Visual Programming Languages are valuable tools for teaching programming concepts, allowing visual abstraction of code blocks. Blockly is a web-based, client-side JavaScript library for rapidly building visual programming editors. We discuss the development of a visual programming application with Blockly, and present two case studies created for this project that demonstrate the power and flexibility of Blockly.

Pixy [2] provides an environment for students to practice media computation [3] (in particular, pixel manipulation of images). Using custom Blockly blocks, users can iteratively develop their own programs and manipulate the RGB values of the pixels of an image. In order to make full use of the Blockly library, it is necessary to define custom blocks that interact with a web application's internal API. The implementation of custom blocks requires both a definition—in which the Blockly library is extended to contain the name, shape, color, label, and other attributes (e.g., variables)—and its corresponding code generation, which returns a string of code to be executed upon the block's execution. Shown to the bottom-right is the definition and code generation for the "change red value of pixel p to 0."

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Blockly is entirely client-side and must be included into the web page by both loading the necessary JavaScript files and by injecting Blockly into a fixed `<div>`.

After including the above script tags in a web app's HTML, Blockly may be injected into an empty `<div>` element with JavaScript similar to the following:

```javascript
Blockly.inject(document.getElementById('toolbox'))
```

References


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