What is the time complexity of binary search with iteration?

Select one:

a. O(logn)

b. O(n2)

c. O(nlogn)

d. O(n)

Feedback

The correct answer is: O(logn)

Question **2**

Correct

Mark 1.00 out of 1.00

Flag question

Question text

Hash values depend on table size so hashes of entries are changed when resizing and algorithm cannot just copy data from old storage to new one

Select one:

a. Disagree

b. Agree

Feedback

The correct answer is: Agree

Question **3**

Correct

Mark 1.00 out of 1.00

Flag question

Question text

A pivot element to partition unsorted list is used in

Select one:

a. Bubble Sort

b. Binary Search

c. Selection Sort

d. Merge Sort

e. Quick Sort

Feedback

The correct answer is: Quick Sort

Question **4**

Correct

Mark 1.00 out of 1.00

Flag question

Question text

 How the process of finding a particular element of an array is called?

Select one:

a. Searching

b. Sorting

c. DFS

d. Checking

e. BFS

Feedback

The correct answer is: Searching

Question **5**

Correct

Mark 1.00 out of 1.00

Flag question

Question text

What are the operations that dictionaries do NOT support?

Select one:

a. Searching

b. Deletion

c. Sorting

d. Insertion

Feedback

The correct answer is: Sorting

Question **6**

Correct

Mark 1.00 out of 1.00

Flag question

Question text

What is the difference between directed and undirected graph

Select one:

a. There is no difference

b. Directed graph has an interconnection in each edge comparing with undirected graphs

c. Undirected graph uses less memory comparing with directed graphs

Feedback

The correct answer is: Directed graph has an interconnection in each edge comparing with undirected graphs

Question **7**

Correct

Mark 1.00 out of 1.00

Flag question

Question text

From the given example, find index of ‘13’. Given: hash(x)= x %(mod) 10

Select one:

a. 3

b. 4

c. 5

d. 2

Feedback

The correct answer is: 3

Question **8**

Correct

Mark 1.00 out of 1.00

Flag question

Question text

 In ……………………….. ; for any node n, every descendant node’s value in the left subtree of n is less than the value of n and every descendant node’s value in the right subtree is greater than the value n.

Select one:

a. AVL tree

b. binary tree

c. binary search tree

d. binary heap tree

Feedback

The correct answer is: binary search tree

Question **9**

Correct

Mark 1.00 out of 1.00

Flag question

Question text

 Which of the following statements about Linear Search is TRUE?

Select one:

a. All of the options in this question are TRUE

b. linear search compares each array element with a search key.

c. on average, the algorithm must compare the search key with half the array elements.

d. it’s just as likely that the value will be found in the first element as the last.

e. In order to check if a value is not in the array, the algorithm must compare the search key to every element in the array.

Feedback

The correct answer is: All of the options in this question are TRUE

Question **10**

Correct

Mark 1.00 out of 1.00

Flag question

Question text

From the given example, find index of ‘12’. Given: hash(x)= x %(mod) 10

Select one:

a. 2

b. 3

c. 4

d. 5

Feedback

The correct answer is: 2

Question **11**

Correct

Mark 1.00 out of 1.00

Flag question

Question text

 If n elements are sorted in a balanced binary search tree. What would be the asymptotic complexity to search a key in the tree?

Select one:

a. O(nlogn)

b. O(n)

c. O(1)

d. O(logn)

Feedback

The correct answer is: O(logn)

Question **12**

Incorrect

Mark 0.00 out of 1.00

Flag question

Question text

What is the precise purpose of partition() method in Quick Sort?

Select one:

a. It rearranges all elements according to the pivot point

b. It joins two sorted subarrays into one

c. It joins two unsorted subarrays into one

d. It sorts an array using Divide and Conquer concept

e. It divides one array into two subarrays

Feedback

The correct answer is: It rearranges all elements according to the pivot point

Question **13**

Correct

Mark 1.00 out of 1.00

Flag question

Question text

 If several elements are competing for the same bucket in the hash table, what is it called?

Select one:

a. Competition

b. Replication

c. Collision

d. Diffusion

e. Duplication

Feedback

The correct answer is: Collision

Question **14**

Correct

Mark 1.00 out of 1.00

Flag question

Question text

The complexity of linear search algorithm is

Select one:

a. O(N\*N)

b. O(N\*logN)

c. O(N)

d. O(logN)

Feedback

The correct answer is: O(N)

Question **15**

Incorrect

Mark 0.00 out of 1.00

Flag question

Question text

Is it possible for a binary search tree to become unbalanced?

Select one:

a. No

b. Yes

Feedback

The correct answer is: Yes

Question **16**

Incorrect

Mark 0.00 out of 1.00

Flag question

Question text

When does merging process start in Merge Sort algorithm?

Select one:

a. Before dividing one array into two smaller subarrays

b. Once all of subarrays become sorted

c. Once all of subarrays obtain their atomic view (one element in each array)

d. After it reaches the pivot point

e. None of the above

Feedback

The correct answer is: Once all of subarrays obtain their atomic view (one element in each array)

Question **17**

Correct

Mark 1.00 out of 1.00

Flag question

Question text

 What is the run time of Merge Sort algorithm in terms of Big O?

