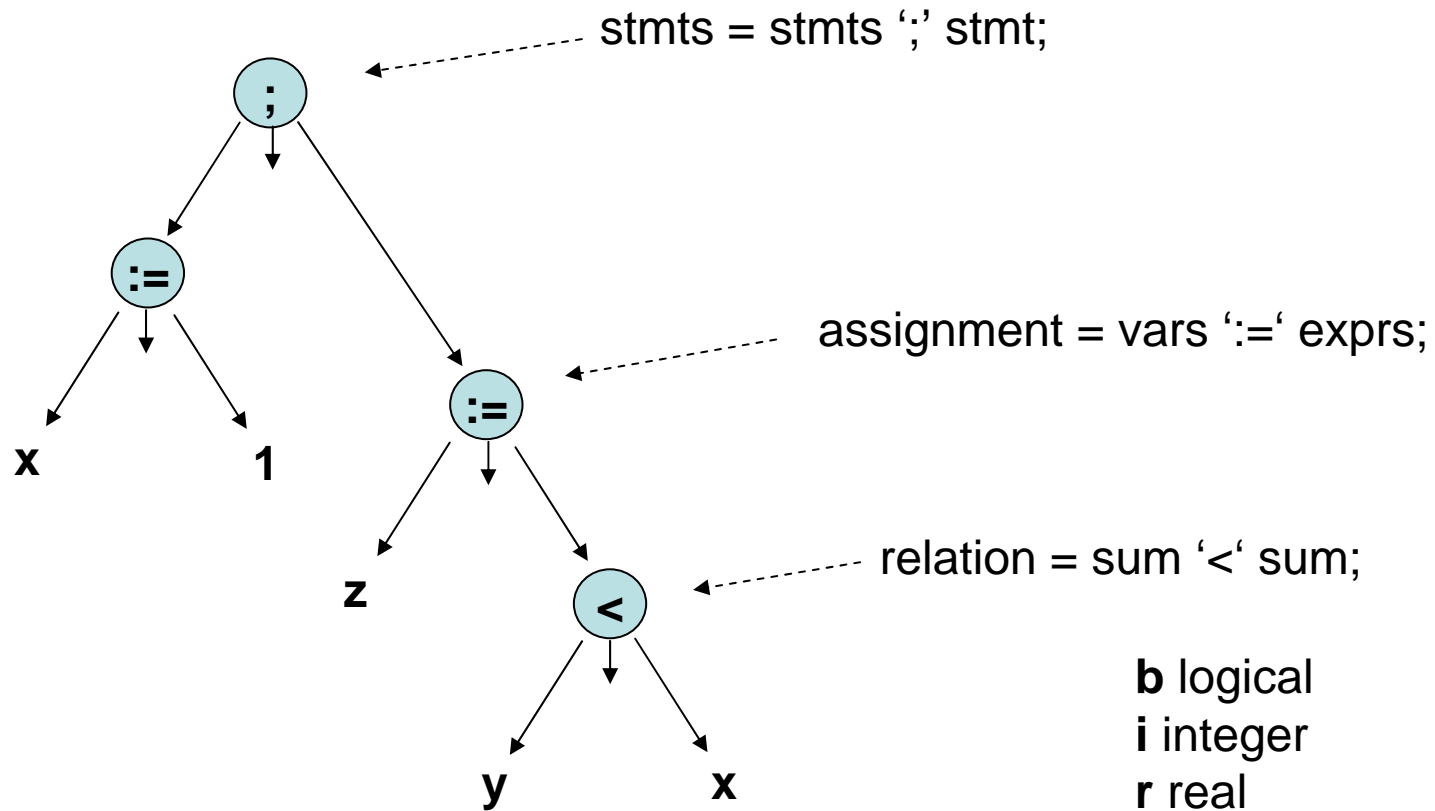


Code Generation Example -- 1

source text: $x := 1; z := y < x$

Abstract Syntax Tree:



Code Generation Example -- 2

source text: $x := 1; z := y < x$

Abbreviate

As

stmts_stmtsSEMIstmt

;

assignment_varsCOLONEQexprs

:=

relation_sumLTsum

<

tree.getRoot()

root()

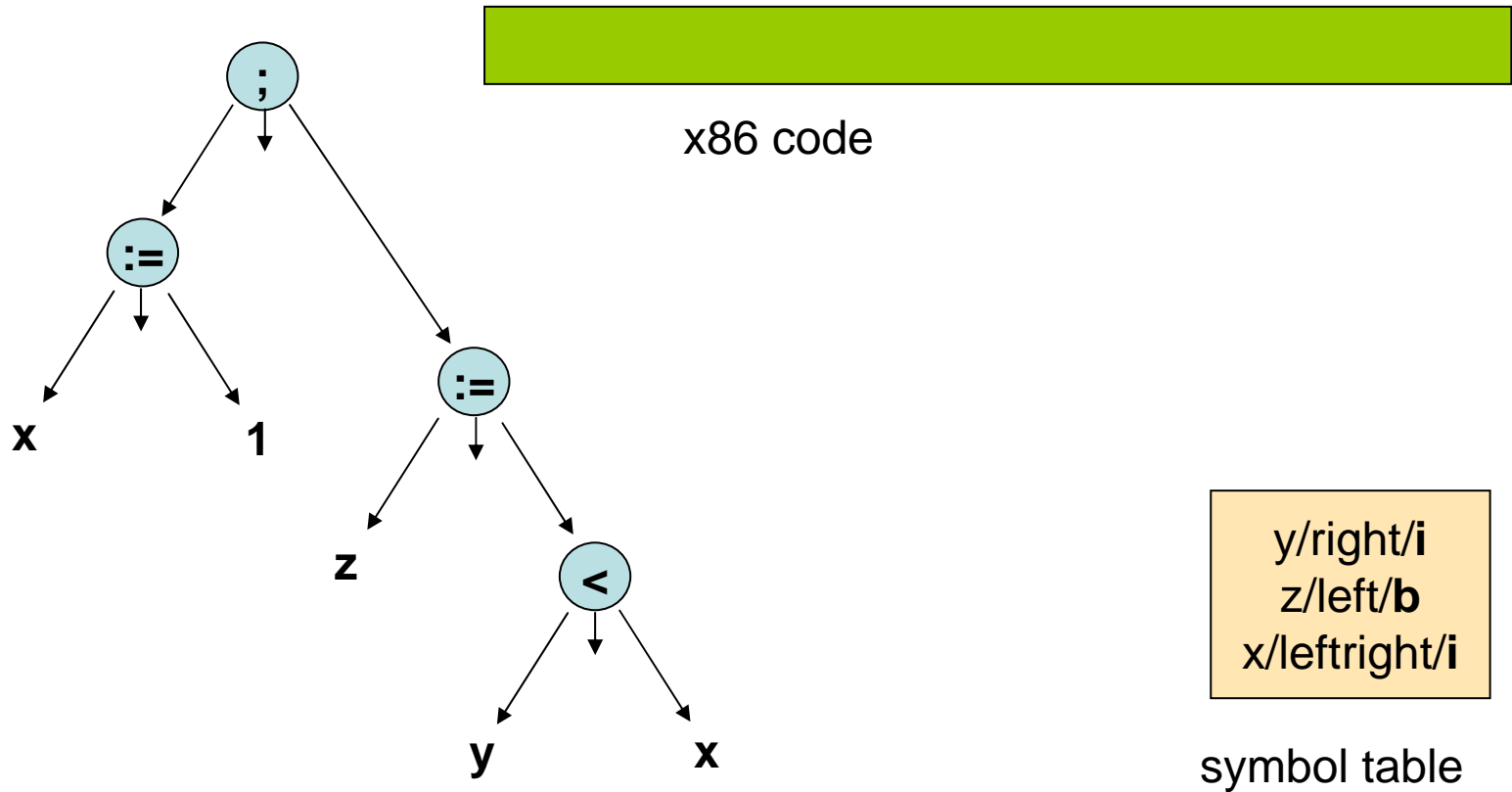
tree.getNode(nd,k)

node(k)

Code Generation Example -- 3

source text: $x := 1; z := y < x$

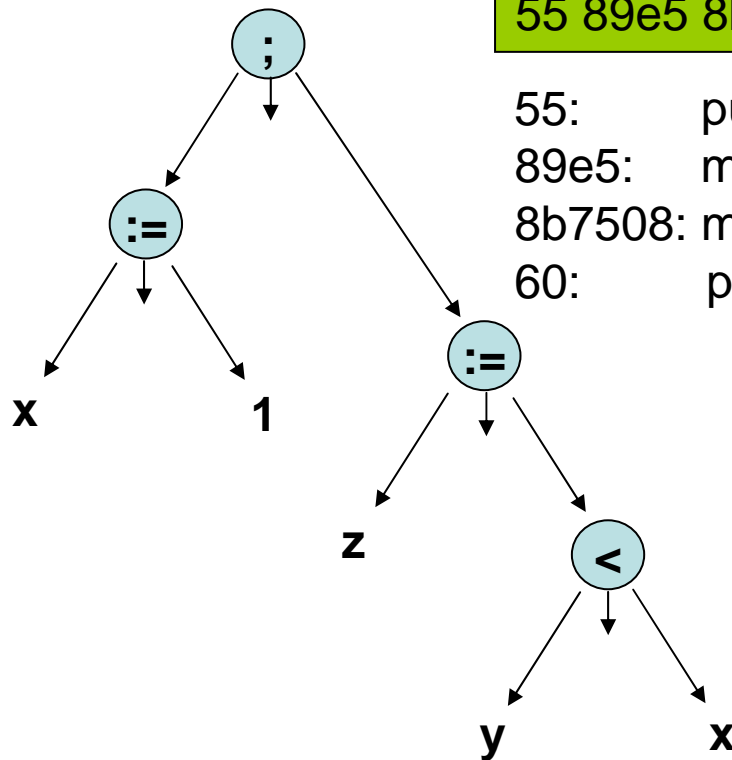
initial state:



Code Generation Example -- 4

source text: $x := 1; z := y < x$

genWalk(): emit.prolog()



55 89e5 8b7508 60

55: pushR EBP # save x86 frame pointer
89e5: movRR EBP,ESP # new x86 frame
8b7508: movRP ESI,8 # point at X frame
60: pushA # callee save

