



K. J. Somaiya College of Engineering, Mumbai-77
(A constituent College of Somaiya Vidyavihar University)

Batch: A2 Roll. No.: 16010122041

Experiment:

Grade: AA / AB / BB / BC / CC / CD /DD

Title: Using virtual labs to understand the data structures

Objective: Use of virtual labs to understand the concepts and theory with examples and verify the same with practice questions.

Expected Outcome of Experiment:

CO	Outcome
CO1	Explain the different data structures used in problem solving
CO2	Apply linear and non-linear data structure in application development
CO3	Demonstrate sorting and searching methods.

Websites/books referred:

Abstract: the virtual lab experiments help in understanding how various data structures work. They also emphasize on some important applications of various data structures and enable students to get familiarized with how certain applications can benefit from the choice of data structures.



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Assigned data structure: (Teacher would assign one of the following to one student)

1. Stack - <https://ds1-iiith.vlabs.ac.in/exp/stacks-queues/stacks/stackdemo.html>
2. Infix and postfix - https://ds1-iiith.vlabs.ac.in/exp/infix-postfix/evaluation-of-postfix-expressions/postfix_eval.html
3. Queue - <https://ds1-iiith.vlabs.ac.in/exp/stacks-queues/stacks/stackdemo.html>
4. Bubble sort - <https://ds1-iiith.vlabs.ac.in/exp/bubble-sort/bubble-sort/bsexercise.html>
5. Graph DFS - <https://ds1-iiith.vlabs.ac.in/exp/depth-first-search/index.html>
6. Graph BFS - <https://ds1-iiith.vlabs.ac.in/exp/breadth-first-search/index.html>
7. Binary search tree - <https://ds1-iiith.vlabs.ac.in/exp/binary-search-trees/bst-insert/bstInsert.html>
8. Hash tables - https://ds1-iiith.vlabs.ac.in/exp/hash-tables/quadratic-probing/qp_practice.html
9. Linked list - <https://ds1-iiith.vlabs.ac.in/exp/linked-list/singly-linked-list/sllpractice.html>

Aim / learning objective of the assigned expt: Bubble Sort (4)

The aim of the virtual lab experiment on bubble sort is to explore how the bubble sort algorithm functions and assess its sorting performance.

Concept and algorithm of the application/activity followed:

Bubble sort is a simple sorting algorithm that repeatedly compares and swaps adjacent elements in a list until the largest element "bubbles up" to its correct position at the end. This process is repeated until the entire list is sorted. While easy to understand, bubble sort is not efficient for large lists, and more efficient sorting algorithms are preferred for practical applications.



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Execution screenshots:

The screenshot shows a web browser window with the URL `ds1-iith.vlabs.ac.in/exp/bubble-sort/bubble-sort/bsexercise.html`. The page title is "Bubble Sort". Below the title is a dropdown menu labeled "Instructions". The main content area displays the question: "Sort the given array using Bubble Sort." Below the question is an array of numbers: 51, 79, 95, 71, 61, 99. The numbers 51, 79, and 95 are in blue boxes, while 71, 61, and 99 are in green boxes. Below the array is a section labeled "Observations" with the text "Number of iterations: 0". At the bottom of the interface are five buttons: "Submit", "Next", "Swap", "Undo", and "Reset".

The screenshot shows the same web browser window as the first screenshot, but the array of numbers has changed to: 51, 79, 71, 61, 95, 99. The numbers 51, 79, and 71 are in blue boxes, while 61, 95, and 99 are in green boxes. The "Observations" section now displays "Number of iterations: 1". The rest of the interface, including the "Instructions" dropdown and the buttons at the bottom, remains the same.



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Somaiya Vidyavihar Course: Data Structures_SY_A_2023 Virtual Labs

ds1-iiith.vlabs.ac.in/exp/bubble-sort/bubble-sort/bsexercise.html

Virtual Labs An IITB-Govt of India Initiative

Bubble Sort

Instructions

Question: Sort the given array using Bubble Sort.

51	71	61	79	95	99
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Observations

Number of iterations: 2

Submit Next Swap Undo Reset

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ds1-iiith.vlabs.ac.in/exp/bubble-sort/bubble-sort/bsexercise.html

Virtual Labs An IITB-Govt of India Initiative

Bubble Sort

Instructions

Question: Sort the given array using Bubble Sort.

51	61	71	79	95	99
----	----	----	----	----	----

Observations

Number of iterations: 3

Submit Next Swap Undo Reset



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Instructions

Question: Sort the given array using Bubble Sort.

51	61	71	79	95	99
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Observations

CORRECT ANSWER

Submit Next Swap Undo Reset

Conclusion and your take away after performing the virtual lab experiment: -
Bubble sort is a simple sorting algorithm that repeatedly swaps adjacent elements until the list is sorted. The experiment underscores the importance of understanding sorting algorithms and their efficiency.