Select one:

a. O(logN)

b. O(NlogN)

c. O(N^2)

d. O(N!)

e. O(N)

Feedback

The correct answer is: O(NlogN)

Question **18**

Correct

Mark 1.00 out of 1.00

Flag question

Question text

Hash function

Select one:

a. Calculates the number of cycles in a graph

b. Gets the minimum and maximum elements in associative arrays

c. Distributes the keys uniformly into buckets

d. Sort all the elements in associative arrays

Feedback

The correct answer is: Distributes the keys uniformly into buckets

Question **19**

Incorrect

Mark 0.00 out of 1.00

Flag question

Question text

What is a "hash(T)" function?

Select one:

a. A function that computes the location of the key in the array

b. A function that computes the location of the values in the array

c. A function has allocated memory to keys

d. A function that creates an array

Feedback

The correct answer is: A function that computes the location of the key in the array

Question **20**

Correct

Mark 1.00 out of 1.00

Flag question

Question text

 Whаt dаtа structurе is hеlpful in visuаlizаtion of rеcursion work?

Select one:

a. Quеuе

b. аrrаy

c. Linkеd List

d. Stаck

e. Trее

Feedback

The correct answer is: Stаck

Question **21**

Incorrect

Mark 0.00 out of 1.00

Flag question

Question text

In a tree, there must be only a single path from the root node to any other nodes in the tree

Select one:

a. Disagree

b. Agree

Feedback

The correct answer is: Agree

Question **22**

Correct

Mark 1.00 out of 1.00

Flag question

Question text

Merge sort uses

Select one:

a. Backtracking approach

b. Divide and conquer strategy

c. Linear strategy

d. Heuristic search

e. Greedy approach

Feedback

The correct answer is: Divide and conquer strategy

Question **23**

Correct

Mark 1.00 out of 1.00

Flag question

Question text

 What is the run time of Quick Sort algorithm in terms of Big O?

Select one:

a. O(N^2)

b. O(logN)

c. O(N)

d. O(NlogN)

e. O(N!)

Feedback

The correct answer is: O(NlogN)

Question **24**

Correct

Mark 1.00 out of 1.00

Flag question

Question text

 Merge sort uses which of the following technique to implement sorting?

Select one:

a. divide and conquer

b. dynamic programming

c. searching

d. backtracking

e. greedy algorithm

Feedback

The correct answer is: divide and conquer

Question **25**

Correct

Mark 1.00 out of 1.00

Flag question

Question text

How many sub arrays does the quick sort algorithm divide the entire array into at each iteration?

Select one:

a. 4

b. 1

c. 3

d. 2

Feedback

The correct answer is: 2

Which of the following algorithms running times is slower for the increasing input (N)?

The correct answer is: Quadratic complexity O(N\*N)

Which of the following case does not exist in complexity theory?

The correct answer is: Null case

Space Complexity can be measured by

The correct answer is: How much operational memory an algorithm needs

When we measure time complexity, do we consider the facts such as a new computer is faster than an old one or a super computer is faster than a smartphone?

The correct answer is: No, we do not

The proper choice of data structure can boost up the algorithms and decrease the running time

The correct answer is: Agree

Let's say that you sort 10 items and it takes 1 second. For 20 items it takes 2 seconds. What is you time comlexity?

The correct answer is: Linear

In the recursion, all calculations continue until the base case is reached

The correct answer is: Agree

Ideally, programmers and data scientists are always trying to achieve the quadratic or exponential time complexity?

The correct answer is: Disagree

Considering the fact that the memory is cheap nowadays, do you agree that space complexity is more important than time complexity

The correct answer is: Disagree

The main idea behind of recursion is in

The correct answer is: The decomposition of the problem into smallers parts and trying to solve them by calling itself

Recursive approaches can be easily scaled up as iterative approaches

The correct answer is: Disagree

In the recursion, it is impossible to run out of memory, because the number of open functions is always small

The correct answer is: Disagree

Ideally, programmers and data scientists are always trying to achieve the constant time complexity?

The correct answer is: Agree

Which of the following algorithms running times is faster for the increasing input (N)?

The correct answer is: Logarithmic complexity O(logN)

The running time of an algorithm with quadratic complexity O(N\*N) is faster than the one with linear time complexity O(N) for the increasing input?

The correct answer is: Disagree

Complexity Theory helps to determine the difficulty of a problem, often measured by how much time and space it takes to solve a particular problem

The correct answer is: Agree

Which one from the considered notations is widely used by computer scientists?

The correct answer is: Big Ordo notation

Lets say we have to swap two number using the third temporary variable. What will be our time complexity?

The correct answer is: Constant complexity O(1)

Let's say that you sort 10 items and it takes 1 second. For 20 items it takes 1 second as well. What is you time comlexity?

The correct answer is: Constant

The Big Ordo notation is used to

The correct answer is: To describe the worst-case running time for an algorithm

Suppose we have an array with 10 elements: [12, 45, 8, 33, 97, 25, 5, 1, 13, 76]. In case if we need to perform a linear search, which element we get first with the worst-case scenario?

The correct answer is: 95

Why is it good to use data structures in the main?

The correct answer is: They can reduce the running time of applications

In every case, we want to make sure that our application are easily scalable?

The correct answer is: Agree

The complexity of linear search algorithm is

The correct answer is: O(N)

Suppose we have an array with 10 elements: [12, 45, 8, 33, 97, 25, 5, 1, 13, 76]. In case if we need to perform a linear search, which element we get first with the best-case scenario?

The correct answer is: 12

The worst case occur in linear search algorithm when

The correct answer is: Item is not in the array at all

Let's say that you sort 10 items and it takes 1 second. For 20 items it takes 4 seconds. What is you time comlexity?