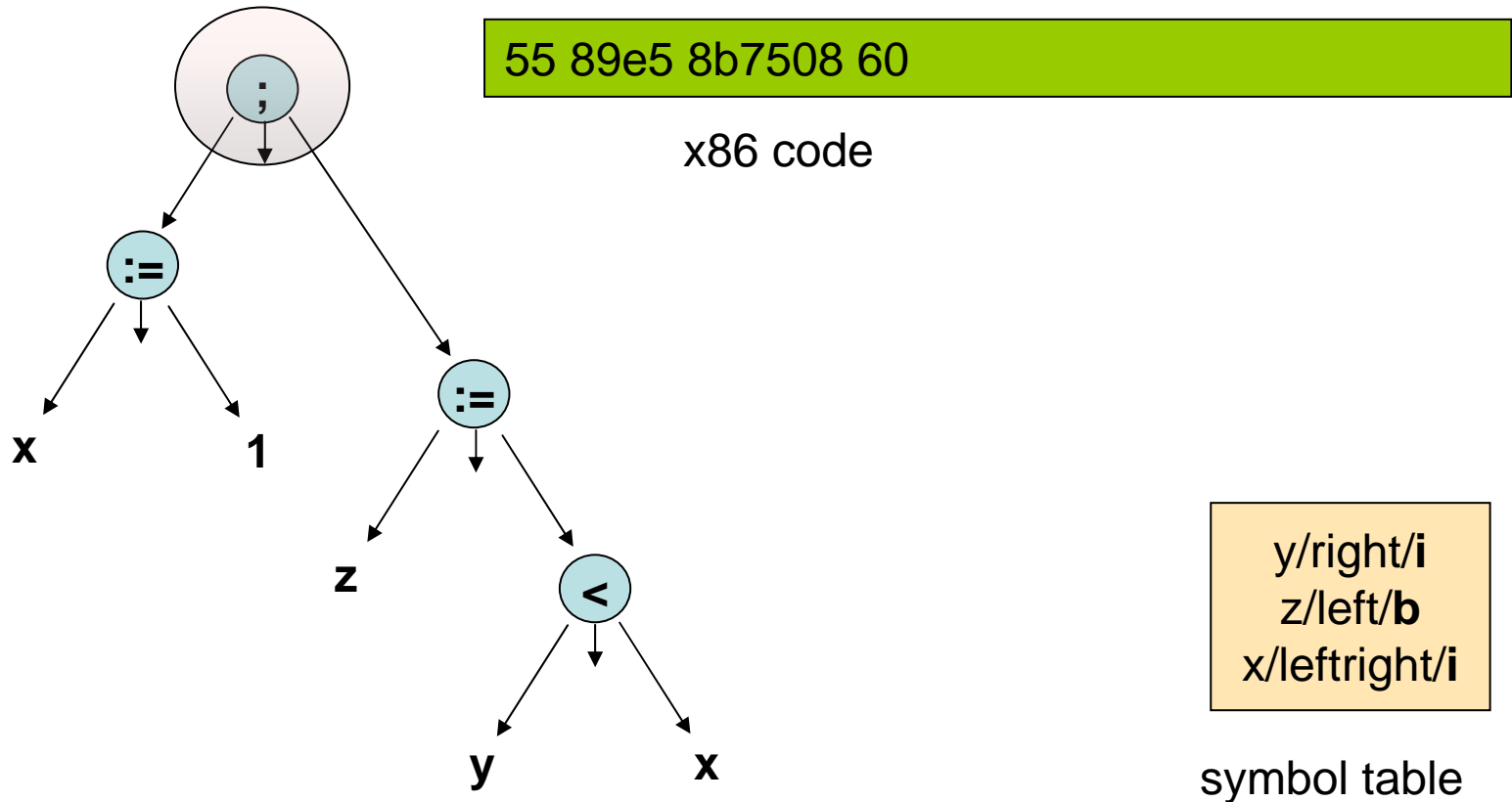
y/right/i
z/left/b
x/leftright/i

symbol table

Code Generation Example -- 5

source text: $x := 1; z := y < x$

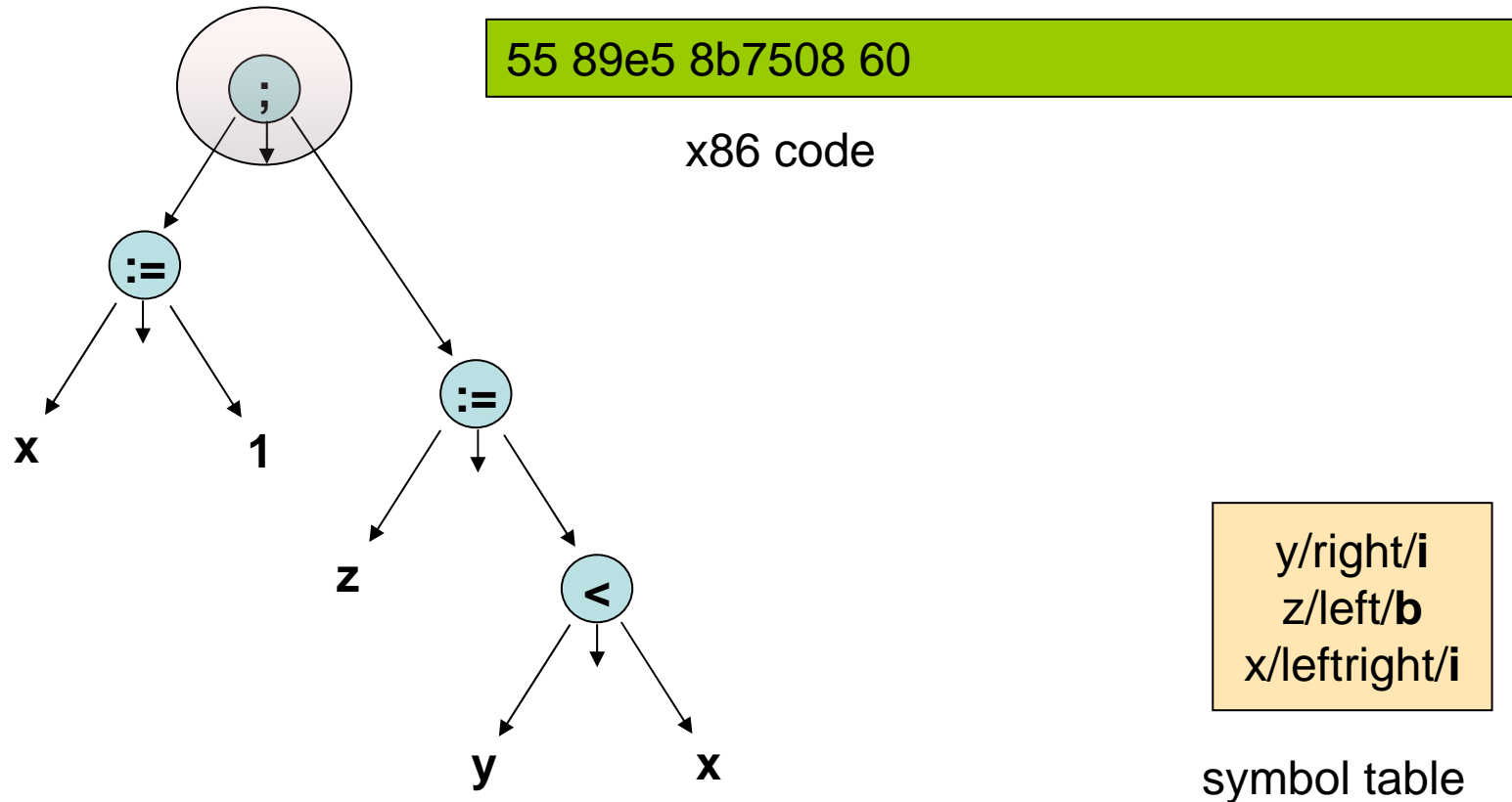
genWalk(): stmtWalk(getRoot())



Code Generation Example -- 6

source text: x:=1; z := y < x

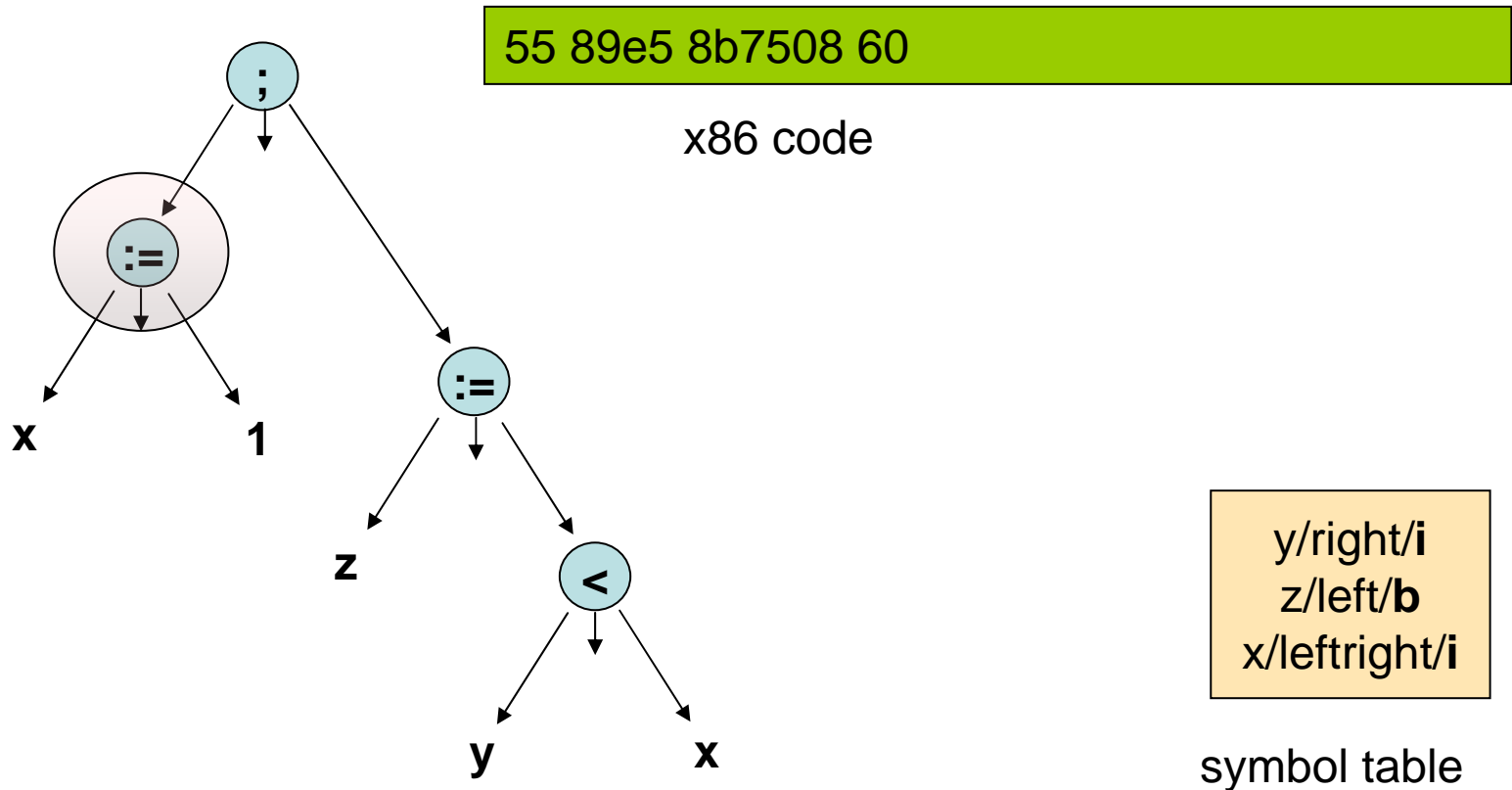
stmtWalk(): assignWalk(getKid(1))



