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.

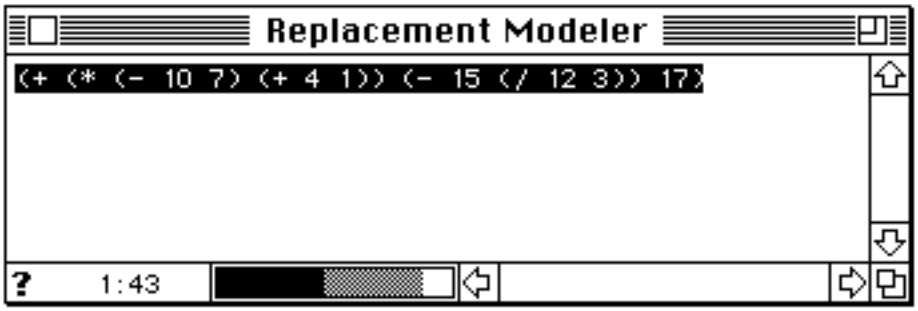
A complete Scheme expression will always be selected and highlighted in the Replacement Modeler window. At any point, you may do one of the following:

- 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.

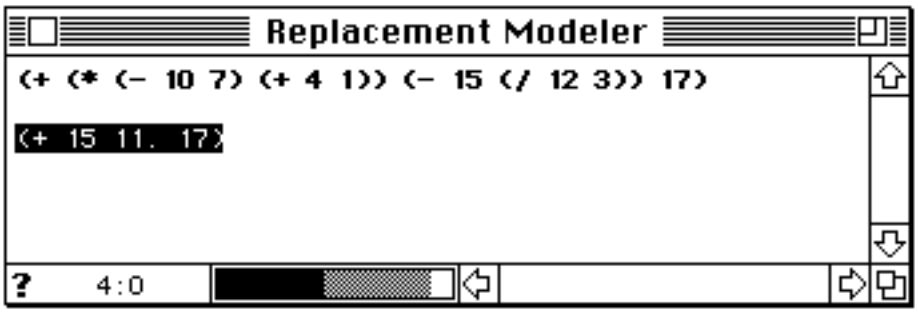
This is easier to do than to explain, so here's an example. When the expression

```
(model (+ (* (- 10 7) (+ 4 1)) (- 15 (/ 12 3)) 17))
```

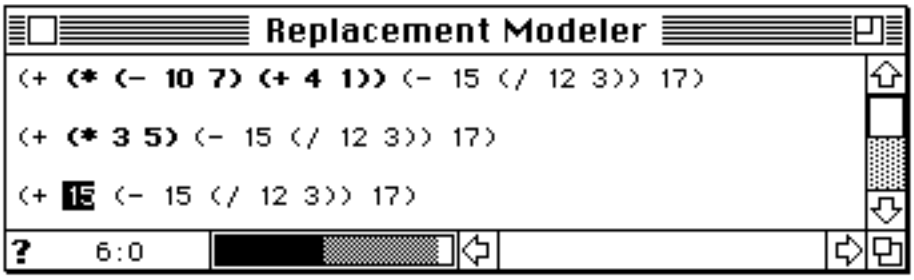
is evaluated, a window appears:



(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 +:



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



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