The correct answer is: Quadratic

Lets say we have to perform a sort of the numbers from the array using bubble sort (nested loops). What will be our time complexity?

The correct answer is: Quadratic complexity O(N\*N)

The running time of an algorithm with linear complexity O(N) is slower than the one with constant time complexity O(1) for the increasing input?

The correct answer is: Agree

Time Complexity can be measured by

The correct answer is: How much steps an algorithm needs

Recursive approaches are usual more understandable in terms of the realisation than iterative approaches

The correct answer is: Disagree

What is the difference between data structures and abstract data types?

The correct answer is: Abstract data types are the specifications and data structures are the concrete implementations

In order to exit from the recursion the base case must be called

The correct answer is: Agree

Asymptotic analysis means that usually we are interested in large sizes so we make some approximations

The correct answer is: Agree

The running time of an algorithm with quadratic complexity O(N\*N) is faster than the one with logarithmic time complexity O(logN) for the increasing input?

The correct answer is: Disagree

The Big Omega notation is used to

The correct answer is: To describe the best-case running time for an algorithm

Do you agree that arrays have better cache locality that can make a pretty big difference in performance

The correct answer is: Agree

In which operation with an array the constant time complexity can be achieved

The correct answer is: Adding new values to the next index of the array

There are many three types of indexing in arrays, which one is the most commonly used?

The correct answer is: 0 (zero-based indexing)

In which operation with an array the constant time complexity can be achieved

The correct answer is: Removing the last values from the array

If we remove elements from the end, this operation is faster in linked lists comparing with arrays

The correct answer is: Disagree

In terms of the memory, linked lists are more efficient than arrays?

The correct answer is: Disagree

In order to remove items from the end of the array, the time complexity is

The correct answer is: Constant complexity O(1)

In zero-based indexing, the first element of the array is indexed by subscript of

The correct answer is: 0

In order to remove items from the specific index of the array, the time complexity is

The correct answer is: Linear time complexity O(N)

How many NULL pointers in a doubly linked list?

The correct answer is: 2

What is a main advantage of arrays?

The correct answer is: Random access to elements

Do you agree that in Linked Lists each element (each node) is identified by at least one index or key

The correct answer is: Disagree

Which of the following is not an advantage of Linked Lists

The correct answer is: Each node in the linked lists must be read from the beginning

In linked lists we can use indexes which allows random access to elements

The correct answer is: Disagree

In linked lists, in order to find specific element, you have to

The correct answer is: Iterate through each element until you find the required one, so the complexity will be linear

Doubly linked lists are much more memory efficient comparing with singly linked lists and arrays?

The correct answer is: Disagree

Linked lists can grow (scale) easily, meaning there is no need to define the size of the linked list in the very beginning

The correct answer is: Agree

Arrays can grow (scale) easily, meaning there is no need to define the size of the array in the very beginning

The correct answer is: Disagree

In one-based indexing, the first element of the array is indexed by subscript of

The correct answer is: 1

In computer science, an array is

The correct answer is: Data Structure

How to find the last node in the linked list

The correct answer is: The last node can be found by searching the one which is pointing to NULL

By default, arrays are dynamic, so the size of the array can be change at compile-time

The correct answer is: Disagree

Imagine a lift in the building: a person have to through all the floors to reach the top, and at the opposite direction. Which data structure reminds you this lift

The correct answer is: Doubly linked list

In computer science, a linked list is

The correct answer is: Data Structure

The last reference in linked lists is pointing to NULL

The correct answer is: Agree

Search operation is faster in linked lists comparing with arrays

The correct answer is: Disagree

If we remove elements from the beginning, this operation is faster in linked lists comparing with arrays

The correct answer is: Agree

In order to add items to the specific index in the array, the time complexity is

The correct answer is: Linear time complexity O(N)

Which of the following is not a disadvantage of arrays?

The correct answer is: The elements can be accessed by keys

In terms of the memory usage, linked lists are more efficient than arrays

The correct answer is: Disagree

Which of the following is not required for the doubly linked list in order to traverse it?

The correct answer is: Status - visited or not

In order to add items to the end in the array, the time complexity is

The correct answer is: Constant complexity O(1)

In doubly Linked list the first and the last nodes are pointing to NULL

The correct answer is: Agree

The array which includes not only column indexes but also row indexes is also known as

The correct answer is: Two-dimensional array

Each node in doubly linked lists does not include

The correct answer is: Index of the node

How to find the first node in the linked list

The correct answer is: The first node can be found by searching the one which has no pointer on it

Which of the following is not a disadvantage of Linked Lists

The correct answer is: Linked lists can allocate the needed memory in run-time

Do you agree the doubly linked list can be traversed in both directions forward and backward?