Code Generation Example -- 7

source text: x:=1; z := y < x

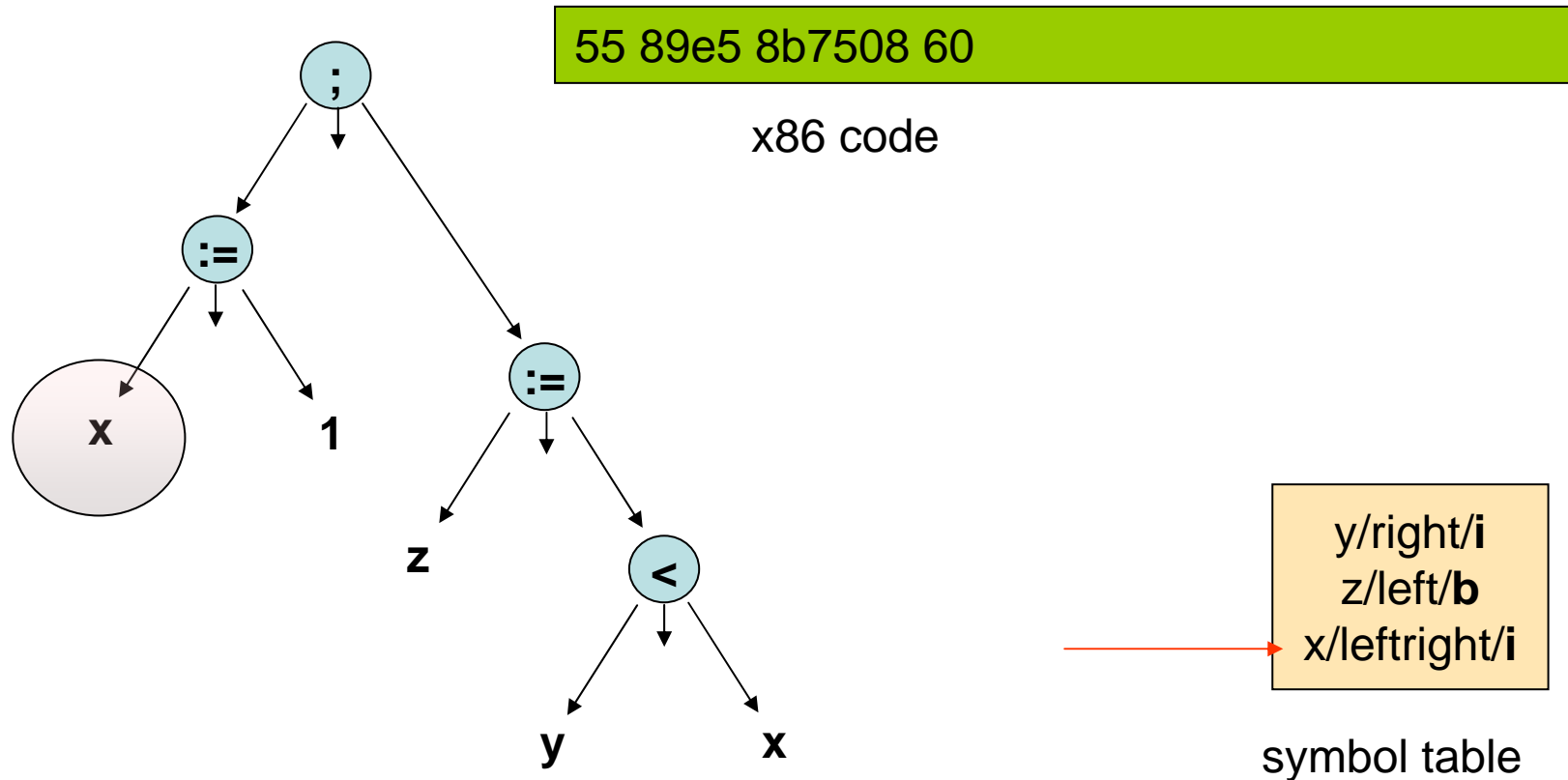
assignWalk(): lhs=varsWalk(getKid(1))



Code Generation Example -- 8

source text: x:=1; z := y < x

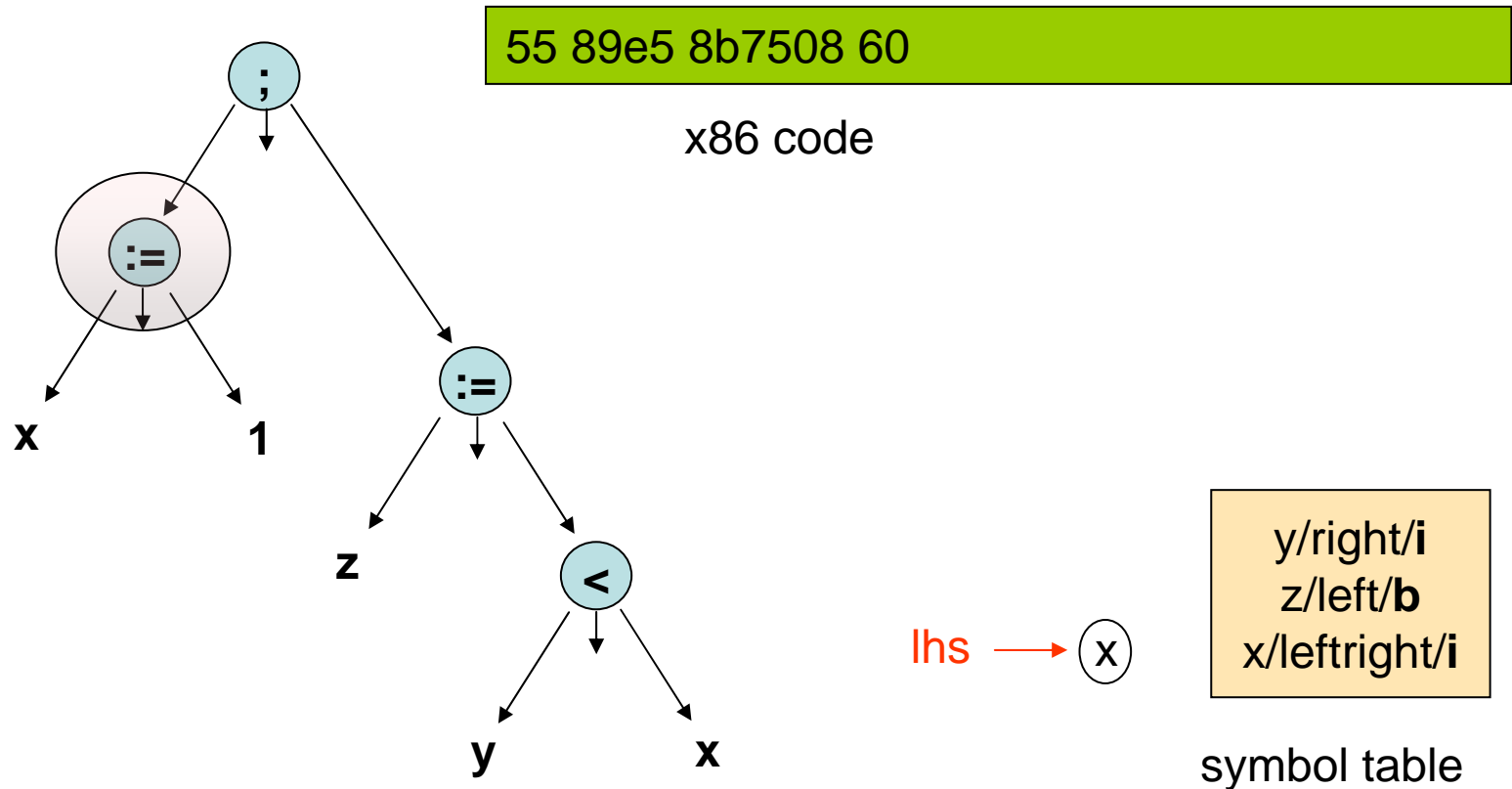
varsWalk(): opd=emit.var(tok)



Code Generation Example -- 9

source text: x:=1; z := y < x

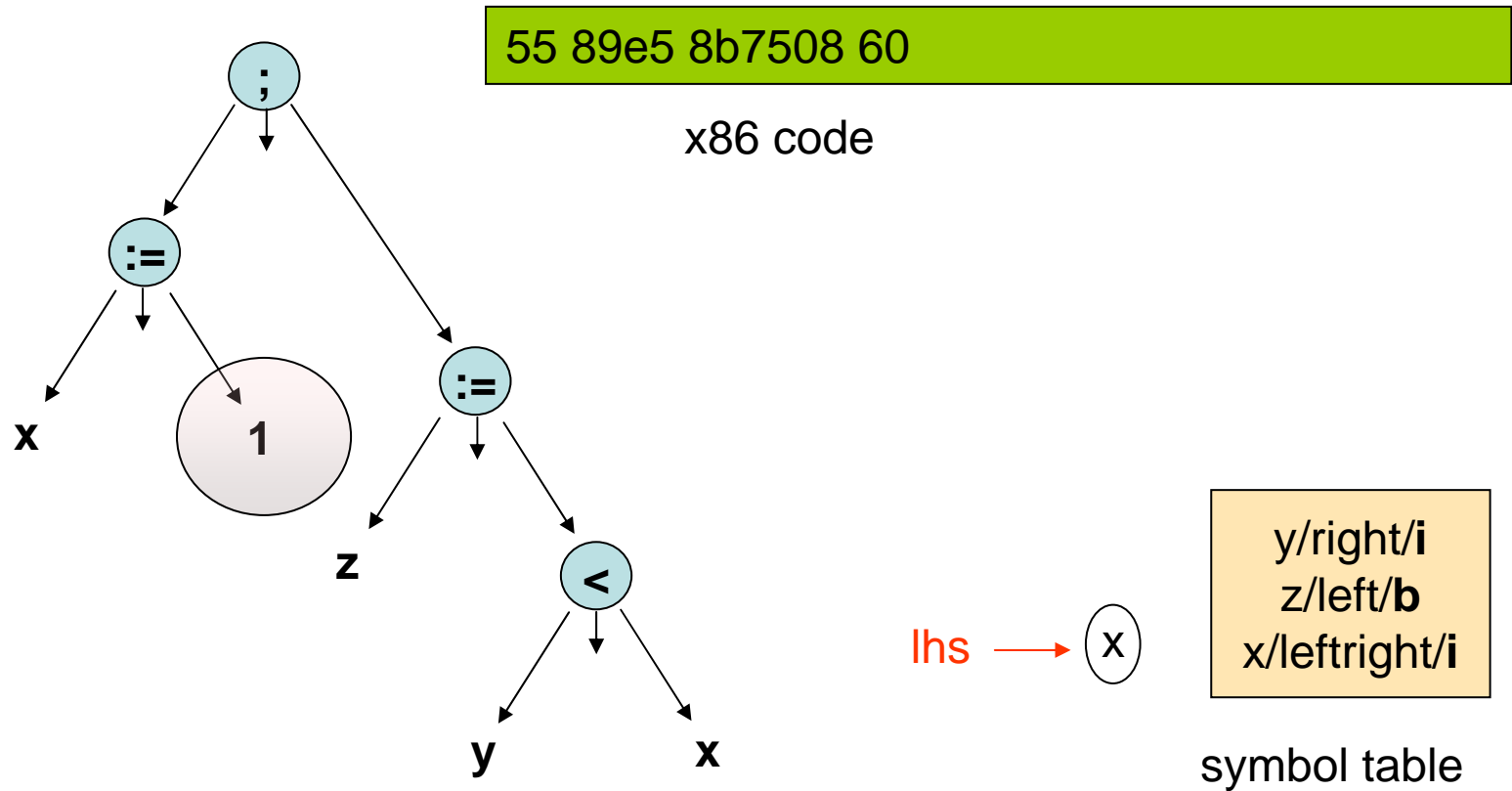
assignWalk(): rhs=exprsWalk(getKid(3))



