Set Operation System(C++)

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Abstract

Set operations are fundamental concepts in mathematics and computer science. This paper presents the implementation of union, intersection, and difference of sets using the C++ programming language. Basic programming constructs such as arrays, loops, conditional statements, and functions are used instead of built-in data structures. The project helps beginners understand the logical implementation of mathematical concepts in programming

I. INTRODUCTION

Set operations are fundamental concepts in mathematics and computer science. This paper presents the implementation of union, intersection, and difference of sets using the C++ programming language. Basic programming constructs such as arrays, loops, conditional statements, and functions are used instead of built-in data structures. The project helps beginners understand the logical implementation of mathematical concepts in programming..

II. Problem System

Many beginner programmers understand the theory of set operations but face difficulty while implementing in the code. The problem addressed in this project is how to efficiently perform set operation using basic Knowledge of functions, loops, arrays, switch statements while ensuring clarify correctness and simplicity.

III . System Design

The system accepts usrer input for two sets. Each set is stored in an aarray. Separate functions are designed for union intersections and difference opertions . Control structures ensure that duplicates elements area avided in the output

IV. Algorithm Description

The algorithm begins by reading the number of elements and values of both sets. For union, elements from the first set are copied directly while the second set is checked for duplicates. For intersection, elements are compared and common values are stored. For difference, elements of the first set not found in the second set are selected.

V. Implementation Details

The project is implemented in C++ using arrays and functions. Nested loops are used for comparison of elements. Conditional statements ensure logical correctness. The modular structure of the code improves readability and maintainability

VI. Results and Discussion

The program successfully performs all specified set operations. Test cases confirm correct behavior for different input sizes. The results demonstrate the accuracy and efficiency of the implemented logic for small to medium-sized datasets

VII. Limitations

The current implementation supports only integer values and uses fixed-size arrays. Input validation is minimal, and the program does not include a graphical interface.

VIII. Future Enhancement

The current implementation supports only integer values and uses fixed-size arrays. Input validation is minimal, and the program does not include a graphical interface.

IX. Conclusions

This project effectively demonstrates the implementation of set operations using C++. It bridges the gap between mathematical theory and programming practice, making it an excellent learning resource for beginner-level students.

X. References

[1] B. Stroustrup, The C++ Programming Language, Addison-Wesley, 2013. [2] E. Balagurusamy, Object Oriented Programming with C++, McGraw-Hill, 2017. [3] T. H. Cormen et al., Introduction to Algorithms, MIT Press, 2009.

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