

SORTING ALGORITHMS

Project Report

*Submitted in Partial fulfillment of the
Requirement for the Award of the Degree of*

*Master of Computer Application
Semester IX
Session Jan-Feb, 2021*

**Under Guidance
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**Submitted by
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**International Institute of Professional Studies
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2021**

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DECLARATION

We hereby declare that the project entitled “**SORTING ALGORITHMS**” submitted by us for the partial fulfillment of the requirement for the award of Master of Computer Application Technology (6 years) Semester IX to International Institute of Professional Studies, Devi Ahilya Vishwavidyalaya , Indore comprises our own work and due acknowledgement has been made in text to all other material used.

Signature of Students:

Date :

Place:

**International Institute of Professional Studies
Devi Ahilya Vishwavidyalaya, Indore, M.P.**

CERTIFICATE FROM GUIDE

It is to certify that dissertation on “**SORTING ALGORITHMS**”, submitted by **Mr. Shubham Namdev** to the International Institute of Professional Studies , DAVV, Indore has been completed under my supervision and the work is carried out and presented in a manner required for its acceptance in partial fulfillment for the award of the degree of “**Master of Computer Application (6 years) Semester IX**” .

Project Guide:

Signature : _____

Name : _____

Date : _____

**International Institute of Professional Studies
Devi Ahilya Vishwavidyalaya, Indore, M.P.**

CERTIFICATE

It is to certify that we have examined the desertion on “**SORTING ALGORITHMS**” , submitted by and **Mr. Shubham Namdev** to the International Institute Of Professional Studies, DAVV, Indore and hereby accord our approval of it as a study carried out presented in a manner required for its acceptance in partial fulfillment for the award of the degree of “**Master of Computer Technology (6 years) Semester XI**” .

Internal Examiner

Signature : _____

Name : _____

Date : _____

External Examiner

Signature : _____

Name : _____

Date : _____

ACKNOWLEDGEMENT

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We acknowledge our sincere thanks to those who have contributed significantly to this project. It is a pleasure our extend my deepest gratitude to **Dr. Jugendra Dongre** , for her valuable guidance and constant supervision as well as providing necessary information regarding the project and also for her support in completing the project.

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We thank and acknowledge each and everyone's efforts that helped us in some or the other way for small and significant things.

Before ending we would like to thank our parents, and friends who have always stood by us whenever we were in need of them. We sincerely regret any inadvertent omissions.

With our heartiest thanks to all.

Shubham Namdev(IC-2k16-88)

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1.INTRODUCTION

What is sorting?

In computer science a sorting algorithm is an algorithm that puts elements of a list in a certain order. The most-used orders are numerical order. Sorting is important for optimizing the use of other algorithms (such as search and merge algorithms) which require input data to be in sorted lists. It is also often useful for arranging data and for producing human-readable output. More formally, the output must satisfy two conditions:

1. The output is in non-decreasing order (each element is no smaller than the previous element according to the desired total order)
2. The output is in non-increasing order (each element is no larger than the previous element according to the desired total order)

Further, the data is often taken to be in an array, which allows random access, rather than a list, which only allows sequential access, though often algorithms can be applied with suitable modification to either type of data.

2. PROBLEM DEFINITION

2.1. AIM:

The aim of this project is to sort elements in timely manner with various types of sorting algorithm and what is the best algorithm from all.

2.2 OBJECTIVES:

The objectives of the development are as follows:

- To save the user time .
- To give simple interface to user.
- Colorful display eye catching console.
- Getting best result without any kind of complexity.

2.3 GOALS:

- The main goal of this project is to less the human effort to sort data in increasing order.

2.4 WORKING:

In computer science, a **sorting algorithm** is an algorithm that puts elements of a list in a certain order. The most frequently used orders are numerical order and lexicographical order. Efficient sorting is important for optimizing the efficiency of other algorithms (such as search and merge algorithms) that require input data to be in sorted lists. Sorting is also often useful for canonicalizing data and for producing human-readable output. More formally, the output of any sorting algorithm must satisfy two conditions:

1. The output is in nondecreasing order (each element is no smaller than the previous element according to the desired total order);
2. The output is a permutation (a reordering, yet retaining all of the original elements) of the input.

2.5 PROPOSED SYSTEM AS A SOLUTION:

For optimum efficiency, the input data in fast memory should be stored in a data structure which allows random access rather than one that allows only sequential access.

Sorting algorithms are often referred to as a word followed by the word "sort" and grammatically are used in English as noun phrases, for example in the sentence, "it is

inefficient to use insertion sort on large lists" the phrase *insertion sort* refers to the insertion sort sorting algorithm.

