



```
root@9e0f0b10a895:/work# cafeobj lecture10-compiler/submit.cafe

-- loading standard prelude

    -- CafeOBJ system Version 1.6.2(PigNose0.99) --
        built: 2024 Dec 26 Thu 0:09:00 GMT
        prelude file: std.bin
        ***
        2025 Jan 12 Sun 7:54:07 GMT
        Type ? for help
        ***
    -- Containing PigNose Extensions --
    ---
        built on SBCL
        2.0.1.debian
processing input : /work/lecture10-compiler/submit.cafe

-- defining module! BOOL-ERR
-- reading in file : bool

processing input : /usr/local/share/cafeobj-1.6/lib/bool.cafe

processing input : /usr/local/share/cafeobj-1.6/lib/base_bool.cafe

processing input : /usr/local/share/cafeobj-1.6/lib/truth.cafe

-- defining module! TRUTH
-- reading in file : truth

-- done reading in file: truth

-- defining module* BASE-BOOL
-- reading in file : eql

processing input : /usr/local/share/cafeobj-1.6/lib/eql.cafe

-- defining module! EQL
-- done reading in file: eql

processing input : /usr/local/share/cafeobj-1.6/lib/sys_bool.cafe

-- defining module! BOOL
-- done reading in file: bool

-- defining module! NAT-ERR
-- reading in file : nat

processing input : /usr/local/share/cafeobj-1.6/lib/nat.cafe

-- defining module! NAT
-- reading in file : nznat

processing input : /usr/local/share/cafeobj-1.6/lib/nznat.cafe

-- defining module! NZNAT
-- done reading in file: nznat

-- done reading in file: nat

-- defining module! PAIR
-- defining module* TRIV-ERR
-- defining module! LIST
-- defining module* TRIV-ERR
[Warning]: Redefining module TRIV-ERR
-- defining module* VAR
-- defining module! INSTRUCT
-- defining view
-- defining module! ILIST
-- defining module! EXP
-- defining module! STM
-- defining module! ENTRYTRIV-ERR2INSTRUCT
-- defining view
-- defining module! ENV
-- defining module! INTERPRETTRIV-ERR2ENTRY
-- defining view
-- defining module! STACK
-- defining module! VM
-- defining module! COMPILE
-- opening module VM + COMPILETRIV-ERR2NAT-ERR
-- reduce in %VM + COMPILE : (genForExp(n(3))):IList
(push(3) | iln):IList
(0.0000 sec for parse, 0.0000 sec for 1 rewrites + 1 matches)
-- reduce in %VM + COMPILE : (genForExp((n(3) + (n(4) * n(5))))):IList
(push(3) | (push(4) | (push(5) | (multiply | (add | iln))))):IList
(0.0000 sec for parse, 0.0000 sec for 15 rewrites + 27 matches)
-- reduce in %VM + COMPILE : (generate((x := (n(3) + (n(4) * n(5))) ; ))):IList
(push(3) | (push(4) | (push(5) | (multiply | (add | (store(x) | iln))))):IList
(0.0000 sec for parse, 0.0010 sec for 22 rewrites + 39 matches)
-- reduce in %VM + COMPILE : (generate((if (n(100) < n(10)) { (x := (x + n(100)) ; ) } else { (x := (x -
n(21)) ; ) })):IList
(push(100) | (push(10) | (lessThan | (jumpOnCond(2) | (jump(6) | (load(x) | (push(100) | (add | (store(x)
| (jump(5) | (load(x) | (push(21) | (minus | (store(x) | iln))))))))))))):IList
(0.0000 sec for parse, 0.0010 sec for 91 rewrites + 155 matches)
-- reduce in %VM + COMPILE : (generate((if (n(100) > n(10)) { (x := (x + n(100)) ; ) } else { (x := (x -
