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CodeFlow

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Abstract

CodeFlow is a web-based educational platform designed to help novice programmers understand programming concepts and construct logical program flows. It features a drag-and-drop interface for creating program code using flowchart elements and converts flowcharts to textual code and vice versa. The platform includes step-by-step execution with memory map visualization, simplifying complex programming concepts. CodeFlow aims to enhance comprehension, problem-solving skills, and confidence among beginners, bridging the gap between visual and textual programming.

Introduction

CodeFlow tackles the challenge novice programmers face in understanding abstract programming concepts and constructing logical flows. This web-based platform features an intuitive drag-and-drop interface using flowchart elements. Its core innovation is converting flowcharts into textual code and vice versa.

With step-by-step flowchart execution and memory map visualization, CodeFlow allows learners to see data manipulation during execution. This interactive environment simplifies programming complexities, making fundamental concepts more accessible. The project integrates visual programming, algorithm design, and educational technology.

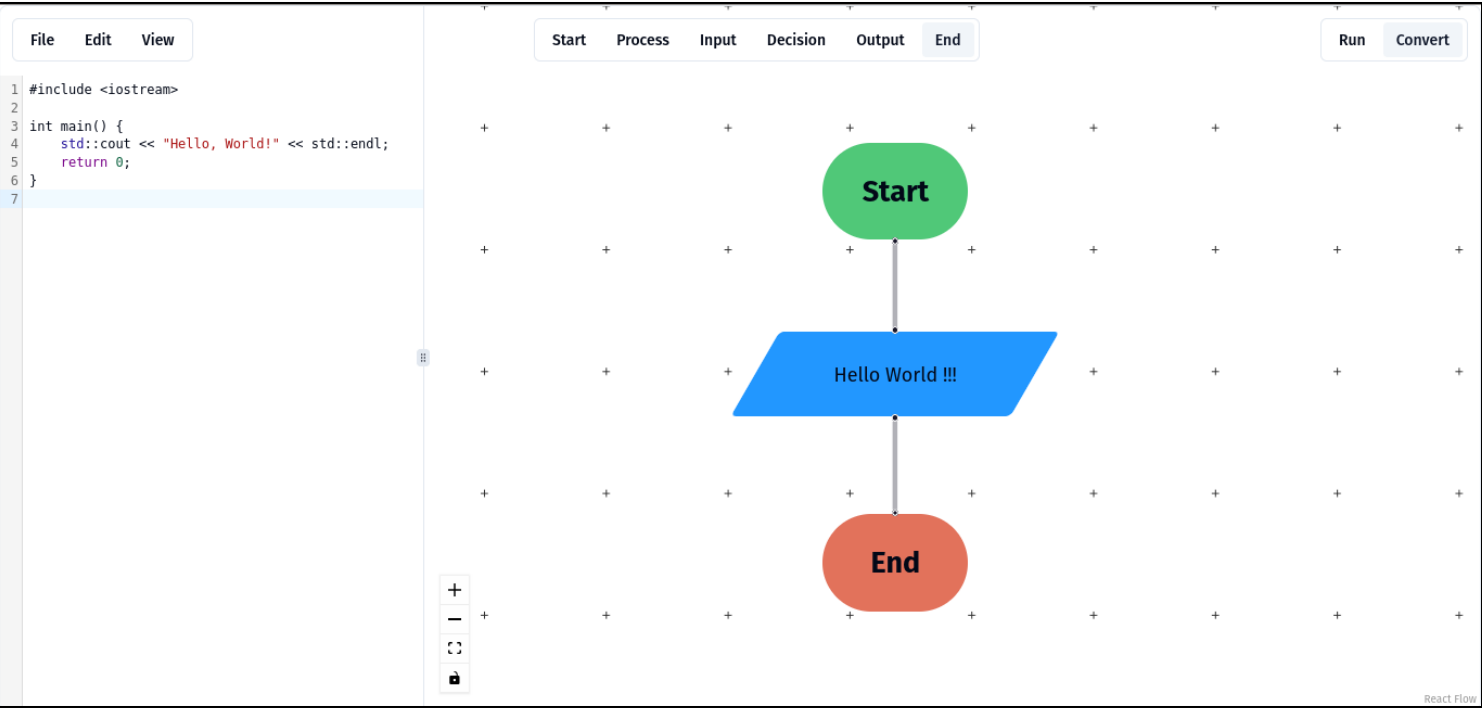
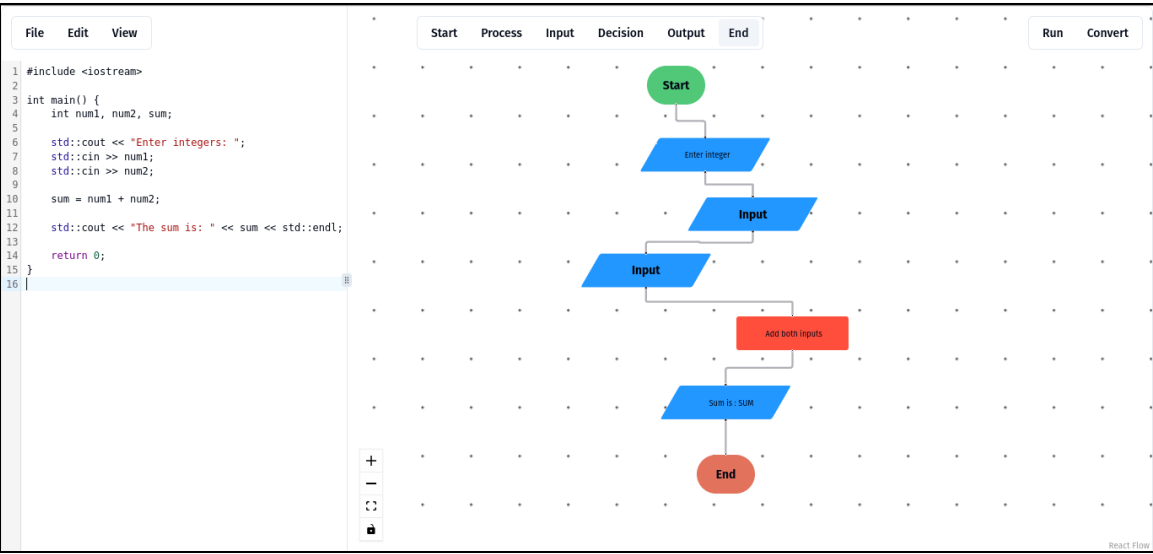
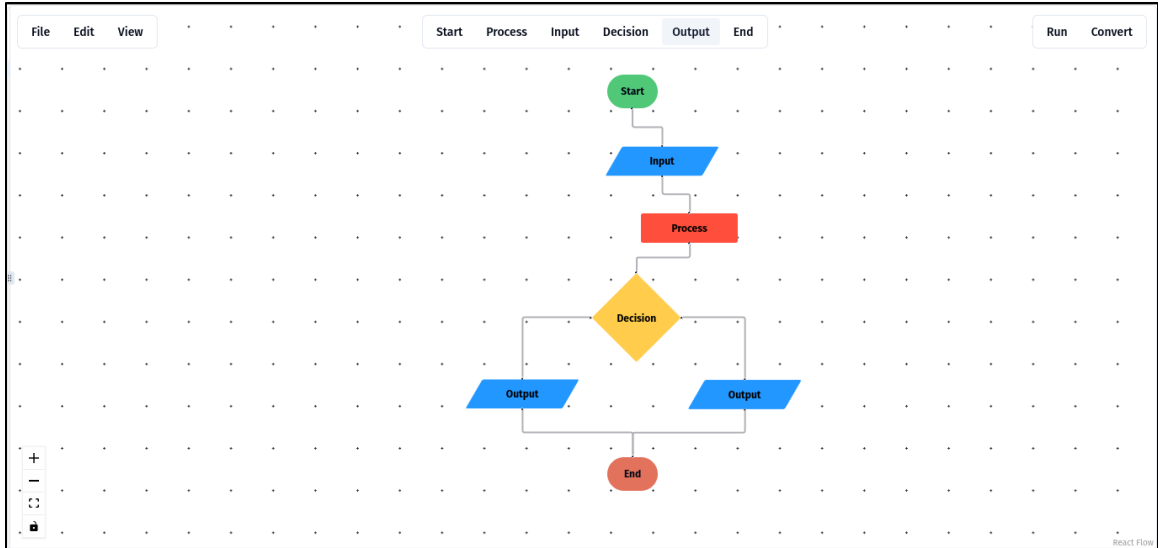
Expected outcomes include better comprehension of programming principles, improved problem-solving skills, and increased confidence among novices. CodeFlow is a transformative tool in programming education, bridging visual and textual programming for deeper understanding and retention of coding concepts.

