XE: Bridging the Aspect-Oriented Programming Usability Gap

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Introduction
AOP developers lack adequate support for:
- visualizing and identifying the exact points in the code where aspects are woven
- preventing aspect-base code inconsistencies
- evolving aspect-oriented code in a coherent way

Prototype
XE was developed as an extension to PLT Scheme and DrScheme IDEs. XE IDE integrates components around a common relational model, providing meta-interpreters that are responsible for combining aspect and base code in a single view.

Future Work
Future work includes extending XE program model and approach to other programming paradigms, e.g. Java and AspectJ, as an Eclipse plug-in. We also aim at supporting parallel development, when different programmers build a common piece of AOP software.

Example: Banking API
(define (deposit)
  (lambda ()
    (run-deposit 2000)))

(define (withdraw)
  (lambda ()
    (run-withdraw 1000)))

(define (balance)
  (lambda ()
    (run-show-balance)
    (run-print-balance)))

Base code

Evolve

Aspect code

Modify
(define authentication-db-aspect
  (aspect ()
    ((before
      (call
        (or
          (inside deposit *)
          (inside withdraw *)
          (inside balance *))
      (inside balance run-show-balance))
     (begin
       (if (not (authenticate-user-db
                 (get-username)
                 (get-password)))
         (error “Authentication Failure”)
         false)))))

Create by copy-and-paste
(define authentication-db-aspect
  (aspect ()
    ((before
      (call
        (or
          (inside deposit *)
          (inside withdraw *)
          (inside balance run-print-balance))
      (inside balance run-show-balance))
     (begin
       (if (not (authenticate-user-db
                 (get-username)
                 (get-password)))
         (error “Authentication Failure”)
         false)))))

For more information about XE and its prototype, please contact one of the authors at {wruengme, rsilvafi, sbajrach, redmiles, lopes}@ics.uci.edu