

I want booleans.

ReportObj ifnz is silly

if safe then ... else ...

Cardinal Syntax

10|1|-1|...

<expr> ::=

- | <expr> && <expr>
 - | <expr> || <expr>
 - | if <expr> then <expr> else <expr>
 - | true
 - | false
 - | <expr> = <expr>
 - |
- let x=true in
if x then ...

if true then 4 else 0 \implies 4

mov eax, ~~true~~

if 7 then 4 else 0 \implies 4

Option: impose static types

let x:bool=true in

let x:int=false in

Option: runtime-extra bits

eax: result

ebx: type?

Option: runtime-repurpose bits

lowest bit = 0 signals int (31-bit signed int)

$-2^{30} - 2^{30} - 1$

lowest bit = 1 signals bool

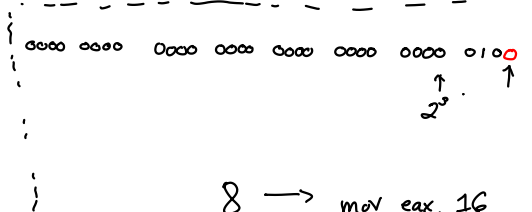
0x00000001 false
0x80000001 true

let rec compile-expression (env:environment) (e:expr) =

match e with

| EIn(n) \rightarrow

[AMov(ArgRegister EAX,
ArgConstant(2*n))]



8 \rightarrow mov eax, 16

false \rightarrow mov eax, 1

R(x): "representation" of x

a + b \implies c

R(a) + R(b) $\stackrel{?}{\implies}$ R(c) \checkmark

R(n) = 2n

R(a) - R(b) \implies R(c) \checkmark

R(a) * R(b) \implies 2R(c) \parallel

2 + 3 \implies 5

R(2) + R(3) \implies R(5)

4 + 6 \implies 10

2 * 3 \implies 6

R(2) * R(3)

4 * 6 \implies 24 = R(12) = 2R(6)

$$1000000 * 1000 = 1000000000$$

$$\frac{2000000 * 2000}{2} = 2000000000 \leftarrow \text{sets overflow bit}$$

$$\frac{2x * 2y}{2} = (x * y)$$

$\mathbb{Z}_{2^{32}}$

$$\frac{2x}{2} * 2y = 2(x * y)$$

Comparison Ops

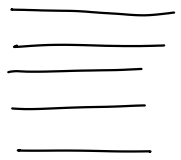
0x80000001 = true
0x00000001 = false

4 < 5 ==> true

```

mov eax, 8
mov [esp+[]], eax
mov eax, 10
mov [esp-8], eax
mov eax, [esp-4]
cmp eax, [esp-8]
jl else
mov eax, 0x00000001
jmp and
else:
mov eax, 0x80000001
end:

```



if first second then eax contains negative

```

sub eax, [esp-8]
and eax, 0x80000000
or eax, 0x00000001

```