



Virtual University

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CS301
Solved Final Terms Papers

Waqar.siddhu@gmail.com

Year
2017

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

In the Name of Allāh, the Most Gracious, the Most Merciful

Paper Pattern

MCQS 40 each 1 mark
Short 4 each 2 marks
Short 4 each 3 marks
long 4 each 5 marks

Question No : 1 of 52

Marks: 1 (Budgeted Time 1 Min)

An array x of 100 integers is declared as ,

Answer (Please select your correct option)

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- ☐ int x = [100];
- ☒ int x[100];
- ☐ integer array x = 100;
- ☐ integer x [] = 100;

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Question No : 2 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following is NOT a correct statement about Table ADT.

Answer (Please select your correct option)

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- ☐ In a table, the type of information in columns may be different.
- ☒ A table consists of several columns, known as entities.
- ☐ The row of a table is called a record.
- ☐ A major use of table is in databases where we build and use tables for keeping information.

moazz

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Question No : 3 of 52

Marks: 1 (Budgeted Time 1 Min)

The easiest case of deleting a node from BST is the case in which the node to be deleted _____

Answer (Please select your correct option)

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☒ Is a leaf node

p 170

☐

☐ Has left subtree only

☐

☐ Has right subtree only

☐

☐ Has both left and right subtree

☐

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Question No : 4 of 52

Marks: 1 (Budgeted Time 1 Min)

Consider the following array
23 15 5 12 40 10 7
After the first pass of a particular algorithm, the array looks like
15 5 12 23 10 7 40
Name the algorithm used

Answer (Please select your correct option)

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☐ Heap sort

☐

☐ Selection sort

☐

☐ Insertion sort

☐

☒ Bubble sort

☐

rep

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Question No : 5 of 52

Marks: 1 (Budgeted Time 1 Min)

Suppose we had a hash table whose hash function is " $n \% 12$ ", if the number 35 is already in the hash table, which of the following numbers would cause a collision?

Answer (Please select your correct option)

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☐ 144

☐

☒ 145

☐

not sure

☐ 143

☐

☐ 148

☐

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Question No : 6 of 52

Marks: 1 (Budgeted Time 1 Min)

What requirement is placed on an array, so that *binary search* may be used to locate an entry?

Answer (Please select your correct option)

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☐ The array elements must form a heap.

☐ The array must have at least 2 entries.

☒ The array must be sorted.

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☐ The array's size must be a power of two.

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Question No : 7 of 52

Marks: 1 (Budgeted Time 1 Min)

Which Boolean expression indicates whether the numbers in two nodes (p and q) are the same. Assume that neither p nor q is null.

Answer (Please select your correct option)

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☐ p.data == q.data

☐ p.nextNode == q.nextNode

☐ p.data = q.data

☐ p == q

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Question No : 8 of 52

Marks: 1 (Budgeted Time 1 Min)

_____ is the stack characteristic but _____ was implemented because of the size limitation of the array.

Answer (Please select your correct option)

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☐ isFull(),isEmpty()

☐ pop(), push()

☒ isEmpty() , isFull()

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☐ push(),pop()

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Question No : 9 of 52

Marks: 1 (Budgeted Time 1 Min)

A kind of expressions where the operator is present between two operands, is called _____ expressions.

Answer (Please select your correct option)

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☐ Postfix

☐ Infix

☐ Prefix

☐ Postfix and Prefix

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Question No : 10 of 52

Marks: 1 (Budgeted Time 1 Min)

Consider a min heap, represented by the following array:

3, 4, 6, 7, 5, 10

After inserting a node with value 1. Which of the following is the updated min heap?

Answer (Please select your correct option)

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☐ 3, 4, 6, 7, 5, 10, 1

☐ 3, 4, 6, 7, 5, 1, 10

☐ 3, 4, 1, 5, 7, 10, 6

☒ 1, 4, 3, 7, 5, 10, 6

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Question No : 11 of 52

Marks: 1 (Budgeted Time 1 Min)

Merge sort and quick sort both fall into the same category of sorting algorithms, which is known as:

Answer (Please select your correct option)

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☐ $O(N \log N)$ sorts

☐ Interchange sorts

☐ Quadratic average time sorts

☒ Complex sorts

p 488

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Question No : 12 of 52

Marks: 1 (Budgeted Time 1 Min)

A tree whose all leaves are at the same level, is called:

Answer (Please select your correct option)

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- ☐ Binary Tree
- ☐ Strictly Binary Tree
- ☒ Complete Binary Tree
- ☐ Simple Tree

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Question No : 13 of 52

Marks: 1 (Budgeted Time 1 Min)

Which one of the following is correct about pointers?

