OO programming with Language E8

OO prog features

- Encapsulation
- Inheritance
- Dynamic Method Binding
- Name binding
- Exceptions
- Typing

Encapsulation

```
(fun pair ( x y)
  (object (def fst x)
          (def snd y)
          (method asString ( )
              (++ "(" (self.fst.asString) ","
                  (self.snd.asString) ")"))))
```

An object is described by what requests it responds to (fst,snd)

Inheritance

```
(val bool
    (object
        (def true
             (object
                  inherits True
                  (method and (x) x)
                  (method or (x) self)
                  (method not () (bool.false))
                  (method ifTrueFalse (x y) (x.apply))
                  ))

        (def false
             (object
                  inherits False
                  (method and (x) self)
                  (method or (x) x)
                  (method not () (bool.true))
                  (method ifTrueFalse (x y) (y.apply))
                  ))
    ))
```

Dynamic method binding

```
(val   i3
   (object inherits done
      (def x 5)
      (def y 3)
      (method asString ()
         (++ (super.asString)
            " + "
            (self.x.asString)
            " + "
            (self.y.asString)))))
```

```
enter Exp>
i3
done[x 5[+ <prim>,
        - <prim>,
        * <prim>,
        / <prim>,
        asString <prim>,
        = <prim>,
        <= <prim>],
     y 3[+ <prim>,
        - <prim>,
        * <prim>,
        / <prim>,
        asString <prim>,
        = <prim>,
        <= <prim>],
     asString <asString>,
     asString <prim>]
```

Which asString method does it answer to?

Name Binding vs
record field declaration

```
(fun temp (x y)

  (local (val hidden x)

          (object (def age y)

            (method foo (w)

                (+ hidden (self.age) w)))))


(val tt (@temp 4 7))
```

Exceptions

```
(fun elem (x xs)
  (local (ref ptr xs)
      (block (while (@not (ptr.null))
                (if (ptr.head.= x)
                    (return elem 99)
                    (:= ptr (ptr.tail))))
              0)))
```

Object request chains

- (x.name)
- (x.add 4)
- (x.inc.add 5)   -> ((x.inc).add 4)
- (x.inc.(add 4).inc)   -> (((x.inc).add 4).inc)