Code Generation Example -- 10

source text: x:=1; z := y < x

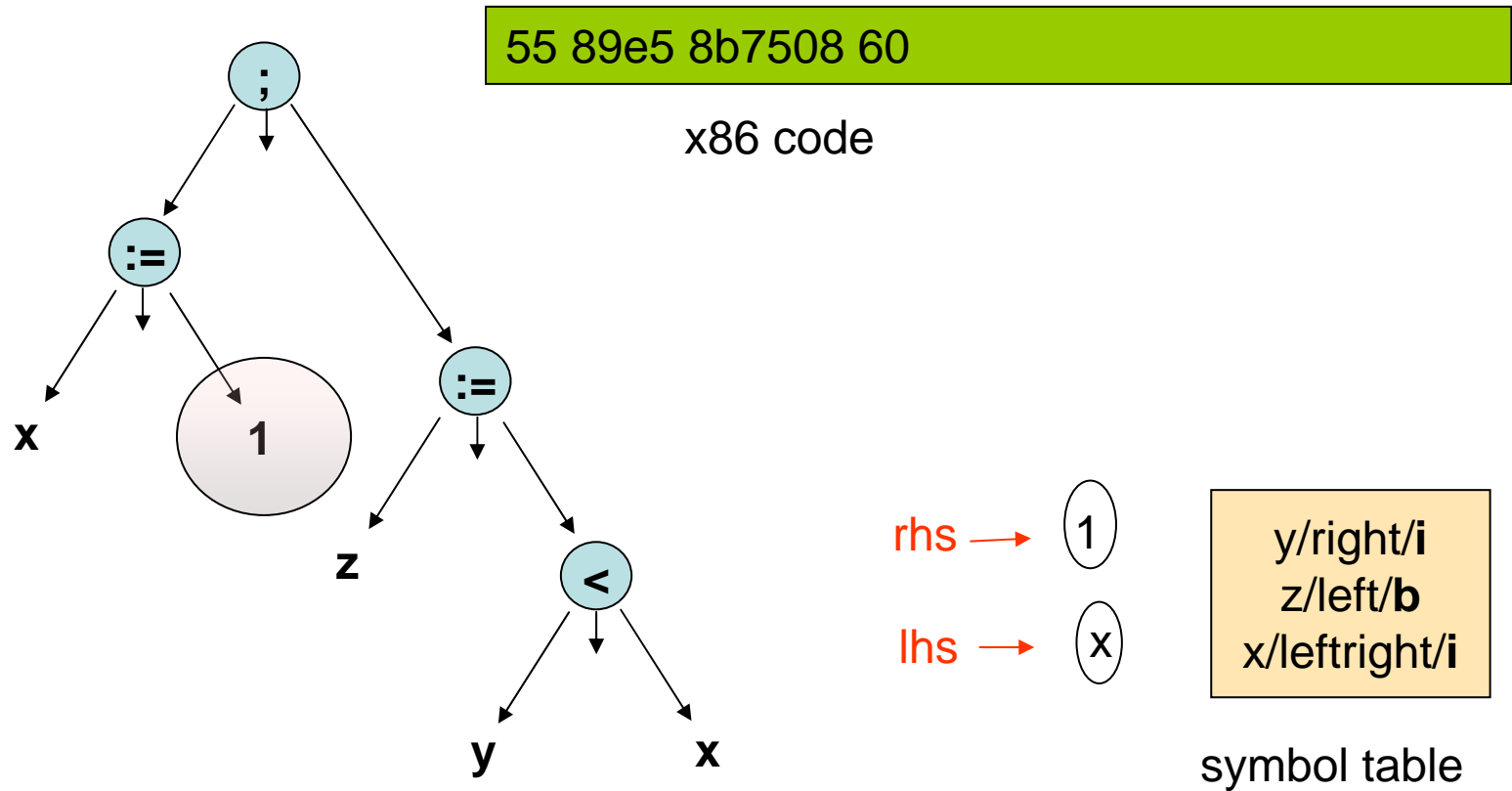
exprsWalk(): t=exprWalk(getKid(1))



Code Generation Example -- 11

source text: x:=1; z := y < x

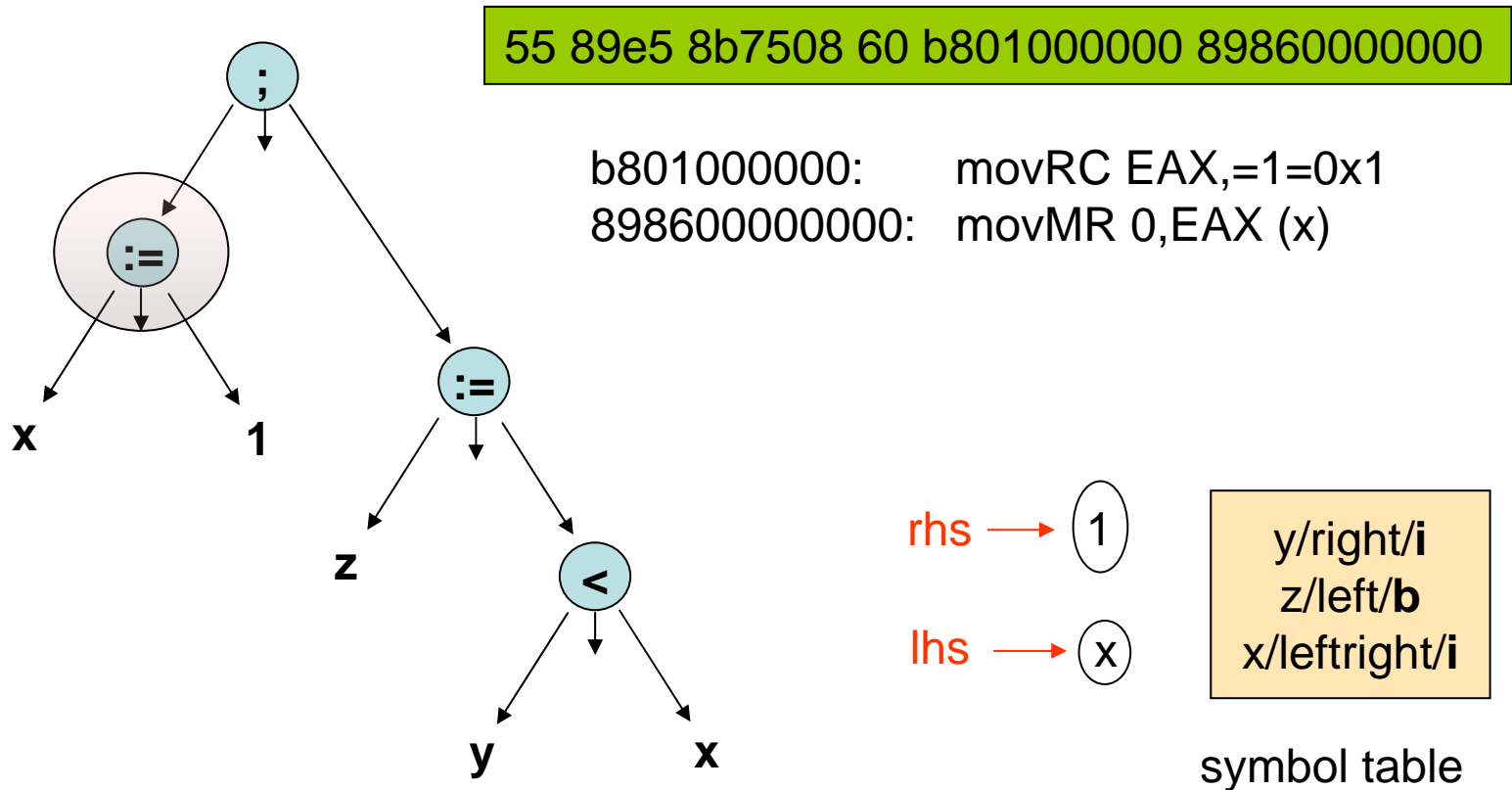
exprWalk(): opd=emit.expr0(rule,tok)



Code Generation Example -- 12

source text: x:=1; z := y < x

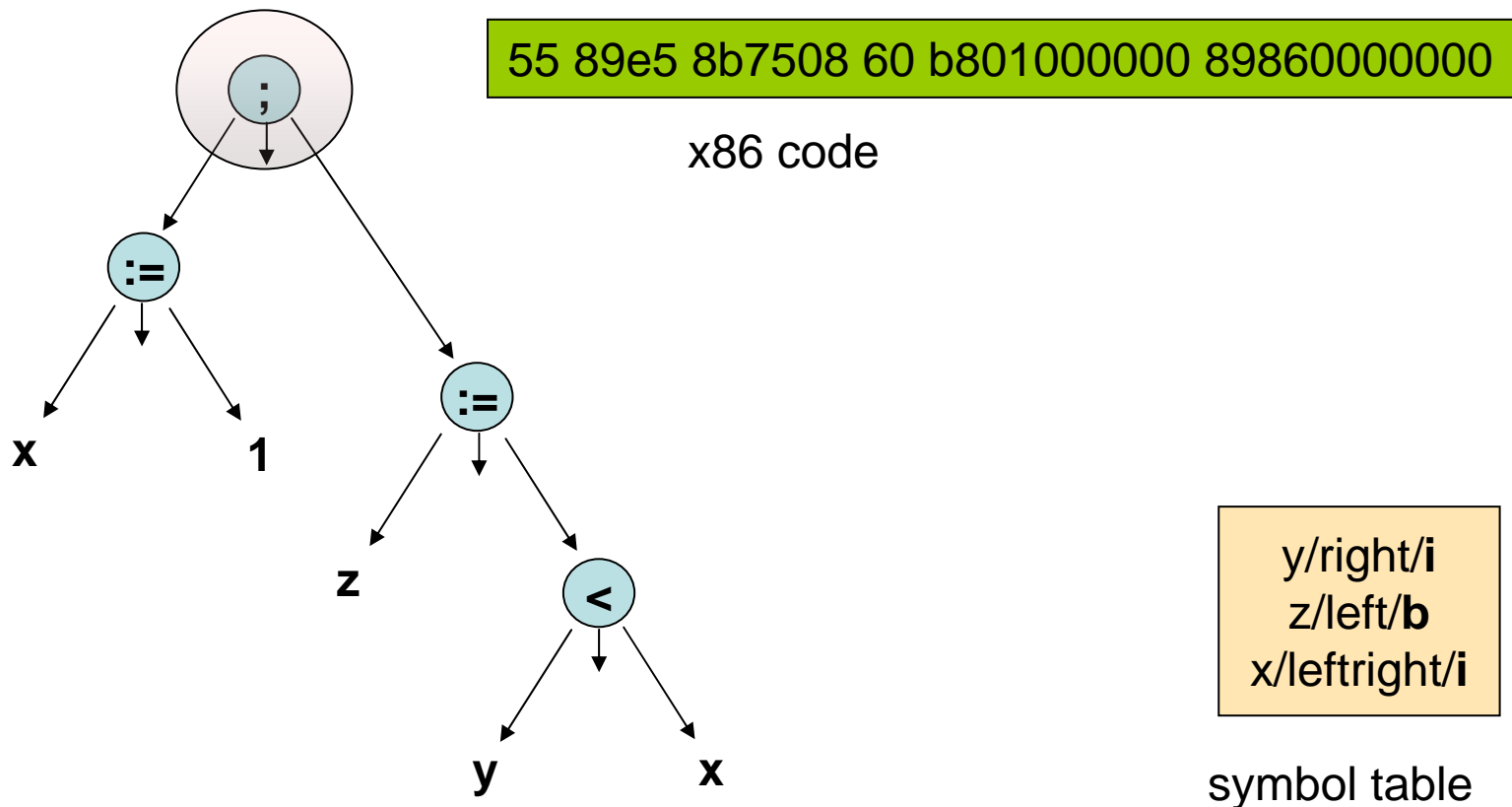
assignWalk(): emit.store(lhs, rhs)