Answer (Please select your correct option)

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- ☐ They always point to different memory locations
- ☐ They may point to a single memory location
- ☐ The address of two pointer variables is same
- ☐ They hold the actual value of a variable

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Question No : 14 of 52

Marks: 1 (Budgeted Time 1 Min)

In an array list, the current element is

Answer (Please select your correct option)

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- ☒ The first element
- ☐ The middle element
- ☐ The last element
- ☐ The element where the current pointer points to

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Question No : 15 of 52

Marks: 1 (Budgeted Time 1 Min)

Suppose T is a Binary tree with 14 nodes. What is the minimum possible depth of T ?

Answer (Please select your correct option)

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☐ 0

☐ 3

☒ 4

☐ 5

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Question No : 16 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following statement is NOT true for Huffman code?

Answer (Please select your correct option)

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☐ It is a method for the compression of standard text documents.

☐ It uses Binary tree to develop codes of varying lengths for the letters used in the original message.

☒ It is no more used in any compressed file format.

☐ It is also part of the JPEG image compression scheme.

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Question No : 17 of 52

Marks: 1 (Budgeted Time 1 Min)

The definition of Transitivity property is

Answer (Please select your correct option)

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☐ For all element x member of S, $x R x$

☐ For all elements x and y, $x R y$ if and only if $y R x$

☒ For all elements x, y and z, if $x R y$ and $y R z$ then $x R z$

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☐ For all elements w, x, y and z, if $x R y$ and $w R z$ then $x R z$

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Question No : 18 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following is true for disjoint sets A and B ?

Answer (Please select your correct option)

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☐ Intersection of A & B is equal to B☐ Union of A & B is empty☒ Intersection of A & B is empty☐ Intersection of A & B is equal to A

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Question No : 19 of 52

Marks: 1 (Budgeted Time 1 Min)

Here is an array of ten integers:

5 3 8 9 1 7 0 2 6 4

Array after the FIRST iteration of the main loop in **selection sort** algorithm will be (sorting from smallest to largest) :

Answer (Please select your correct option)

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☒ 0 3 8 9 1 7 5 2 6 4

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☐ 2 6 4 0 3 8 9 1 7 5☐ 2 6 4 9 1 7 0 3 8 5☐ 0 3 8 2 6 4 9 1 7 5

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Question No : 20 of 52

Marks: 1 (Budgeted Time 1 Min)

Suppose A is an array containing numbers in increasing order, but some numbers occur more than once. When using a binary search for a value, the binary search always finds _____

Answer (Please select your correct option)

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☒ the first occurrence of value.

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☐ the second occurrence of value.☐ may find first or second occurrence of value.☐ It will give an error.

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Question No : 21 of 52

Marks: 1 (Budgeted Time 1 Min)

When unions are done by weight (size), the depth of any element is never greater than

Answer (Please select your correct option)

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☒ $\log_2 n$

☐ $n \log_2 n$

☐ $n \log_2 n + 1$

☐ $\log_2 n - 1$

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Question No : 22 of 52

Marks: 1 (Budgeted Time 1 Min)

What is the best definition of *collision* in a hash table?

Answer (Please select your correct option)

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☐ Two entries are identical except for their keys.

☐ Two entries with different data have different keys.

☒ Two entries with different keys have the same hash value.

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☐ Two entries with the same key have different hash values.

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Question No : 23 of 52

Marks: 1 (Budgeted Time 1 Min)

Non-recursive calls are faster than which of the following calls?

