The Replacement Modeler

Available on the EECS instructional computers is a tool called the Replacement Modeler. This tool slows down and clarifies the process of evaluation; later in CS 3S you will find it useful for debugging your code.

The Replacement Modeler is activated by evaluating a call to the function model. The model function takes a single argument, an expression whose evaluation is to be modeled. When called, model displays a window called “Replacement Modeler”, which you may move and resize just like other windows.

A complete Scheme expression will always be selected and highlighted in the Replacement Modeler window. At any point, you may do one of the following:

- Hit enter. That completely evaluates the selected expression, then rewrites the complete expression of which it is a part with the resulting value substituted.
- Hit return. That performs the next step of the evaluation of the selected expression: either its arguments are evaluated, or the function is applied to the argument values if they are already in simplest form. The complete expression is then rewritten as just described.
- Select some other part of the displayed expression by single-clicking on the corresponding left or right parenthesis.

This is easier to do than to explain, so here’s an example. When the expression

\[(model \ (+\ (*\ (-\ 10\ 7)\ (+\ 4\ 1))\ (-\ 15\ (/\ 12\ 3))\ 17))\]

is evaluated, a window appears:

![Replacement Modeler Window Example](image)
(The examples shown are from the Macintosh implementation. The Modeler works similarly on a UNIX account.) Hitting return performs one step of the evaluation, namely evaluating the arguments of +:

![Image of Replacement Modeler interface]

One may, however, wish to explore steps of the evaluation of the argument expressions. Clicking on, say, the left parenthesis of the multiplication and hitting return twice gives

![Image of Replacement Modeler interface after clicking on the left parenthesis]

On the Macintosh version, the replaced expression appears in boldface to make it easy to see the correspondence between the expression and its replacement.