The correct answer is: Agree

In computer science, a stack is

The correct answer is: Abstract Data type

In computer science, a queue is

The correct answer is: Abstract Data type

Imagine a queue, and you have enqueued there 12, 56, 92 in the same order. What the result of queue.peek() operation

The correct answer is: Retrieve 12

The idea of the Top operation in the Stack is

The correct answer is: Return the item from the top of the stack without removing it

FILO structure stands for

The correct answer is: FIRST IN LAST OUT

In the recursion we need a base case because

The correct answer is: It helps us to exit from the recursion, so there is no stackoverflow

If all the elements in an input array is equal for example {1,1,1,1,1,1}, What would be the running time of the Insertion Algorithm? the application of the stacks

The correct answer is: None of the listed options

A stack follows

The correct answer is: FILO structure Which of the listed options are not the application of queues

Imagine some real world applications of stacks. Which one should not be in the list

The correct answer is: Lift which goes in two directions up and down

Imagine a stack, and you have pushed there three strings - ict, aitu, ads in the same order. What will be the result of stack.peek() operation

The correct answer is: Retrieve ads

Which of the listed options are not the application of queues

Imagine a stack, and you have pushed there three strings - ict, aitu, ads in the same order. What will be the result of stack.pop () operation

The correct answer is: Retrieve and remove ads

Imagine a queue, and you have enqueued there three strings - ict, aitu, ads in the same order. What will be the result of queue.dequeue() operation

The correct answer is: Retrieve and remove ict

When we use recursive methods, operating systems use a queue in a background?

The correct answer is: Disagree

Using call stacks (stack memory), you cannot:

The correct answer is: None of the listed options

The idea of the Pop operation in the Stack is

The correct answer is: Take the last item we have added to the top of the stack

The idea of the Peek operation in the Stack is

The correct answer is: Return the item from the top of the stack without removing it

Stack memory is the most important application of stack abstract data type

The correct answer is: Agree

The idea of the Dequeue operation in the Queue is

The correct answer is: Take the first item we have added to the queue

Imagine a stack, and you have pushed there 12, 56, 92 in the same order. What will be the result of stack.peek() operation

The correct answer is: Retrieve 92

Imagine a queue, and you have pushed there three strings - ict, aitu, ads in the same order. What the result of queue.peek () operation

The idea of the Push operation in the Stack is

The correct answer is: Put the given item to the top of the stack

When we use recursive methods, operating systems use a stack in a background?

The correct answer is: Agree

Imagine a queue, and you have enqueued there 12, 56, 92 in the same order. What will be the result of queue.dequeue() operation

The correct answer is: Retrieve and remove 12

Imagine some real world application of queues. Which one can be named as so

The correct answer is: All of the listed options

The idea of the Enqueue operation in the Queue is

The correct answer is: Put the given item to the end of the queue

In most high level languages, a queue or stack can be easily implemented either with arrays or linked lists

The correct answer is: Agree

The idea of the Peek operation in the Queue is

The correct answer is: Return the first item from the queue without removing it

Stackoverflow error message appears when

The correct answer is: The stack is full (run out of memory)

In most high level languages, an array or linked lists can be easily implemented either with stacks or queues

The correct answer is: Disagree

Peek and Top operations in queues and stacks are the same

The correct answer is: Agree

FIFO structure stands for

The correct answer is: FIRST IN FIRST OUT

A queue follows

The correct answer is: FIFO structure

Which definition of a stack is not correct

Imagine a line with ticket checker and ticket counter so several people queueing to get the ticket. Which logical data structure can represent it in a best way

The correct answer is: Queue

Imagine a stack, and you have pushed there 12, 56, 92 in the same order. What will be the result of stack.pop() operation

The correct answer is: Retrieve and remove 92

The main idea behind of binary search tree is to achieve O(1) time complexity

The correct answer is: Disagree

Which of the following expression is not true about binary search trees

The correct answer is: Binary search tree can be classified as max tree and min tree

Why it is important to make sure a tree is balanced?

The correct answer is: If a tree is balanced, most of the operations will have O(logN) time complexity

Binary search trees have following properties, the left subtree of a node contains only nodes with keys lesser than the nodes key, and the right subtree of a node contains only nodes with keys greater than the nodes key

The correct answer is:Agree

Lets say we want to get rid of an item in a binary search tree and the item is a leaf node, how to perform this operation

The correct answer is: We have to remove the item setting it to NULL

Lets say we want to get rid of an item in a binary search tree and the item has two children, how to perform this operation

What is the time complexity of search operation in a balanced binary search tree in average case?

The correct answer is: O(logN)

Binary search tree is

The correct answer is: Data Structure

The running in the binary search tree for insert, delete and search operations in the worst case is

The correct answer is: O(N)

Lets say that you have build you binary search tree with the following numbers 8, 3, 10, 1, 6, 4, 7, 14 (the same order), what will be the result of in-order traversal of the tree

The correct answer is: 1, 3, 4, 6, 7, 8, 10, 14

Imagine a binary search tree, and the result of pre-order traversal was 25, 15, 10, 4, 12, 22, 18, 24, 50. Which one in this tree is the item located in the right as far as possible?

The correct answer is: 50

In a tree, there must be only a single path from the root node to any other nodes in the tree

The correct answer is: Agree

In a binary search tree, every node can have at most two children, left and right

The correct answer is: Agree

How many children can a node in binary trees have at most?

The correct answer is: 2

Is it possible for a binary search tree to become unbalanced?

The correct answer is: Yes

In order to calculate the height of tree, it is required to

The correct answer is: Calculate the length of the path from the root to the deepest node in the tree

The main advantage of binary search tree is that on every decision we can get rid of half of the data in which we are searching

The correct answer is: Agree

Lets say that you have build you binary search tree with the following numbers 8, 3, 10, 1, 6, 4, 7, 14 (the same order), what will be the result of post-order traversal of the tree

The correct answer is: 1, 4, 7, 6, 3, 14, 10, 8

In a binary search tree, there are several ways to get to a given node from the parent node

The correct answer is: Disagree

Lets say we want to get rid of an item in a binary search tree and the item has one child only, how to perform this operation

The correct answer is: We have to update the reference from the node itself to its child

In order to remove an item in a binary search tree, you have to find the item, then you have to remove it, so the time complexity will be

The correct answer is: O(LogN)

Imagine a binary search tree, and the result of pre-order traversal was 25, 15, 10, 4, 12, 22, 18, 24, 50. Which one in this tree is the item located in the left as far as possible?