Answer (Please select your correct option)

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☐ Parameterized

☒ Recursive

p 159

☐ Function

☐ Non-Function

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Question No : 24 of 52

Marks: 1 (Budgeted Time 1 Min)

How many child nodes a leaf node has in the binary tree:

Answer (Please select your correct option)

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☒ Zero

p 121

☐ One

☐ Two

☐ Three

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Question No : 25 of 52

Marks: 1 (Budgeted Time 1 Min)

Running time of $find(i)$ is proportional to the _____ of the tree containing node i .

Answer (Please select your correct option)

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☐ Weight

☒ Height

☐ Root

☐ Number of links

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Question No : 26 of 52

Marks: 1 (Budgeted Time 1 Min)

Which one may cause the "endless problem" of a process/program?

Answer (Please select your correct option)

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☐ Function call

☐ Recursive function call

☐ Program execution

☐ Compilation of program

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Question No : 27 of 52

Marks: 1 (Budgeted Time 1 Min)

In which of the following, there is no need to go for rotations and balancing?

Answer (Please select your correct option)

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☐ Skip list

☐ AVL tree

☒ Unbalanced tree

☐ None of the given

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Question No : 28 of 52

Marks: 1 (Budgeted Time 1 Min)

In equivalence relations, x to y and y to x sort of relationship is known as.....

Answer (Please select your correct option)

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☐ Concurrency

☐ Transitivity

☒ Symmetry

p 385

☐ Non-Symmetry

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Question No : 29 of 52

Marks: 1 (Budgeted Time 1 Min)

.....in equivalence relations is as, if x leads to y and y to z then x leads to z .

Answer (Please select your correct option)

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☐ Equality

☐ Symmetry

☐ Non-Symmetry

☒ Transitivity

p 385

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Question No : 30 of 52

Marks: 1 (Budgeted Time 1 Min)

The worst case of building a heap of N keys is

Answer (Please select your correct option)

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☐ N

☐ N^2

☒ $N \log N$

☐ 2^N

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Question No : 31 of 52

Marks: 1 (Budgeted Time 1 Min)

A complete binary tree is a tree that is _____ filled, with the possible exception of the bottom level.

Answer (Please select your correct option)

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☐ partially

☒ completely

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☐ incompletely

☐ partly

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Question No : 32 of 52

Marks: 1 (Budgeted Time 1 Min)

In threaded Binary tree, we convert _____ pointers of the tree to threads.

Answer (Please select your correct option)

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☐ Left

☐ Right

☒ NULL

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☐ All

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Question No : 33 of 52

Marks: 1 (Budgeted Time 1 Min)

Compiler is a _____.

Answer (Please select your correct option)

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☐ Language Translator

☐ Database

☐ Network

☐ Data Structure

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Question No : 34 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following is the most significant part of compilers?

Answer (Please select your correct option)

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☐ AVL tree

☒ Expression tree

☐ Array

☐ Binary tree

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Question No : 35 of 52

Marks: 1 (Budgeted Time 1 Min)

If there are N external nodes in a Binary tree, then number of internal nodes will be:

Answer (Please select your correct option)

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☐ N -1

☒ N+1 p 303

☐ N+2

☐ N

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Question No : 36 of 52

Marks: 1 (Budgeted Time 1 Min)

In disjoint sets, union is a _____ time operation.

Answer (Please select your correct option)

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☒ Constant

p 405

☐ Variable

☐ Exponential

☐ Quadratic

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Question No : 37 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following methods is helpful in creating the heap at once?

Answer (Please select your correct option)

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☐ Insert

☐ Add

☐ Update

☒ PerculateDown

p 358

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Question No : 38 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following heap methods, increases the value of key at position 'p' by the amount 'delta'?

Answer (Please select your correct option)

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☒ IncreaseKey(p, delta)

p 363

☐ PerculateDown(p, delta)

☐ DecreaseKey(p, delta)

☐ Remove(p, delta)

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Question No : 39 of 52

Marks: 1 (Budgeted Time 1 Min)

A complete binary tree of height 3 has nodes between _____.

Answer (Please select your correct option)

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☐ 8 to 14

☒ 8 to 15 ref moazz

☐ 8 to 16

☐ 8 to 17

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Question No : 40 of 52

Marks: 1 (Budgeted Time 1 Min)

In case of deleting a node from AVL tree, rotation can expand to the node.

