)
c) O(log n)	d) O(n)

Select one:

○ a. *
○ b. *
○ c. *
○ d. *

Question 12
Not yet answered
Marked out of 1.00

Q9

Which of the following is correct recurrence for worst case of Binary Search?

a) T(n) = 2T(n/2) + O(1) and T(1) = T(0) = O(1)

Question 6

Not yet answered

Marked out of 1.00

Flag question

Q3

Suppose we are sorting an array of eight integers using quicksort, and we have just finished the first partitioning with the array looking like this:

2 5 1 7 9 12 11 10

Which statement is correct?

a) The pivot could be either the 7 or the 9
b) The pivot could be the 7, but it is not the 9
c) The pivot is not the 7, but it could be the 9
d) Neither the 7 nor the 9 is the pivot

Select one:

- a. *
- b. *
- c. *
- d. *