The correct answer is: 4

Lets say that you have build you binary search tree with the following numbers 8, 3, 10, 1, 6, 4, 7, 14 (the same order), what will be the result of pre-order traversal of the tree

The correct answer is: 8, 3, 1, 6, 4, 7, 10, 14

What is the problem with unbalanced binary trees?

The correct answer is: The favorable O(logN) running time may even be reduced to O(N) running time

What does in-order traversal mean?

The correct answer is: Visit left subtree + visit root node + visit right subtree

In a binary search tree, if we need to find the smallest node, we have to

The correct answer is: Go to the left as far as possible, and get the last leaf node

Imagine a binary search tree, and the result of pre-order traversal was 25, 15, 10, 4, 12, 22, 18, 24, 50. Which one in this list is a root node?

Lets say you want to insert [12, 4, 5, 20, 1, 10] in a binary search tree. What will be the height of the binary search tree?

The correct answer is: 4

Successor in a binary search tree is

The correct answer is: The smallest item in the right subtree

In order to insert an item in a binary search tree, the time complexity will be

The correct answer is: O(LogN)

There are three types of traversing for binary search trees, which one is the most used one

The correct answer is: In-order traversal

In a binary search tree, if we need to find the greatest node, we have to

The correct answer is: Go to the right as far as possible, and get the last leaf node

Predecessor in a binary search tree is

The correct answer is: The largest item in the left subtree

If the binary search tree is unbalanced, the time complexity of search operation is

The correct answer is: O(N)

If the binary search tree is balanced, the time complexity of search operation is

The correct answer is: O(LogN)

In Red-Black trees, each node has an extra bit of information, and that bit is often interpreted as the color (red or black) of the node

The correct answer is: Agree

Which of the following properties cannot be applied for Red-Black trees

The correct answer is: The height of leaf nodes is always equal to zero

The running time complexity of search operation in AVL trees in the average case takes

The correct answer is: O(logN) time complexity

Let's consider the case when you have to construct a binary search tree from a sorted array with the following elements 10, 15, 20, 25, 30. What kind of tree you will get as a results of this operation

The correct answer is: Unbalanced tree

Every path from a given node to any of its descendant NULL/NONE nodes contains different number of black trees?

The correct answer is: Disagree

In an AVL tree, by default, we want the keep the height as as possible

The correct answer is: Agree

What is the problem with unbalanced binary trees?

The correct answer is: The favorable O(logN) running time may even be reduced to O(N) running time

Why it is important to make sure a tree is balanced?

The correct answer is: If a tree is balanced, most of the operations will have O(logN) time complexity

The height of leaf nodes in an AVL tree is equal to

The correct answer is: 0

Every red node in a Red-Black tree must have two black children and no other children

The correct answer is: Agree

In Red-Black trees, we keep inserting new node in the same way as we do for AVL trees

The correct answer is: Agree

Imagine a stack, and you have pushed there 12, 56, 92 in the same order. What will be the result of stack.peek() operation

The running time complexity of insert operation in AVL trees in the worst case takes

The correct answer is: O(logN) time complexity

The root node in Red-Black tree is always red

The correct answer is: Disagree

In AVL tree, the heights of two child subtrees of any node differ by at most one

The correct answer is: Agree

In Red-Black trees, on every insertion we don't need to check whether we have violated the red-black (rb) properties or not

The correct answer is: Disagree

All leaf nodes NULL pointer (Null, or None) in a Red-Black tree are always black

The correct answer is: Agree

If we construct a binary search tree from a sorted array, we end up with a linked list where the complexity of the search operation is O(N)

The correct answer is: Agree

How many rotations to the left we have to make in a balanced AVL tree, where we have inserted 10, 20, 30, 40, 50 (in the same order)

The correct answer is: 1 big rotation and 1 small rotation

The height of children of leaf nodes, NULLs, in an AVL tree is equal to

The correct answer is: -1

In a Red-Black tree, with all recolorings we may violate the red-black properties in other parts of the tree

The correct answer is: Agree

In order to find the minimum / maximum elements in an AVL tree you have to perform the same operation as in a binary search tree

The correct answer is: Agree

What is the difference between insertion in an AVL tree and in a classic binary search tree

The correct answer is: After each insertion we have to check the tree for the balance

When to use AVL trees in comparison with Red Black trees?

