CS6110/6116 Friday February 10, 2012

CS6116 Lect 3
CS6110 Lect 9

Evaluation function using closures

We use the lecture notation for <u>closures</u> $\{\lambda(x.b), e\}$ where e is an environment, say a list of $\langle v, d\rangle$ pairs where v is a variable, d is a value. Values will be closures. We assume $FV(\lambda(x.b)) \subseteq dom(e)$, i.e. a v in $\langle v,d\rangle$.

We use the auxiliary functions:

$$lookup(v, env) = \begin{cases} env(v) & \text{if } v \text{ is in the domain of } env \\ abort & \text{otherwise} \end{cases}$$

$$ext(env, \langle v,d\rangle) = \begin{cases} \text{add } \langle v,d\rangle \text{ to } env & \text{if } v \text{ is new} \\ \text{replace } \langle v,d'\rangle \text{ by } \langle v,d\rangle & \text{otherwise} \end{cases}$$

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eval(t, env) =
    case  isvar(t) then lookup(t, env)
          isabs(t) then let λ(x.b) = λ(bvar(t). body(t))
                        in {λ(x.b), env}
          isap(t)  then let cl = eval(fun(t), env)
                            a  = eval(arg(t), env)
                        in
                        eval(clbody(cl), ext(e, <v,a>))
                        where clbody(cl) is the body of the closure
                              v is bvar(cl)
                              e is clenv(cl)
                              (this is the environment of the cl)
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Show how to extend this if we take closures $\{\lambda(x.b), e\}$ as inputs