Code Generation Example – 13

source text: x:=1; z := y < x

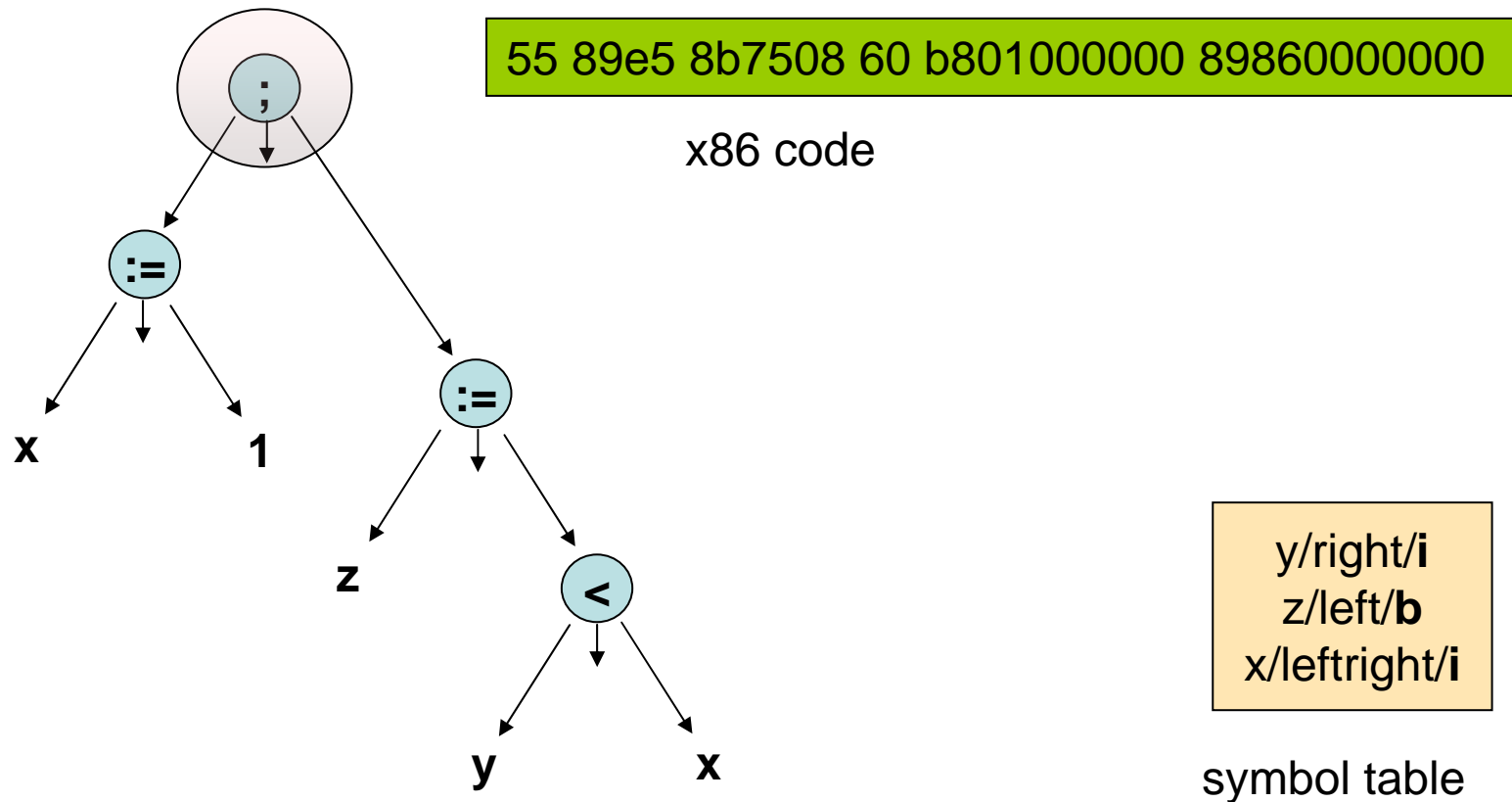
stmtWalk(): stmtWalk(getKid(2))



Code Generation Example – 14

source text: x:=1; z := y < x

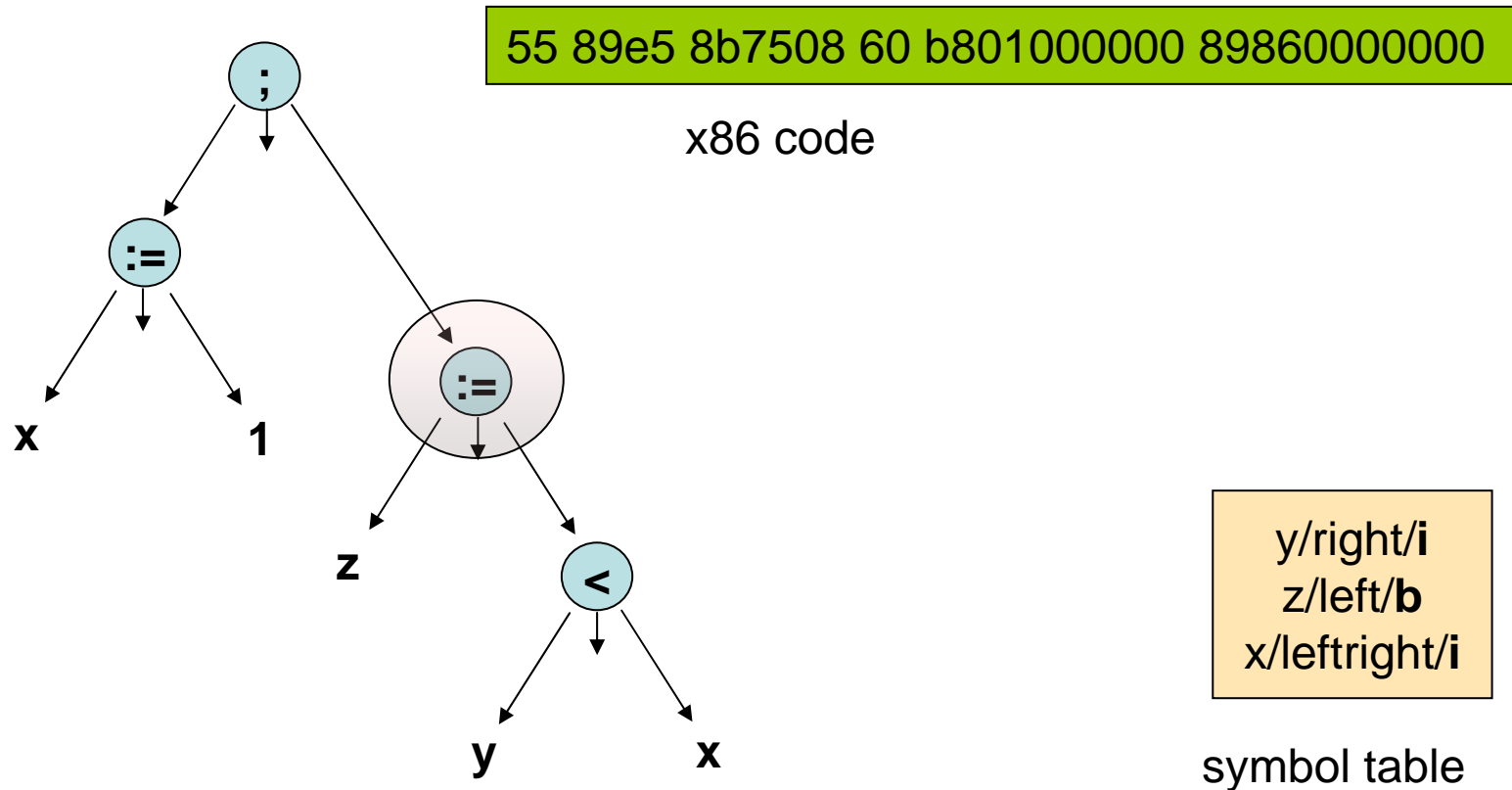
stmtWalk(): assignWalk(getKid(3))



Code Generation Example – 15

source text: x:=1; z := y < x

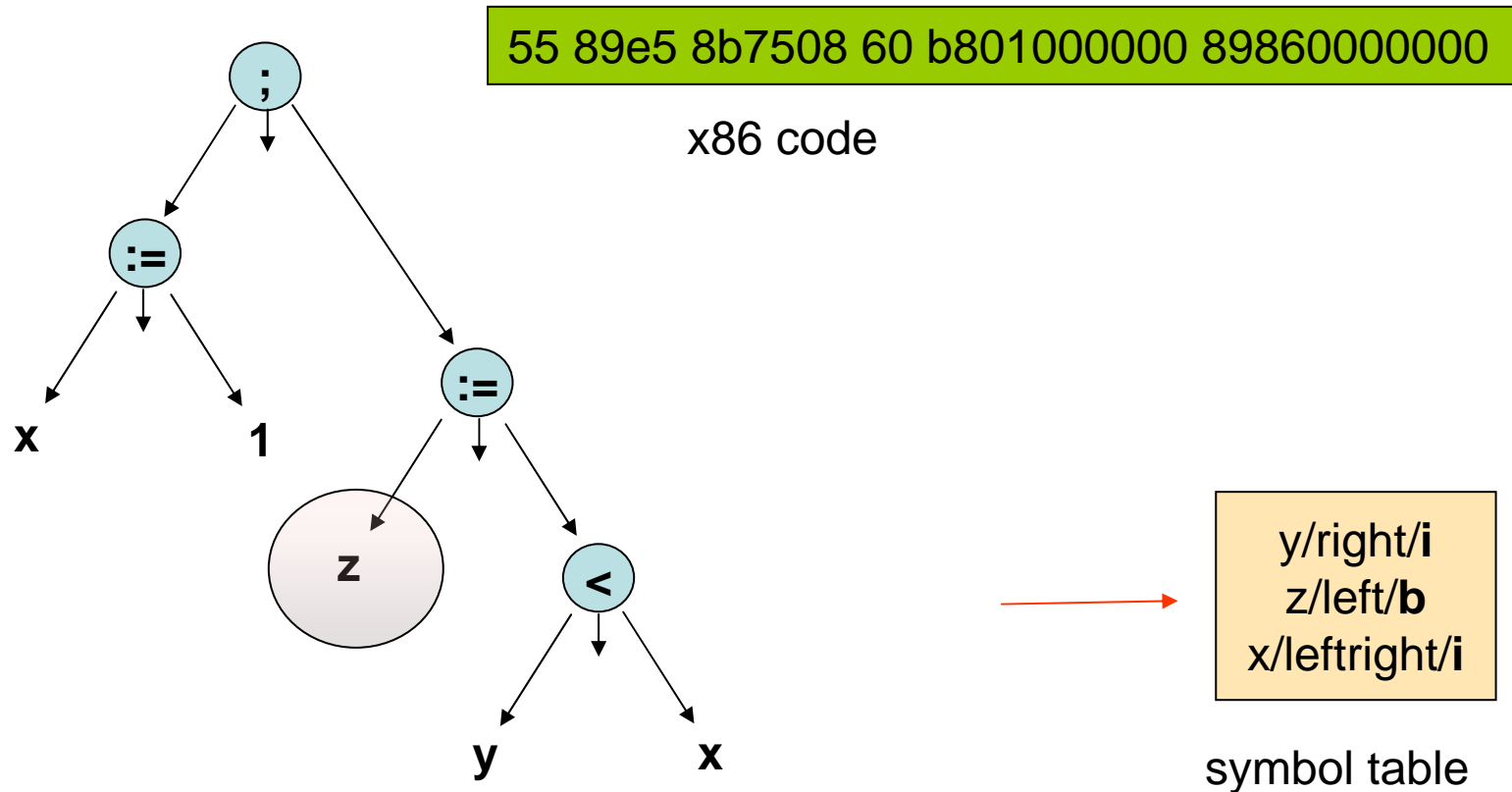
assignWalk(): lhs = varsWalk(getKid(1))