The correct answer is: When there are a lot of search operations

Red-Black trees can be used in order to be sure that the tree is approximately balanced

The correct answer is: Agree

In an AVL tree, in Case 1 (doubly-left heavy situation), in order to make the tree balanced, it is required

The correct answer is: To make one big right rotation

In order to find the height of a node, it is required

The correct answer is: To get the maximum between the left and the right child and add one

Lookup(search), insertion and deletion in an AVL tree in both average and worst case takes

The correct answer is: O(logN) time complexity

How many rotations to the right we have to make in a balanced AVL tree, where we have inserted 10, 20, 30, 40 (in the same order)

The correct answer is: 0

Operating systems relies heavily on AVL trees and Red-Black trees

The correct answer is: Agree

In a Red-Black tree in case if we have violated the RB properties, we should NOT

The correct answer is: Remove all leaf nodes

How many rotations to the left we have to make in a balanced AVL tree, where we have inserted 10, 20, 30, 40 (in the same order)

The correct answer is: 2

Which of the AVL traversal algorithms required to sort given numbers

In an AVL tree, in Case 2 (doubly-right heavy situation), in order to make the tree balanced, it is required

The correct answer is: To make one big left rotation

In an AVL tree, in Case 4 (right-left heavy situation), in order to make the tree balanced, it is required

The correct answer is: To make one small right rotation and one big left rotation

In an AVL tree, in Case 3 (left-right heavy situation), in order to make the tree balanced, it is required

The correct answer is: To make one small left rotation and one big right rotation

In a heap, we insert new item to the next available place, so it guarantees that the heap is complete

The correct answer is: Agree

In a heap, how to find the index of the parent node if the right childs index is Ind?

The correct answer is: (Ind-2)/2

Priority queues are usually implemented with heaps as well as with self balancing trees

The correct answer is: Agree

What is a min heap?

The correct answer is: When the root node is the smallest value

Lets say that you built a min heap inserting 10, 8, 15, 12 one after another. What will be the final representation of your heap as an array

The correct answer is: 8, 10, 15, 12

What is the complexity of deletion (removal) operation in a heap

The correct answer is: O(logN)

When to use heaps?

The correct answer is: When we need the smallest (or largest for max-heaps) item

In min heap the highest key is in the root node

The correct answer is: Disagree

In a min heap, in order to find the minimum element, we have toIn a min heap, in order to find the minimum element, we have to

The correct answer is: Get the root node

Do we need to reconstruct the heap if we retrieved the element with the highest priority

The correct answer is: Yes, we have to

Lets say that you have to implement a heapsort algorithm, when you removed the root node, in which way the heapify process should go

The correct answer is: You have to fix the heap from top to bottom

Lets say that you built a max heap inserting 1, 2, 3, 4, 5 one after another. What will be the final representation of your heap as an array

The correct answer is: 5, 4, 2, 1, 3

In max heap the highest key is in the root node

The correct answer is: Agree

In a max heap, when we remove the root node in order to sort items in descending order, what we put to its place

The correct answer is: The last element

A heap can be easily represented with an array

The correct answer is: Agree

The peek () operation, also called as top() operation, differs in priority queue and classic queue in the following way

The correct answer is: In a priority queue peek () returns the element with highest priority while in a classic queue peek () returns the first inputted element.

What is the difference between priority queue and classic queue?

The correct answer is: Priority queue uses priorities while classic queue uses FIFO structure

What is the complexity of building a heap

The correct answer is: O(N)

In a heap, knowing that the index of the parent node is i, how to find the index of the parents right child

The correct answer is: 2i+2

Which of heaps properties should not be in the following list

The correct answer is: In a heap, the left child is always smaller than the parent node, and the right child is always bigger than the parent node

Lets say that you have insert following pairs, the element and its priority, a - 4, b - 2, c - 1, d - 3, e - 5, which element will be retrieve first

The correct answer is: e

A priority queue is

The correct answer is: Abstract Data type

In a heap, knowing that the index of the parent node is i, how to find the index of the parents left child

The correct answer is: 2i+1

In a heap, after each insertion we have to we have to reconstruct it, the complexity will be check whether the heap properties were violated or not

The correct answer is: Agree

What is the difference between classic binary heaps and binomial (or fibonacci) heaps

The correct answer is: The complexity differs for insert operation

Heap is basically a binary tree, which can be both balanced and unbalanced

The correct answer is: Disagree

In a binary heap, each node has two children, the left one is smaller than the parent node, and the right one is greater than the parent node

The correct answer is: Disagree

In a priority queue, an element with high priority is served after an element with low priority.

The correct answer is: Disagree

In a heap, in order to remove the node, the complexity is O(1), and then you have to reconstruct the heap, where the complexity is O(logN). What is the overall complexity of this operation

The correct answer is: O(logN)

In a heap, in case when we have to reconstruct it, the complexity will be

The correct answer is: O(logN)

In a heap, how to find the index of the parent node if the left childs index is Ind?

The correct answer is: (Ind-1)/2

There are two types of heaps, such as

The correct answer is: Min heap and Max heap

What is the complexity of getting (finding) the minimum / maximum element in a heap

The correct answer is: O(1)

What is the time complexity for heapsort?

The correct answer is: O(N\*logN)

Lets say that you built a max heap inserting 10, 8, 12, 15 one after another. What will be the final representation of your heap as an array

The correct answer is: 15, 12, 10, 8

What is a heapify process

The correct answer is: Reconstruct the heap in order to make it a valid heap

It is important that a hash function always returns an integer value because

The correct answer is: This is used as the index of the array slot

Hash function

The correct answer is:  Distributes the keys uniformly into buckets

If several elements are competing for the same bucket in the hash table, what is it called?

The correct answer is:  Collision

What hashfunctions do?

The correct answer is:  They transform keys into array indexes

What is a load factor when we deal with hash functions

In a given hash table of size 5, the key of value 8 be placed at position

The correct answer is: 3

In a given hash table of size 157, the key of value 172 be placed at position

The correct answer is: 15

Lets say that you would like to perform a password verification process, which data structure (or abstract data type) is better to use

The correct answer is: Associative arrays

Hash values depend on the table size so hashes of entries are changed when resizing and algorithm cannot just copy data from old storage to new one

The correct answer is: Agree

What is a hash function?