n(21)) ; ) })):IList
(push(100) | (push(10) | (greaterThan | (jumpOnCond(2) | (jump(6) | (load(x) | (push(100) | (add |
(store(x) | (jump(5) | (load(x) | (push(21) | (minus | (store(x) | iln))))))))))))):IList
(0.0000 sec for parse, 0.0010 sec for 91 rewrites + 156 matches)
-- reduce in %VM + COMPILE : (generate((if ((tmp * tmp) > x) { (z := (tmp - n(1)) ; ) } else { (y := tmp
; ) })):IList
(load(tmp) | (load(tmp) | (multiply | (load(x) | (greaterThan | (jumpOnCond(2) | (jump(6) | (load(tmp) |
(push(1) | (minus | (store(z) | (jump(3) | (load(tmp) | (store(y) | iln))))))))))))):IList
(0.0000 sec for parse, 0.0000 sec for 81 rewrites + 145 matches)
-- reduce in %VM + COMPILE : (generate((if (((z - y) % n(2)) == n(0)) { (tmp := (y + ((z - y) / n(2)))
; ) } else { (tmp := ((y + ((z - y) / n(2))) + n(1)) ; ) })):IList
(load(z) | (load(y) | (minus | (push(2) | (mod | (push(0) | (equal | (jumpOnCond(2) | (jump(10) |
(store(y) | (load(z) | (load(y) | (minus | (push(2) | (divide | (add | (store(tmp) | (jump(11) | (load(y)
| (load(z) | (load(y) | (minus | (push(2) | (divide | (add | (push(1) | (add | (store(tmp) |
iln))))))))))))))))):IList
(0.0000 sec for parse, 0.0010 sec for 253 rewrites + 472 matches)
-- reduce in %VM + COMPILE : (generate((while ((y < n(10)) || (y == n(10))) { ((x := (x * y) ; ) (y := (y
+ n(1)) ; ) })):IList
(load(y) | (push(10) | (lessThan | (load(y) | (push(10) | (equal | (or | (jumpOnCond(2) | (jump(10) |
(load(x) | (load(y) | (multiply | (store(x) | (load(y) | (push(1) | (add | (store(y) | (bjump(17) |
iln))))))))))))):IList
(0.0000 sec for parse, 0.0010 sec for 210 rewrites + 421 matches)
-- reduce in %VM + COMPILE : (generate((for y n(1) n(10) { (x := (y * x) ; ) })):IList
(push(1) | (store(y) | (load(y) | (push(10) | (lessThan | (load(y) | (push(10) | (equal | (or |
(jumpOnCond(2) | (jump(10) | (load(y) | (load(x) | (multiply | (store(x) | (load(y) | (push(1) | (add |
(store(y) | (bjump(17) | iln))))))))))))):IList
(0.0000 sec for parse, 0.0010 sec for 218 rewrites + 435 matches)
-- reduce in %VM + COMPILE : (generate((x := (y * x) ; ) (y := (y + n(1)) ; ))):IList
(load(y) | (load(x) | (multiply | (store(x) | (load(y) | (push(1) | (add | (store(y) | iln))))):IList
(0.0010 sec for parse, 0.0000 sec for 30 rewrites + 59 matches)
-- reduce in %VM + COMPILE : (generate((y := n(1) ; ) (while ((y < n(10)) || (y == n(10))) { ((x := (y *
x) ; ) (y := (y + n(1)) ; ) })):IList
(push(1) | (store(y) | (load(y) | (push(10) | (lessThan | (load(y) | (push(10) | (equal | (or |
(jumpOnCond(2) | (jump(10) | (load(y) | (load(x) | (multiply | (store(x) | (load(y) | (push(1) | (add |
(store(y) | (bjump(17) | iln))))))))))))):IList
(0.0000 sec for parse, 0.0010 sec for 218 rewrites + 440 matches)
-- reduce in %VM + COMPILE : (generate(p0)):IList
(push(1) | (store(x) | (push(1) | (store(y) | (load(y) | (push(10) | (lessThan | (load(y) | (push(10) |
