Programming with:
Less Keyboard.
More Mouse.
<table>
<thead>
<tr>
<th>Programming Language</th>
<th>Direct Manipulation</th>
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<tbody>
<tr>
<td>2D Graphics</td>
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<tr>
<td>Presentations</td>
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<tr>
<td>Documents</td>
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<tr>
<td>Spreadsheets</td>
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<tr>
<td>Web Apps</td>
<td><img src="image" alt="Google Apps" /></td>
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</tbody>
</table>
Programming Language

General-Purpose Languages

Domain-Specific Languages or Libraries

Domain-Specific GUI Tools

2D Graphics

Presentations

Documents

Spreadsheets

Web Apps

JS

Latex

Lua

SQL

Sass

Ai

P

Google Web Designer

Direct Manipulation
<table>
<thead>
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<td>Latex, Scholarly MD</td>
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<td>M, Sass</td>
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</tbody>
</table>
$\lambda$-Calculus + Direct Manipulation
\(\lambda\text{-Calculus} + \text{Direct Manipulation of Output}\)
Sketch-n-Sketch: Direct Manipulation Programming

Ravi Chugh
Brian Hempel
Justin Lubin
Mikaël Mayer
Semi-Automated Programming by Manipulating Output
Prototype | Draw
---|---
Repair | Relate
Refactor | Group
Refine | Tweak
This Seminar:

Brainstorming for Direct Manipulation Programming

MAKE

things with
Programming Languages
and/or
Direct Manipulation Editors
This Seminar:
Brainstorming for Direct Manipulation Programming

MAKE
things with
Programming Languages
and/or
Direct Manipulation Editors

READ
papers about
Programming Languages
and/or
Direct Manipulation Editor
Idea

Prototype; Repair; Refactor; Repeat