The correct answer is: A function that computes the location of the key in the array

In order to map string keys to indexes of an array, pre-hashing must be performed

The correct answer is: Agree

Ideally, programmers or mathematicians try to write a perfect hash function in order to avoid

The correct answer is: Collison

In case with a linear probing, if a collision occurs, we try the next available slot until we find an empty slot

The correct answer is: Agree

A collision when we deal with associative arrays is

The correct answer is: When we map two or more keys to the same bucket

Associative array is

The correct answer is: Abstract Data type

What is the search operation complexity of associative arrays in average and worst cases

The correct answer is: Average O(1), Worst O(N)

Why to use associative arrays also known as dictionaries?

The correct answer is:

In case with a quadratic probing, if a collision occurs, we try the next available slot until we find an empty slot

The correct answer is: Disagree

In an associative arrays each possible key appears at most once in the collection

The correct answer is: Agree

In order to map a certain string key to a slot in an array If we have to use have to use the ASCII values of each character in the string key and make sure some transformation

The correct answer is: Agree

Which of the following methods does not resolve collision problem

The correct answer is: Sorting

In a given hash table of size 15, the key of value 22 be placed at position

The correct answer is: 7

What is the insert (or remove) operation complexity of associative arrays in average and worst cases

The correct answer is: Average O(1), Worst O(N)

What are the operations that dictionaries do NOT support?

The correct answer is: Sorting

What is the space complexity of associative arrays in average and worst cases

The correct answer is: Average O(N), Worst O(N)

What is the hash function used in the Class? (n is number of keys, m is number of buckets)

The correct answer is: h(k)=n mod m

Which of the operations are not allowed for associative arrays?

The correct answer is: the sorting by values from the collection

It is impossible to map a certain string key to a slot in an array

The correct answer is: Agree

What is the underlying data structure for associative arrays also known as dictionaries?

The correct answer is: Array

The main disadvatage of using chaining methods in order to avoid collisions is

The correct answer is: Because of usage of linked lists the complexity can get worst than O(1)

In order to map a certain integer key to a slot in an array If we have to use the modulo operator to transform the number into the range

The correct answer is: Agree

High level programming languages have predefined threshold for dynamic resizing, which of the following does not look as a right threshold

The correct answer is: 0.555 for Java Script

Why hashfunctions came to be?

The correct answer is: In order to achieve O(1) time complexity for some operations

Associative arrays are the same as two dimensional arrays

The correct answer is: Disagree

1. How to get an index of list (chain) from the hash code of a HashTable Node (M - number of chains/bins)

Using modulo operator (hashcode % M)

2.  What is the run time of Merge Sort algorithm in terms of Big O?

O(NlogN)

3. Which of the following data structures is non-linear?

Trees

4. Which of the following is required to apply Binary Search algorithm?

Array must be sorted in ascending order

5.  The Data structure used in standard implementation of Breadth First Search is?

Queue

6. The Data structure used in standard implementation of Depth First Search is?

Stack

7.  What programming technique divides problem into subroblems and uses memoization?

Dynаmic Progrаmming

8. In which data structure a hash function is used?

HashTable

9. From the given example, find a value placed at index '2'. Given: hash(x)= x %(mod) 10

12

10. In ……………………….. ; for any node n, every descendant node’s value in the left subtree of n is less than the value of n and every descendant node’s value in the right subtree is greater than the value n.

binary search tree

11. What is the average running time of a quick sort algorithm?

O(N log N)

12. From the given example, find index of ‘13’. Given: hash(x)= x %(mod) 10

3

13. A pivot element to partition unsorted list is used in

Merge Sort or Quick sort

14. What is the problem with unbalanced binary trees?

The favorable O(logN) running time may even be reduced to O(N) running time

15. What is a "hash(T)" function?

A function that computes the location of the key in the array

16. What is the position of maximum element in Binary Search Tree?

Most right node

17. In a tree, there must be only a single path from the root node to any other nodes in the tree

Agree

18. What is a hash table?

A structure that maps keys to values

19. Hash values depend on table size so hashes of entries are changed when resizing and algorithm cannot just copy data from old storage to new one

Agree

20. State True or False. 1. Binary search is used for searching in a sorted array. 2. The time complexity of binary search is O(logn).

True, True

21. What is the structure used for storing data in a Hash Table?

Key-Value

22. What is the time complexity of binary search with iteration?

O(logn)

23. Merge sort uses which of the following technique to implement sorting?

divide and conquer

24. Lets say we have to perform a sort of the numbers from the array using bubble sort (nested loops). What will be our time complexity?

Quadratic complexity O(N\*N)

25. How many children can a node in binary trees have at most?

2

26. Lets say you want to insert [12, 4, 5, 20, 1, 10] in a binary search tree. What will be the height of the binary search tree?

4

27.  What is the time complexity of Bubble Sort algorithm?

O(N^2)

28.  If several elements are competing for the same bucket in the hash table, what is it called?

Collision

29. Apply Quick sort on a given sequence 7 11 14 6 9 4 3 12. What is the sequence after first phase, pivot is first element?