2.6 SCOPE OF PROJECT:

An important key to algorithm design is to use sorting as a basic building block, because once a set of items is sorted, many other problems become easy.

- Sorting algorithm using Parallel processing.
- In future, we shall explore and support it with experimental results on data which could not only be numeric but also text, audio, video, etc.

3.FEASIBILITY STUDY

Feasibility study conducted once the problem is clearly understood. Feasibility study is a high-level capsule version of the entire system-analysis and design process. The objective is to determine quickly and at the minimum expense how to solve the problem and to determine the problem is solved. The system has been tested for feasibility in the following ways.

3.1 ECONOMIC FEASIBILITY:

Economic analysis is the most frequently used method for evaluating the effectiveness of a of candidate system. More commonly known as cost/benefit analysis, the procedure is to determine the benefits and savings that are expected from a candidate system and compares them with costs. If benefits outweigh costs, then the decision is made to design and implement the system. Otherwise, further justification or alternations in the proposed system will have to be made if it is to have a chance of being approved.

3.2 TECHNICAL FEASIBILITY:

Technical feasibility centers around the existing computer system (hardware, software, etc.) and to what extent it can support the proposed addition. For example, if the current computer is operating at 80 percent capacity - an arbitrary ceiling – then running another application could overload the system or require additional hardware.

3.3 BEHAVIORAL FEASIBILITY:

People are inherently resistant to change, and computers have been known to facilitate change. An estimate should be made of how strong a reaction the user staff is likely to have toward the development of a computerized system. It is common knowledge that computer installation has something to do with turnover, transfers and changes in employee job status. Therefore, it is understandable that the introduction of a candidate system requires special effort to educate, sell and train the staff on new ways of conducting business.

4.PROJECT PLANNING

The most critical phase is planning. Many systems are now have been used.

4.1 PROJECT SCOPE:

An important key to algorithm design is to use sorting as a basic building block, because once a set of items is sorted, many other problems become easy.

- Sorting algorithm using Parallel processing.
- In future, we shall explore and support it with experimental results on data which could not only be numeric but also text, audio, video, etc.

4.2 DEVELOPMENT PLAN:

Design and implementation of this project has been carried out in a completely step by step manner :

- Idea of Project
- Language Preference
- Designing
- Coding
- Testing
- Project Report

4.3 PROJECT DELIVERABLES :

1. Project Report:

Project report provides an introduction of our project. It gives us a brief knowledge of our project.

2. Project Documentation :

A complete Documentation is given in the form of C++ code.

3. Project Report:

The installation of software is Turbo c++ These software's are essential for the smooth and proper running of project.

4.4 TEAM STRUCTURE :

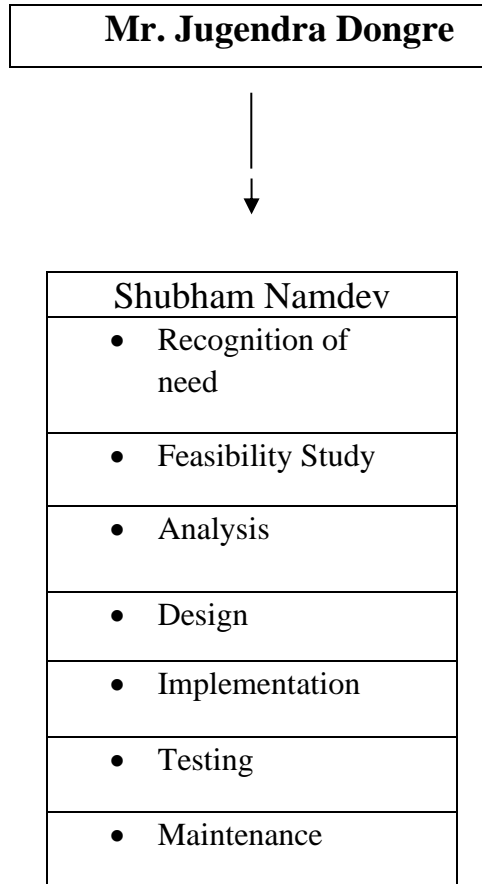
This project will be made under the supervision of Mr. Jugendra Dongre Sir who will be guiding us regarding the successful implementation of this project.

The following are the students working under this project with their respective roles:

Rahul Meena

- Analysis: System study and organizational knowledge. Problem identification analysis and problem solving.
- Design: Includes the design of application, network, databases, user interfaces and system interfaces. Prepare a design document which will be used during next phases
- Maintenance: Implement the changes that software might undergo over a period of time and implement the new requirements.
- Implementation: Implement the design into source code through coding and combine all the modules together.
- Recognition: Gather and validate the system.
- Feasibility Study: Define the problem and scope of existing system. Overview the new system and determine its objective and produce the project schedule.