(equal | (or | (jumpOnCond(2) | (jump(10) | (load(y) | (load(x) | (multiply | (store(x) | (load(y) |
(push(1) | (add | (store(y) | (bjump(17) | iln))))))))))))):IList
(0.0000 sec for parse, 0.0010 sec for 227 rewrites + 453 matches)
-- reduce in %VM + COMPILE : (run(compile(p0))):Env&Err
((x , 3628800) | ((y , 11) | empEnv)):Env
(0.0000 sec for parse, 0.0520 sec for 6033 rewrites + 15718 matches)
-- reduce in %VM + COMPILE : (compile(p1)):IList
(push(1) | (store(x) | (push(1) | (store(y) | (load(y) | (push(10) | (lessThan | (load(y) | (push(10) |
(equal | (or | (jumpOnCond(2) | (jump(10) | (load(y) | (load(x) | (multiply | (store(x) | (load(y) |
(push(1) | (add | (store(y) | (bjump(17) | iln))))))))))))):IList
(0.0000 sec for parse, 0.0020 sec for 253 rewrites + 510 matches)
-- reduce in %VM + COMPILE : (run(compile(p1))):Env&Err
((x , 3628800) | ((y , 11) | empEnv)):Env
(0.0000 sec for parse, 0.0510 sec for 6035 rewrites + 15729 matches)
-- reduce in %VM + COMPILE : (compile(p2)):IList
(push(1) | (store(x) | (push(1) | (store(y) | (load(y) | (push(10) | (lessThan | (load(y) | (push(10) |
(equal | (or | (jumpOnCond(2) | (jump(10) | (load(y) | (load(x) | (multiply | (store(x) | (load(y) |
(push(1) | (add | (store(y) | (bjump(17) | iln))))))))))))):IList
(0.0000 sec for parse, 0.0010 sec for 251 rewrites + 499 matches)
-- reduce in %VM + COMPILE : (run(compile(p2))):Env&Err
((x , 3628800) | ((y , 11) | empEnv)):Env
(0.0000 sec for parse, 0.0530 sec for 6033 rewrites + 15718 matches)
-- reduce in %VM + COMPILE : (compile(p3)):IList
(push(24) | (store(x) | (push(30) | (store(y) | (load(y) | (push(0) | (notEqual | (jumpOnCond(2) |
(jump(10) | (load(x) | (load(y) | (mod | (store(z) | (load(y) | (store(x) | (load(z) | (store(y) |
(bjump(13) | (quit | iln))))))))))))):IList
(0.0000 sec for parse, 0.0010 sec for 217 rewrites + 444 matches)
-- reduce in %VM + COMPILE : (run(compile(p3))):Env&Err
((x , 6) | ((y , 0) | ((z , 0) | empEnv)):Env
(0.0000 sec for parse, 0.0120 sec for 1581 rewrites + 4072 matches)
-- reduce in %VM + COMPILE : (compile(p4)):IList
(push(200000000000000000) | (store(x) | (push(0) | (store(y) | (load(x) | (store(z) | (load(y) | (load(z)
| (notEqual | (jumpOnCond(2) | (jump(44) | (load(z) | (load(y) | (minus | (push(2) | (mod | (push(0) |
(equal | (jumpOnCond(2) | (jump(10) | (load(y) | (load(z) | (load(y) | (minus | (push(2) | (divide | (add
| (store(tmp) | (jump(11) | (load(y) | (load(z) | (load(y) | (minus | (push(2) | (divide | (add |
(push(1) | (add | (store(tmp) | (load(tmp) | (load(tmp) | (multiply | (load(x) | (greaterThan |
(jumpOnCond(2) | (jump(6) | (load(tmp) | (push(1) | (minus | (store(z) | (jump(3) | (load(tmp) |
(store(y) | (bjump(47) | (quit | iln))))))))))))))))):IList
(0.0000 sec for parse, 0.0120 sec for 1425 rewrites + 2634 matches)
-- reduce in %VM + COMPILE : (run(compile(p4))):Env&Err
((x , 200000000000000000) | ((y , 0) | ((z , 0) | ((tmp , 1) | empEnv))):Env
(0.0000 sec for parse, 0.0630 sec for 4121 rewrites + 9674 matches)

CafeOBJ>
```