6 3 4 7 9 14 11 12

30. How does the binary search work?

Recursively goes to the left or right subarrays and compares a key with the middle

31.  How the number of edges from the node to the deepest leaf of the tree is called?

Height

32. Lets say we want to get rid of an item in a binary search tree and the item has two children, how to perform this operation

We look for the predecessor (successor) and swap it the required node

33.  Which of the following statements about Linear Search is TRUE?

All of the options in this question are TRUE

34.  What is the run time of Quick Sort algorithm in terms of Big O?

O(NlogN)

35. How to insert a new node to Binary Search Tree?

Starting from the root go to the right or left child of each node according to the new node`s key recursively till it finds an empty position

36.  How the process of finding a particular element of an array is called?

Searching

37. Is it possible for a binary search tree to become unbalanced?

Yes

38. Hash function

Distributes the keys uniformly into buckets

39. When does merging process start in Merge Sort algorithm?

Once all of subarrays obtain their atomic view (one element in each array)

40. Lets say we want to get rid of an item in a binary search tree and the item has one child only, how to perform this operation

We have to update the reference from the node itself to its child

41. Given an array arr = {5,4,77,88,99} and key = 88; How many iterations are done until the element is found? (Binary Search)

2

42. What are the operations that dictionaries do NOT support?

Sorting

43. What is the difference between directed and undirected graph

Directed graph has an interconnection in each edge comparing with undirected graphs

44. From the given example, find index of ‘12’. Given: hash(x)= x %(mod) 10

2

45.  If n elements are sorted in a balanced binary search tree. What would be the asymptotic complexity to search a key in the tree?

O(logn)

46. What is the precise purpose of partition() method in Quick Sort?

It rearranges all elements according to the pivot point

47. The complexity of linear search algorithm is

O(N)

48.  Whаt dаtа structurе is hеlpful in visuаlizаtion of rеcursion work?

Stаck

49. Merge sort uses

Divide and conquer strategy

50. How many sub arrays does the quick sort algorithm divide the entire array into at each iteration?

2

51. What is a load factor when we deal with hash functions

Number of entries divided by the number of slots

52.  This algorithm design paradigm based on decomposition of problem into sub-problems.

Divide and Conquer

53.  Which of the following methods is used for sorting in merge sort?

Merging

54. Lets say we want to get rid of an item in a binary search tree and the item is a leaf node (end node - with no childs), how to perform this operation

We have to remove the item setting it to NULL

55. the run time for traversing all the nodes of a binary search tree with n nodes and printing them in an order is

O(n)

56. Quick sort uses which of the following technique to implement sorting?

divide and conquer

57. The main idea behind of binary search tree is to achieve O(1) time complexity

Disagree

58.  What searching algorithm starts at the beginning of the list and check every element in the list?

Linear search

59. What is the precise purpose of merge() method in Merge Sort?

It joins two sorted subarrays into one

60. What does a hash functions do in a HashTable?

They transform keys into array indexes

61. How many children can a What is the structure used for storing data in a Hash Table?in binary trees have at most?

2

62. The worst case occur in linear search algorithm when

Item is not in the array at all

63. In terms of the memory, linked lists are more efficient than arrays?

Disagree

64. What is the worst case time complexity of a quick sort algorithm?

O(N^2)

65.  Which of the following methods is used for sorting in quick sort?

Partitioning

66. What is the index of minimum in Min Heap?

0

67. Default constructor must be defined, if parameterized constructor is defined and the object is to be created without arguments

True

68. In linked list implementation of a queue, front and rear references are tracked. Which of these references will change during an insertion into EMPTY queue?

Both front and rear references

69. Predict output of following program #include int fun(int n) { if (n == 4) return n; else return 2\*fun(n+1); } int main() { printf("%d ", fun(2)); // printing the value return 0; }

16

70.  Which of the following data structures is LIFO data structure?

Stack

71.  How the getting process to a specific node in the linked list is called?

Traversal

72. What is the time complexity of the following code : int a = 0; for (i = 0; i < N; i++) { for (j = N; j > i; j--) { a = a + i + j; } }

O(N\*N)

73. What would be the asymptotic time complexity to add a node at the end of singly linked list, if the reference is initially referencing to the head of the list?

O(n)

74. What is the time, space complexity of following code :  int a = 0, b = 0;        for (i = 0; i < N; i++) {         for (j = 0; j < N; j++) {             a = a + j;         }     }     for (k = 0; k < N; k++) {         b = b + k;     }

O(N \* N) time, O(1) space

75. Complexity Theory helps to determine the difficulty of a problem, often measured by how much time and space it takes to solve a particular problem

Agree

76. Average time complexity of Bubble sort is?

O(n^2)

77. In linked list each node contain minimum of two fields. One field is data field to store the data second field is?

Pointer to node

78. Lets say we have to swap two number using the third temporary variable. What will be our time complexity?

Constant complexity O(1)

79. Given a hash table T with 25 slots that stores 3000 elements, the load factor α for T is

120

80. Indicate constant time complexity in terms of Big-O notation

O(1)

81. What is the time complexity of recursive Binary Search algorithm?

O(logn)

82.  Whаt аlgorithm is dеscribеd bеlow? 1. аdd thе еlеmеnt to thе bottom lеvеl of thе hеаp аt thе most lеft. 2. Compаrе thе аddеd еlеmеnt with its pаrеnt; if thеy аrе in thе corrеct ordеr, stop. 3. If not, swаp thе еlеmеnt with its pаrеnt аnd rеturn to thе prеvious stеp.

Insеrtion to а hеаp

83. Search a binary search tree costs?

O(logn)