Below figure is used to describe team structure(figure 1):



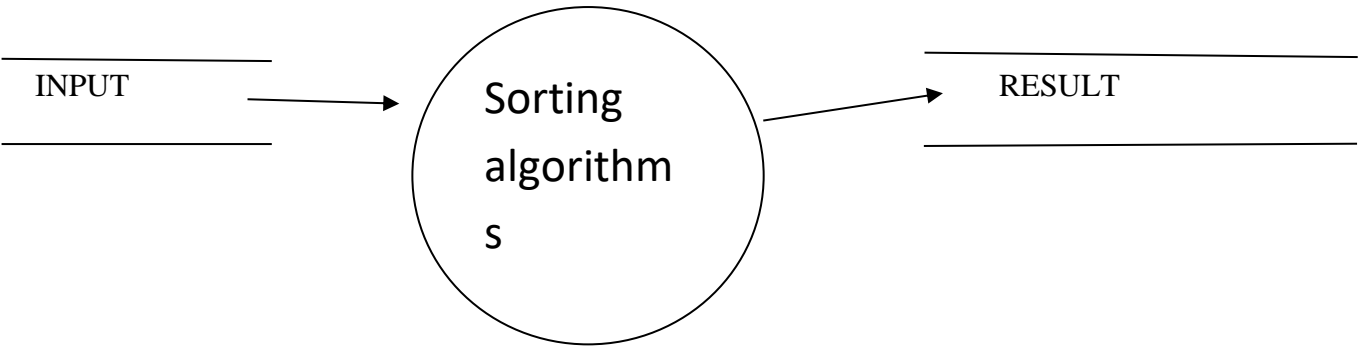
4.5 GANTT CHART:

Analysis	27 NOV				
Design		10 DEC			
Implementation			6 JAN		
Testing				20 JAN	
Report Making					15 FEB

(fig. 2 Gantt Chart)

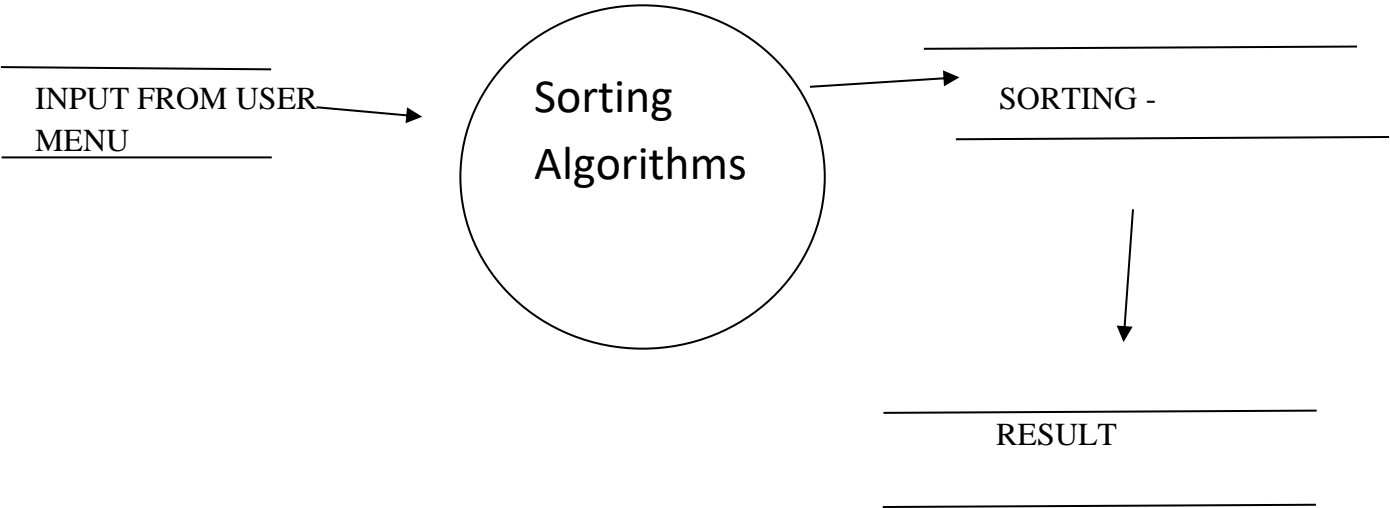
5.REQUIREMENT ANALYSIS

5.1 DATA FLOW DIAGRAM (DFD):



(GENERALIZED FORM)

(FIRST LEVEL DFD)



5.2 PERFORMANCE REQUIREMENT:

5.2.1 HARDWARE REQUIREMENT:

Any Intel Pentium Processor

Minimum 512 MB RAM

Minimum 80GB HARDISK

Mouse

Laptop

5.2.1 SOFTWARE REQUIREMENT:

Operating System : Windows 10

Coding language : **CPP**

6. TESTING AND IMPLEMENTATION

6.1 TEST PLAN AND TEST CASES:

The first step in system testing is to prepare a plan that will test all the aspects of the system in a way that promotes its credibility among potential users:

A test plan entails the following activities :

1 Prepare test plan :

- Outputs expected from the system.
- Criteria for evaluating outputs.
- A volume of test data.
- Procedure for using test data.
- Personnel and training requirements.

