

Problem Set 9: The Metacircular Evaluator

Out: Tuesday, 21 November 2006

Due: Thursday, 5 December 2006

Overview: In this problem set, you'll make modifications to the metacircular evaluator, changing UML Scheme.

To run the metacircular evaluator, download `mceval.ss` from the course web site. Use the MzScheme language in DrScheme. After executing the code, evaluate `(driver-loop)`. This will run the interactions for your metacircular UML Scheme world. Remember that everything you type in (except for variables and numbers) should be prefixed by `"uml:"` – if you forget, the system will have an error. If you type in an error, the driver-loop exits and you lose the state you had in the metacircular world.

You only need to turn in the portions of the code that you change.

Warm-up:

Run the metacircular evaluator and evaluate some UML Scheme expressions.
Nothing to turn in for this part.

Problem 1:

Exercise 4.4 (“or” only) on p. 374. Remember to tag your new “or” with `"uml:"`.

Problem 2:

Create the `uml:if-not` syntax in the metacircular evaluator:

```
(uml:if-not <pred> uml:then <consequent> uml:else <alternative>)
```

If the predicate is false, the consequent should be evaluated. If the predicate is true, the alternative should be evaluated.

Problem 3:

Add `uml:list` to the metacircular evaluator. It should be a derived expression, meaning that you should convert the `uml:list` expression into a series of `uml:cons` expressions, with a `nil` at the end (`nil`, like `true` and `false`, are added to the global environment when `setup-environment` is evaluated and its value defined as `the-global-environment`). Hint: remember that `uml:cond` was also a derived expression; it was converted to a sequence of `uml:if` statements.

Problem 4:

Exercise 4.10 on p. 376. Choose your own way to change UML Scheme's syntax. You can add a new statement, change the syntax of existing statements, make Scheme be postfix instead of prefix, etc. For this problem, explain what you did as well as turning in the code.