Methods and Materials

CodeFlow was developed to offer an intuitive drag-and-drop flowchart creation experience. The platform features seamless conversion between flowcharts and textual code and integrates step-by-step code execution with memory map visualization. Key functionalities include flowchart-to-code and code-to-flowchart conversions, real-time program execution visualization, and export/import capabilities for flowcharts. Comprehensive test cases were designed to validate these features, with iterative user feedback from novice programmers guiding improvements. The platform operates on standard computing devices with internet access and modern web browsers.

What Users Can Do

- Create program logic using a drag-and-drop flowchart interface.
- Convert flowcharts to executable C++ code and vice versa.
- Execute programs step-by-step with real-time memory map visualization.
- Debug and understand code flow through execution visualization.
- Export flowcharts as PNG or JSON files.
- Import flowcharts for further editing.
- Save and load projects for continued work.



Conclusion

CodeFlow provides an innovative solution to the challenges faced by novice programmers in understanding abstract programming concepts and constructing logical program flows. By integrating an intuitive drag-and-drop interface, accurate conversion between flowcharts and textual code, and real-time execution visualization, CodeFlow makes programming more accessible and engaging. The platform enhances learning by simplifying complex concepts, improving problem-solving skills, and boosting confidence among beginners. As a comprehensive educational tool, CodeFlow bridges the gap between visual and textual programming, paving the way for a deeper understanding and retention of coding principles, and ultimately transforming programming education.

References

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