Code Generation Example – 16

source text: x:=1; z := y < x

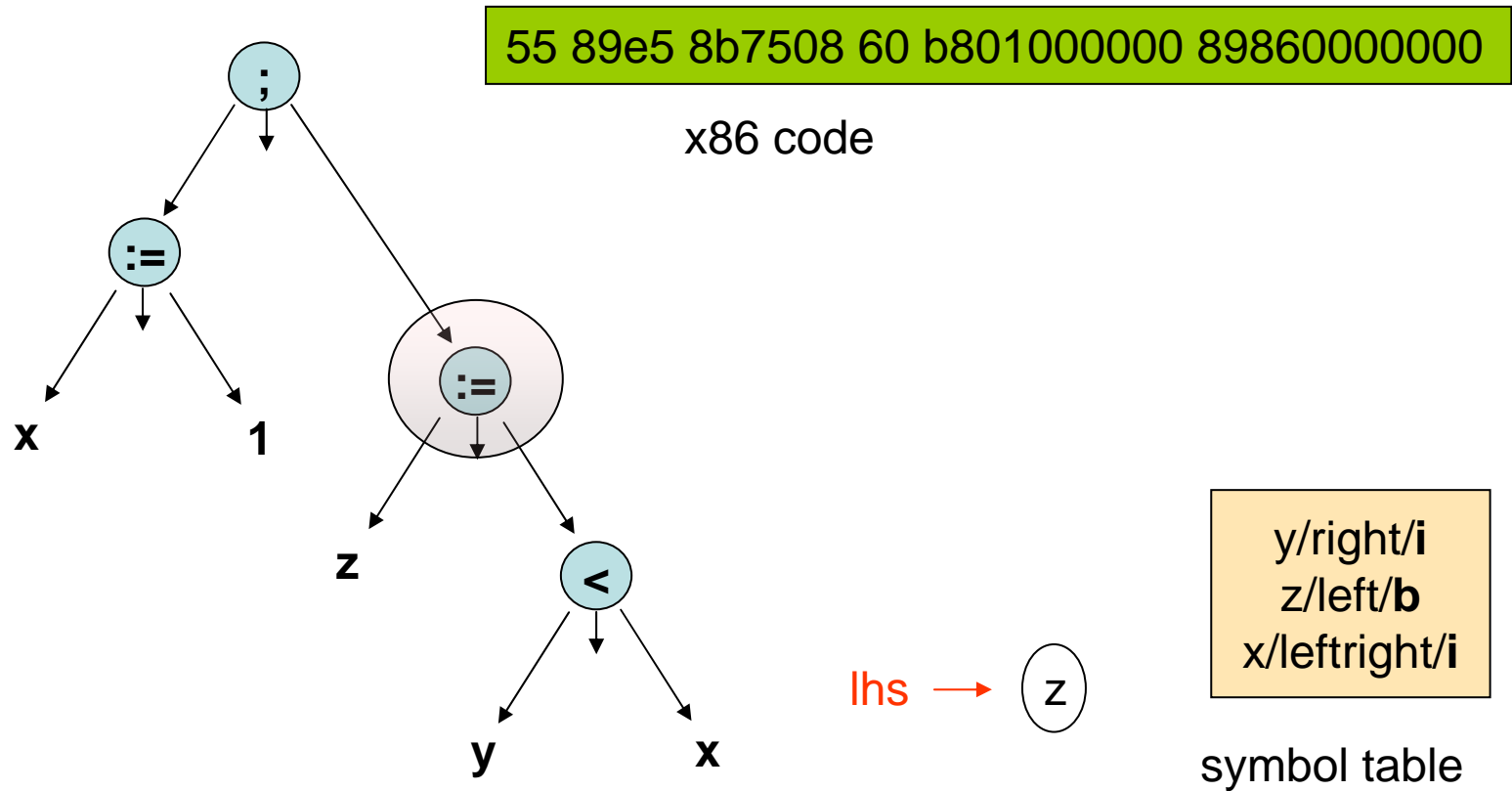
varsWalk(): opd=emit.var(tok)



Code Generation Example – 17

source text: x:=1; z := y < x

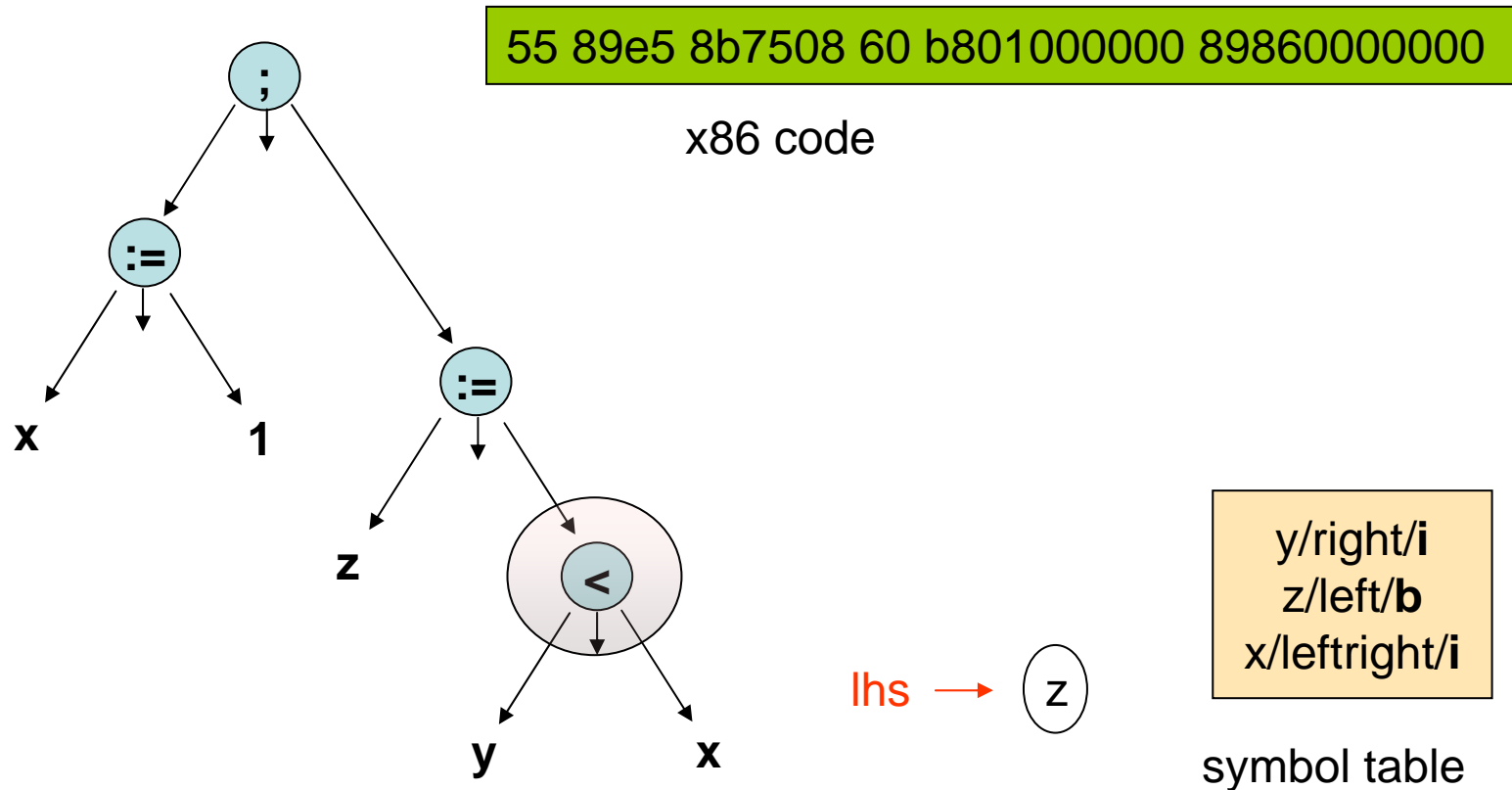
assignWalk(): rhs =exprsWalk(getKid(3))



Code Generation Example – 18

source text: $x := 1; z := y < x$

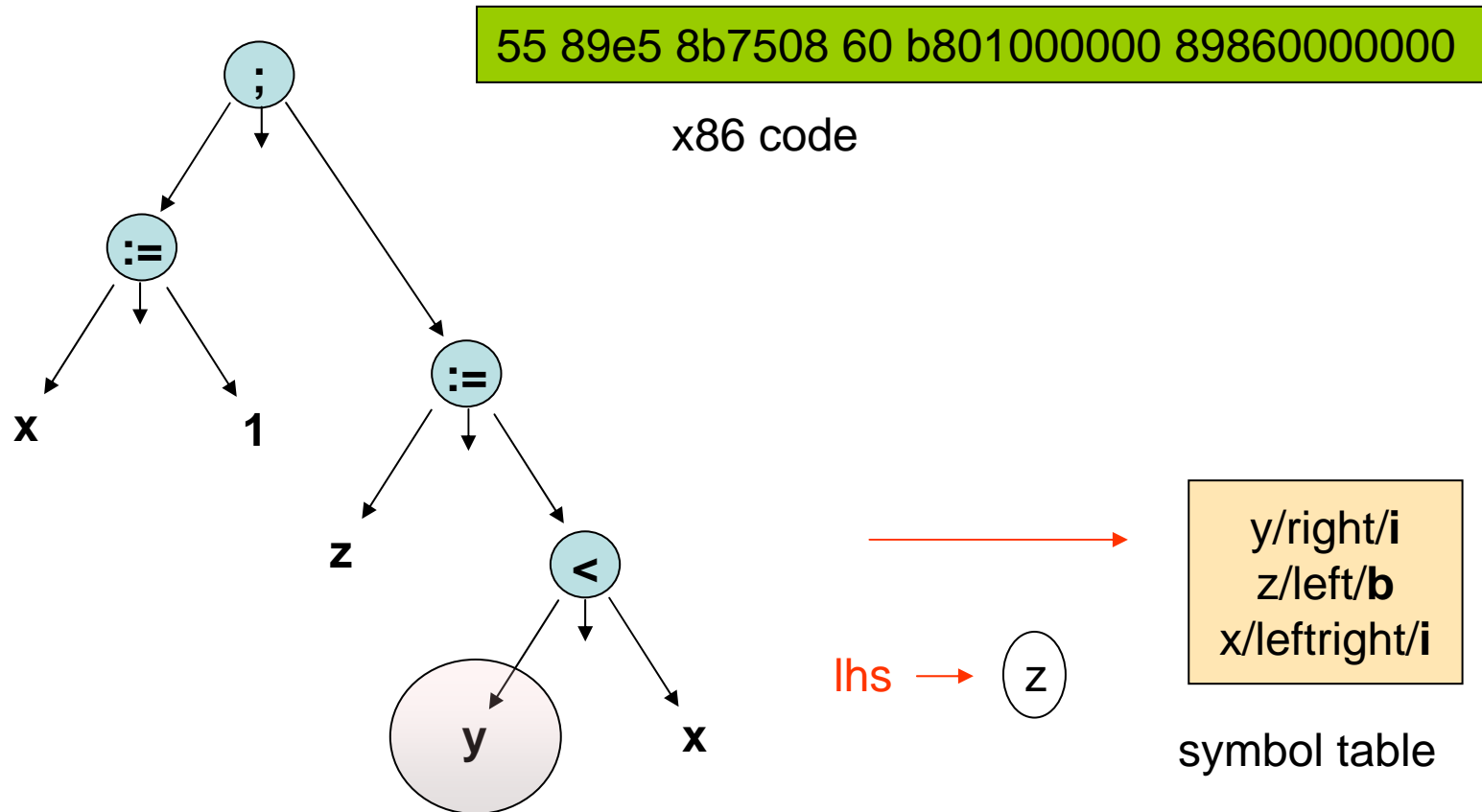
exprWalk(): $lft = \text{exprWalk}(\text{getKid}(1))$



