Websites need to be displayed on a panoply of different devices today, but most websites are designed with fixed widths only appropriate to workstations. We propose to programmatically rewrite websites into responsive (parameterized) formats which adapt the website layout to different devices’ displays on the fly.

Responsive Design

Responsive Design allows websites to be displayed on a variety of different devices. It involves rewriting websites into responsive formats that adapt to different devices’ displays on the fly. The HTML & CSS specifications are exceedingly complex. Rather than attempt to manipulate and reason about HTML/CSS documents, we immediately reduce documents to a collection of boxes. Unlike most webpage segmentation and analysis systems, ReMorph prepares webpages for resynthesis. Lexed boxes can be repositioned and resized by JavaScript while maintaining the original CSS styling.

Retargeting as Compilation

Retargeting can be viewed as a form of compilation, where the input is a webpage and the output is a layout that adapts to different devices. This process involves several steps:

1. **Lexer**: The input boxes define a logical grid. Each sub-rectangle of this grid is a dynamic programming subproblem.
2. **Parser**: For example, dynamic programming may solve for the grouping depicted here. The concrete grouping of boxes corresponds to the abstract layout tree shown here.
3. **Adaptive Layouts via LASM**: LASM uses a vocabulary of only 6 nodes to arrange boxes (box) and whitespace (space) horizontally, vertically, and in depth (row, col, stack), while allowing for arbitrary discrete changes in layout (if).
4. **Code Gen**: We expand the layout tree into a Layout Assembly program by macro-substituting each node with a chunk of LASM. The result of running the LASM program at two different widths, note the discrete shift caused by the if node.

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