- 2 **Specify conditions for user acceptance testing :** Planning for user acceptance testing calls for the analyst and the user to agree on the conditions for the test.
- 3 **Prepare test data :** As each program is coded, test data are prepared and document to ensure that all aspects of the program are properly tested.
- 4 **Prepare test data for transaction path testing :** This activity develops the data required for testing every condition and transaction to be introduced into the system.
- 5 **Plan user training :** User testing is designed to prepare the user for testing and converting the system.
- 6 **Compile/Assemble program :** All programs are to be compiled for testing. However, a complete program description should be available.
- 7 **Prepare job performance :** In this activity, the materials to be used by the personnel to run the system are specified and scheduled. This includes a display of material such as program codes, a list of input codes attached to the monitor.
- 8 **Program operational documents :** Here, all operational documents are finalized.

The following are some attributes of a good test cases:

- 1 It has high probability of finding out error. To achieve this goal, the tester must understand the software and attempt to develop an actual picture of how software may fail.
- 2 It is not redundant: testing time and resources are limited.
- 3 It should be best of breed.
- 4 It should be neither so simple nor so complex.

6.2 TEST CRITERIA AND OBJECTIVES:

In system testing , performance and acceptance standards are developed. Substandard performance or service interruption that results in system failure are checked during the test. The following performance criteria are used for system testing :

- 1 Turnaround time : This is the elapsed time between the receipt of the input and the availability of the output.
- 2 File Protection : It pertains to storing files in a separate area for protection against fire, flood, or natural disaster.
- 3 The human factor : During system testing , lightning , air conditioning, noise and other environmental factors are evaluated with people's desk, chairs, CRT's etc. Hardware should be designed to match human factor. This is referred to as ergonomics.

TEST OBJECTIVE :

- 1 Inadequate testing or non – testing leads to error that may appear until months later.
- 2 Another objective is that is its utility as a oriented vehicle before implementation.

6.3 IMPLEMENTATION:

Implementation is the process of converting the new designed system into the operational one. There are various types of implementation. Some of these are as follows:

- 1 Implementation of a computer system to replace a manual system.
- 2 Implementation of a new computer system to replace an existing system.
- 3 Implementation of a modified application to replace an existing one.

We are following the second implementation method to implement our system. In implementing our system, we do not need to give very hard user training.

For conversion, we will use the parallel system method. The old system and the new system will be in operation simultaneously. This will provide the greatest security.

The new system will be implemented fully after sometime on the basis of feedback given by the user.

6.3 SCREENS AND SNAPSHOTS:

SORTING - MENU

Bubble-Sort

Heap-sort

Selection-Sort

Insertion-Sort

Quick-sort

Merge-sort

Shell_sort

Quit

MENU

Enter how many elemnets = 15

Input array

Enter 1 element = 1
Enter 2 element = 9
Enter 3 element = 2
Enter 4 element = 8
Enter 5 element = 3
Enter 6 element = 7
Enter 7 element = 4
Enter 8 element = 6
Enter 9 element = 5
Enter 10 element = 0
Enter 11 element = 99
Enter 12 element = 888
Enter 13 element = 444
Enter 14 element = 532
Enter 15 element = 532

Sorted array

1 Element is = 0
2 Element is = 1
3 Element is = 2
4 Element is = 3
5 Element is = 4
6 Element is = 5
7 Element is = 6
8 Element is = 7
9 Element is = 8
10 Element is =9
11 Element is =99
12 Element is =444
13 Element is =532
14 Element is =888
15 Element is =899

RESULT OF BUBBLE SORT

ENTER CHOICE

SORTING - MENU

Bubble-Sort
Heap-sort
Selection-Sort
Insertion-Sort
Quick-sort
Merge-sort
Shell_sort
Quit

QUIT

No index entries found.

best algo is Quick sort

Thanks

For using

This

Project

7.BIBLIOGRAPHY

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Data Structure Using C & C++ (Rajesh K. Shukla)

Website :- www.tutorialspoints.com

www.geeksforgeeks.com

www.youtube.com