Answer (Please select your correct option)

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☐ Leaf

☒ Root p 262

☐ Left

☐ Right

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Question No : 41 of 52

Marks: 2 (Budgeted Time 4 Min)

For a perfect binary tree of height 5, What will be the sum of heights of nodes?

Answer (Please [click here](#) to Add Answer)

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Rich text editor toolbar with options: Normal, Arial, 12, Bold, Italic, Underline, Bulleted List, Numbered List, Indent, Outdent, Link, Unlink, Image, Table, Undo, Redo, and a 100% zoom level.

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Question No : 42 of 52

Marks: 2 (Budgeted Time 4 Min)

What are postfix expressions?

Answer (Please [click here](#) to Add Answer)

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Question No : 43 of 52

Marks: 2 (Budgeted Time 4 Min)

Give any two important characteristics of skip list.

Answer (Please [click here](#) to Add Answer)

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Question No : 44 of 52

Marks: 2 (Budgeted Time 4 Min)

In array representation of *Union* operation , what does "-1" represent on a particular index?

Answer (Please [click here](#) to Add Answer)

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Question No : 45 of 52

Marks: 3 (Budgeted Time 6 Min)

Which implementation of disjoint set is better with respect to space and why?

Answer (Please [click here](#) to Add Answer)

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A screenshot of a Microsoft Word document. The document is mostly blank, with the text "Made by: Waqar Siddhu" written in a large, bold, black, stylized font at the bottom right. The Word ribbon is visible at the top, showing the "Home" tab with options for font (Normal, Arial, size 12) and paragraph (B, I, U, bulleted list, numbered list, decrease indent, increase indent). The status bar at the bottom left shows the page number "1".

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Question No : 46 of 52

Marks: 3 (Budgeted Time 6 Min)

The following array represents a heap structure:

1	2	3	4	5	6	7	8	9	10	11	12
97	76	61	42	54	59	31	23	17	44	49	

Insert a new value **86** into the heap. Show the resultant heap, after insertion, in the form of array

Answer (Please [click here](#) to Add Answer)

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Question No : 47 of 52

Marks: 3 (Budgeted Time 6 Min)

Here is an array of ten integers:

```
3 5 9 8 1 7 0 2 6 4
```

Draw this array after the **FIRST** iteration of main loop in **selection sort** algorithm (sorting from smallest to largest).

Answer ([Please click here to Add Answer](#))

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Question No : 48 of 52

Marks: 3 (Budgeted Time 6 Min)

For time-based simulation model for bank system, below is the pseudo code of routine of the clock.

```
clock = 0;  
while ( clock <= 24*60 ) ( // one day  
read new customer;  
if customer.arrivaltime == clock
```

Answer (Please [click here](#) to Add Answer)

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Question No : 49 of 52

Marks: 5 (Budgeted Time 10 Min)

Here is an array with exactly 15 elements:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15.

Suppose that we are doing a binary search for an element. Indicate any elements that will be found by examining two or fewer numbers from the array.

Answer (Please [click here](#) to Add Answer)

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Question No : 50 of 52

Marks: 5 (Budgeted Time 10 Min)

Here is an array of ten integers:

5 3 8 9 1 7 0 2 6 4

Sort the array by using **selection sort** algorithm and show content of array after each step.

Answer (Please [click here](#) to Add Answer)

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Marks: 5 (Budgeted Time 10 Min)

Write a public method for `LinkedList` class called `remove_first()` that removes the first element of linked list.

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Marks: 5 (Budgeted Time 10 Min)

Apply BuildHeap method on the elements of following array (reading from left to right) to convert them into a Min Heap. Show its contents in the form of array as shown below,

original array	6	5	3	9	1	2	10	8	-
Heapified array									

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The screenshot shows a Microsoft Word window. The title bar reads "Microsoft Word - [Untitled-1].docx". The ribbon is set to the "Home" tab, with the "Font" group selected. The font face is "Normal", the size is "12", and the style is "Normal". The text "Made by: Waqar Siddhu" is written in a large, bold, black, cursive font across the bottom of the page. A faint, light blue watermark is visible in the background, reading "Waqar Siddhu" in a stylized font.

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