Code Generation Example – 19

source text: $x := 1; z := y < x$

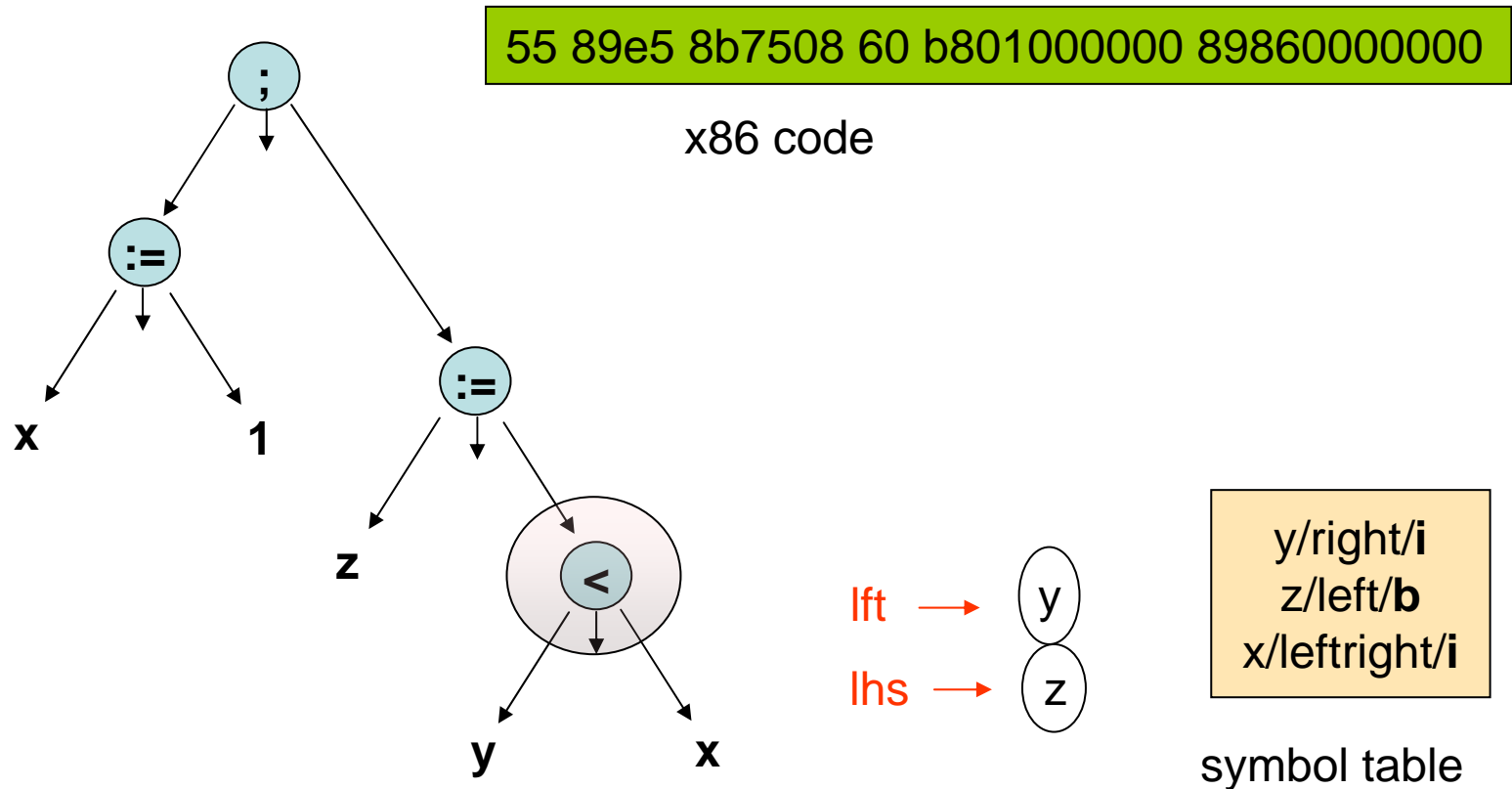
exprWalk(): $res = emit.expr0(tok)$



Code Generation Example – 20

source text: x:=1; z := y < x

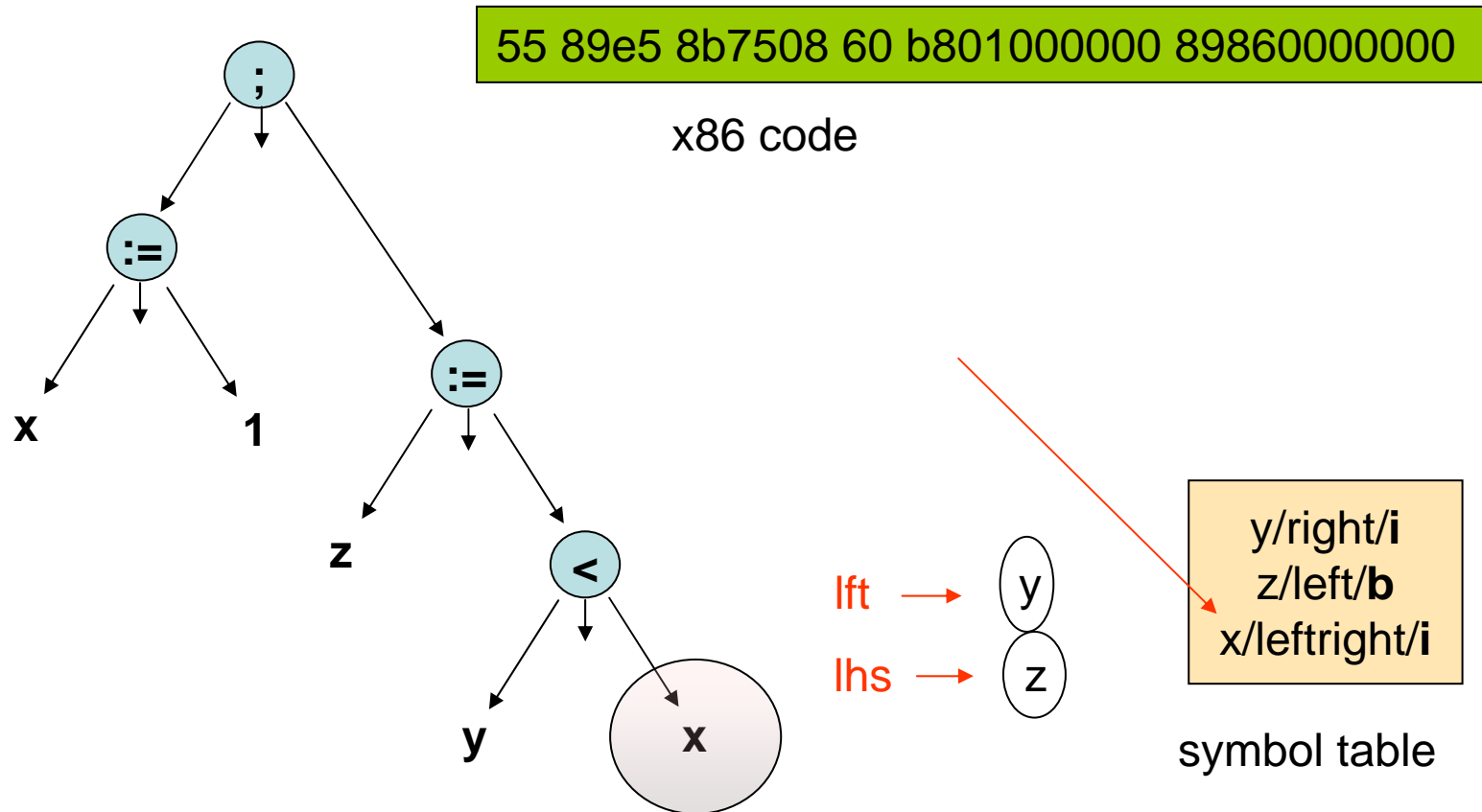
exprWalk(): rgt=exprWalk(getKid(3))



Code Generation Example – 21

source text: x:=1; z := y < x

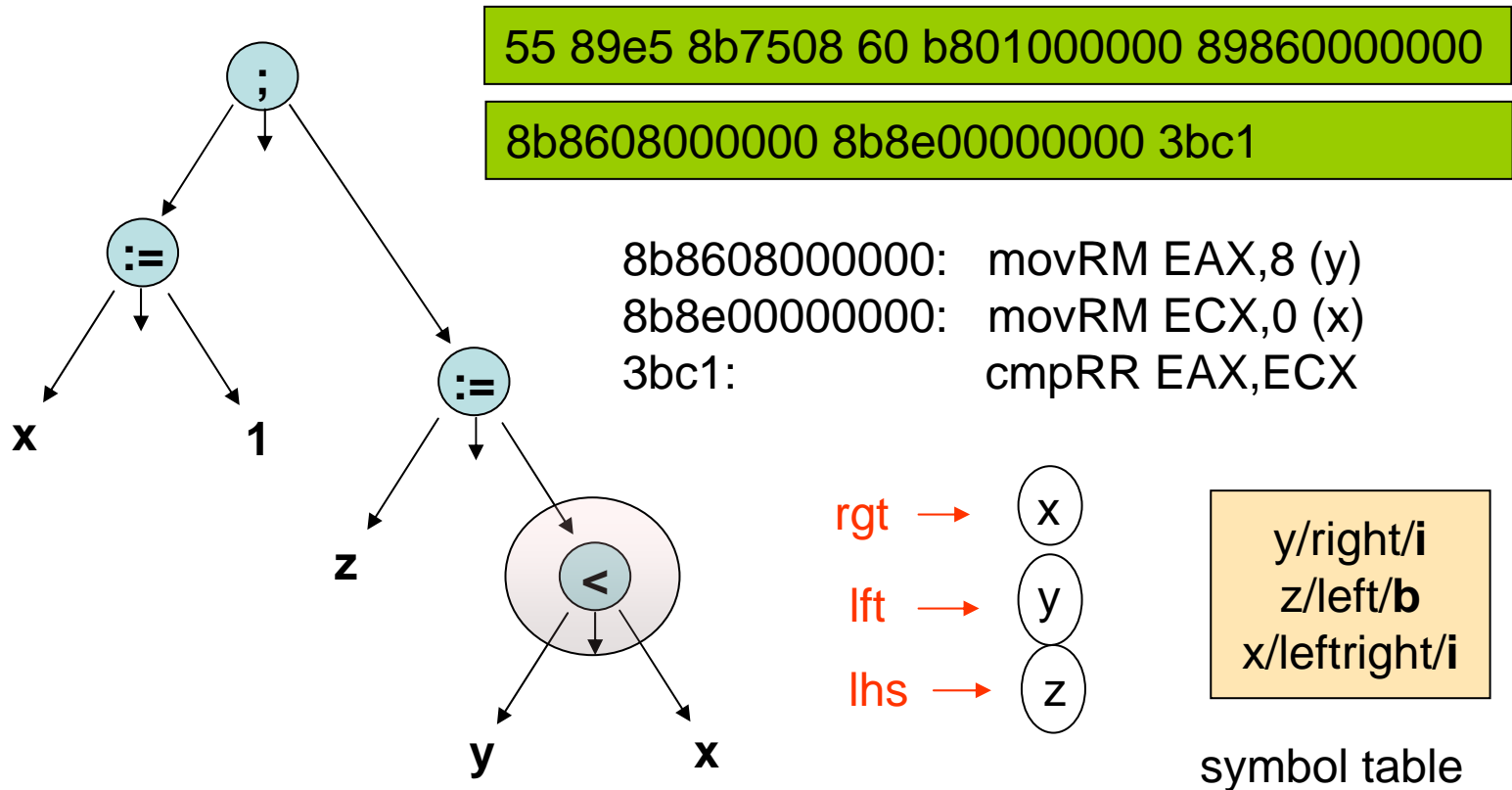
exprWalk(): res = emit.expr0(r, tok)



Code Generation Example – 22

source text: `x:=1; z := y < x`

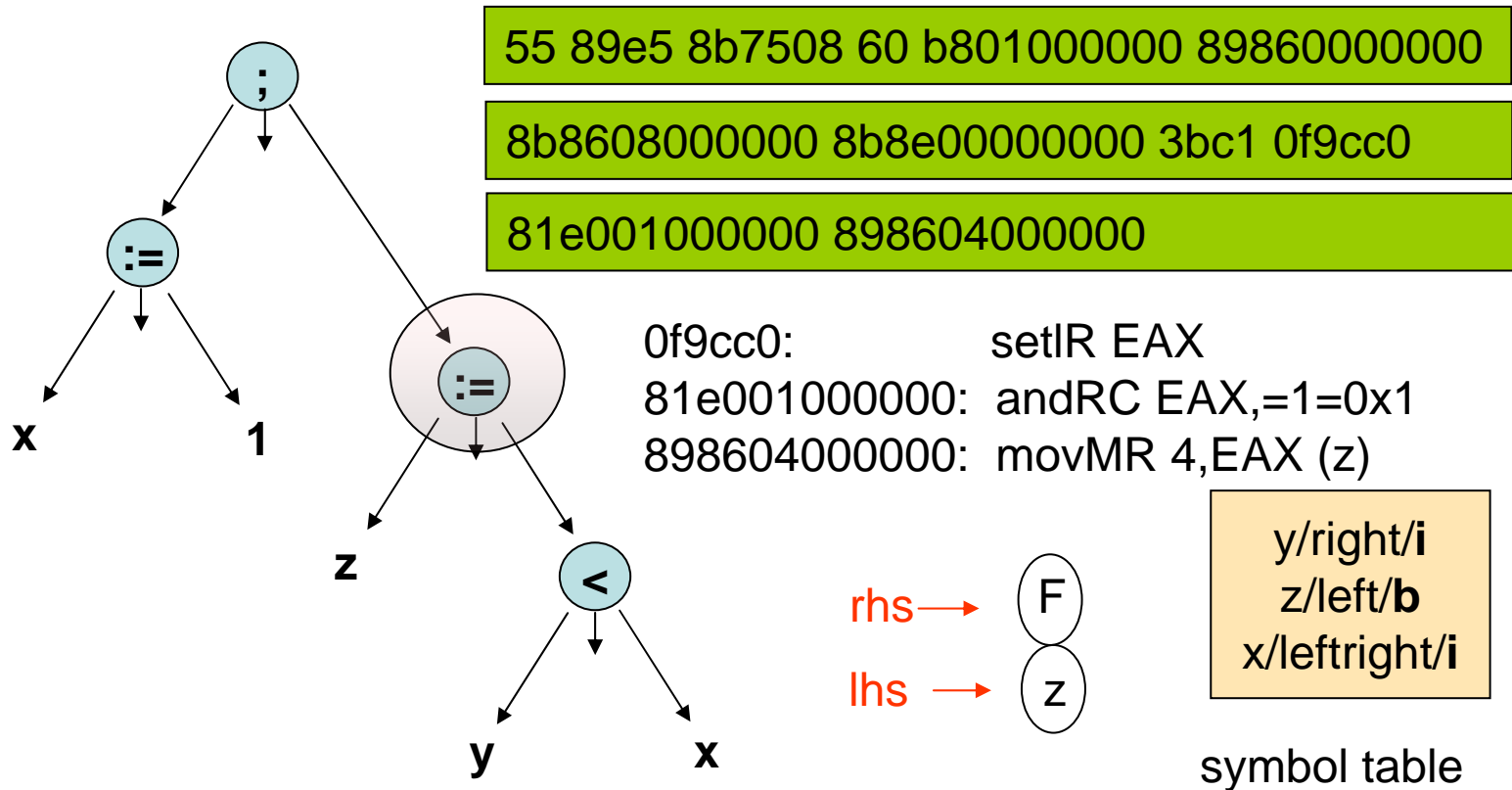
exprWalk(): `emit.expr2(rule,lft,rgt)`



Code Generation Example – 23

source text: x:=1; z := y < x

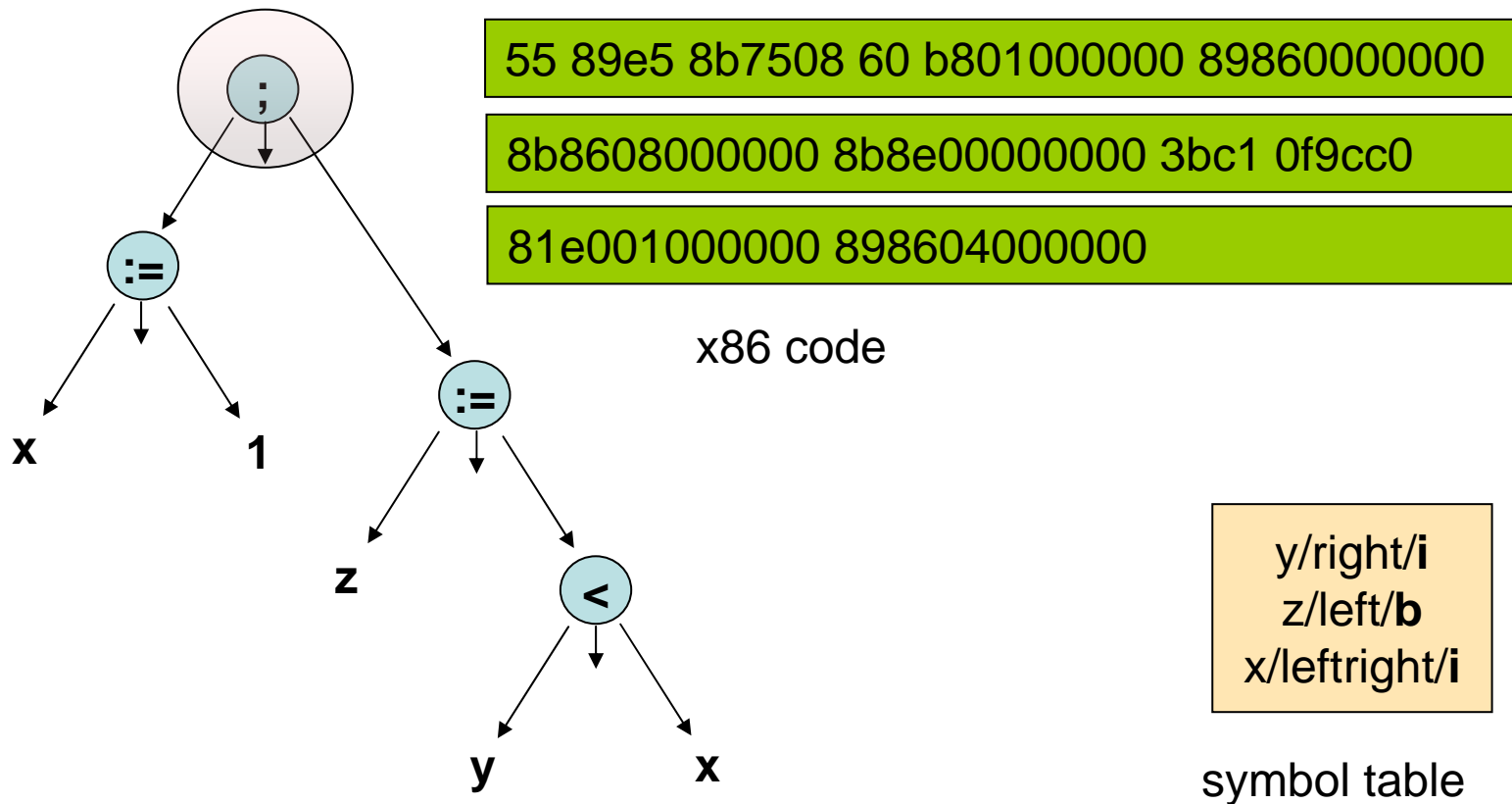
assignWalk(): emit.store(lhs,rhs)



Code Generation Example – 24

source text: $x := 1; z := y < x$

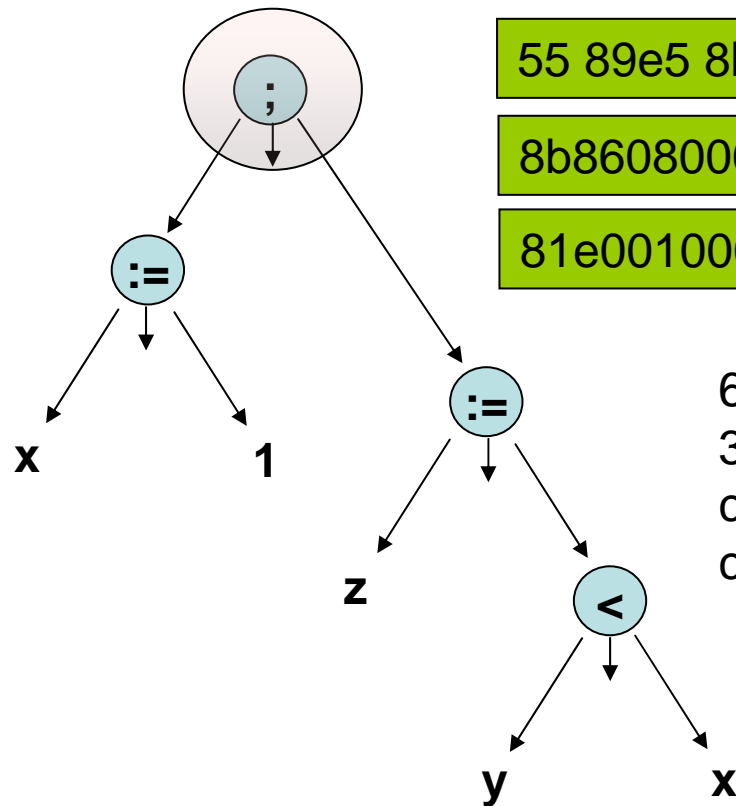
stmtWalk():



Code Generation Example – 25

source text: `x:=1; z := y < x`

genWalk(): emit.epilog()



55 89e5 8b7508 60 b801000000 898600000000

8b8608000000 8b8e00000000 3bc 0f9cc0

81e001000000 898604000000 61 33C0 c9 c3

61: popA # callee restore
33C0: xorRR EAX,EAX # 0 means no error
c9: leave # restore stack
c3: ret # restore EIP