COBRA

Data

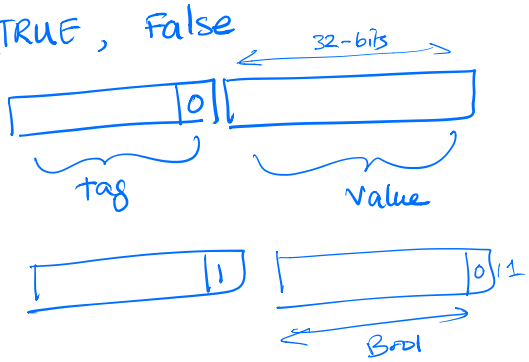
- Int
- Bool TRUE/False
- FP x
- Strings x
- Arrays ✓
- Pointers / Structures / Tuples ✓
- Functions ✓ Closures

2 + True

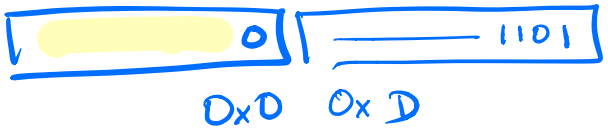
0, 1, 2, 3, 4, . . .

wait

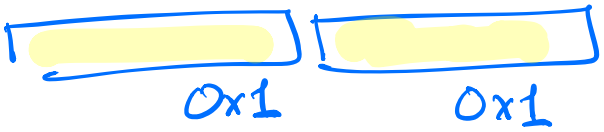
TRUE, False



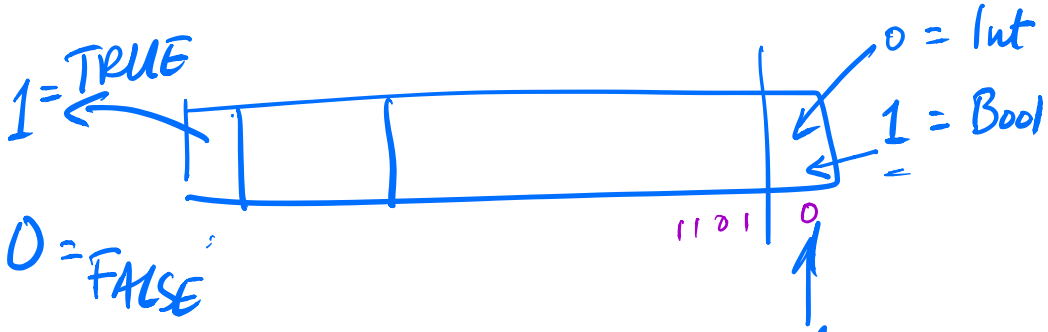
13



TRUE



False



TRUE = 1000 0000 0000 0001

TRUE = 0x8001

FALSE = 0x0001

13 = 0b00 ... 11010

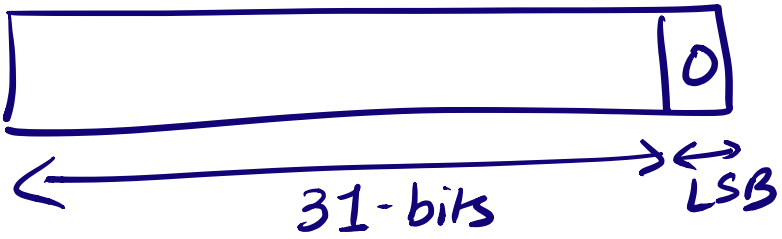
26

---

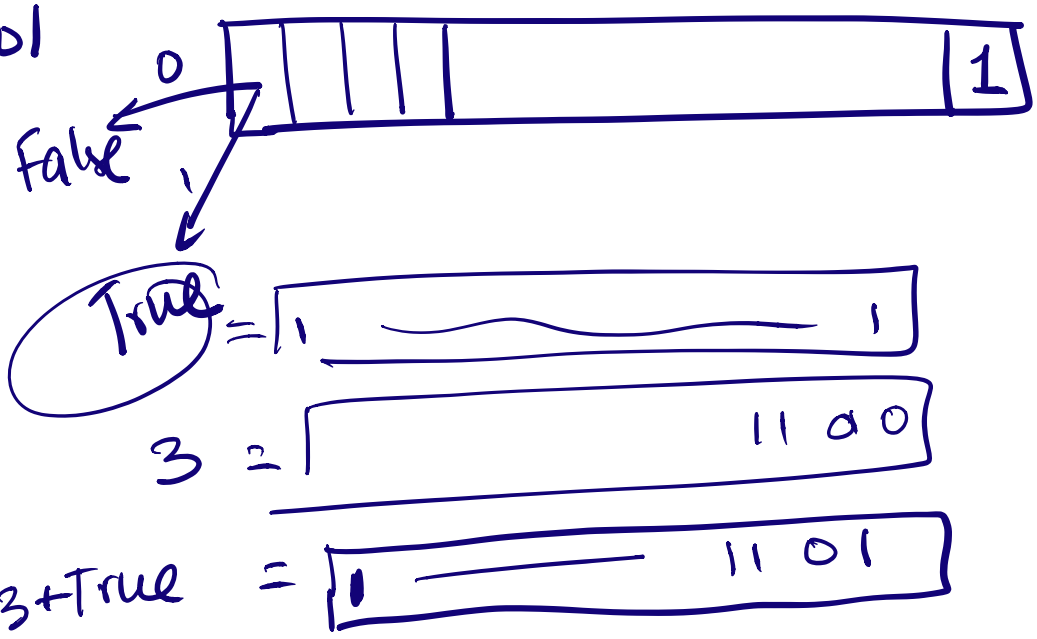
where SHALL we unstuff?

- "where we put it"
-

Int



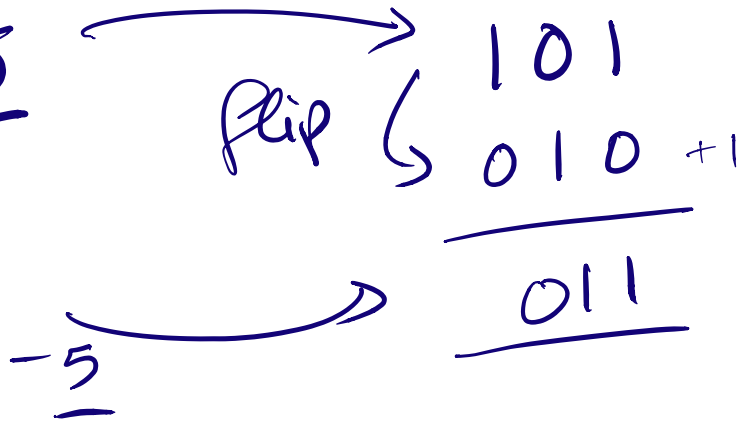
Bool



Value	Rep
2	0x4
4	0x8
2+4	0xC (12)
n_1	$2.n_1$
n_2	$2.n_2$
$n_1 + n_2$	$2.(n_1+n_2)$
$n_1 - n_2$	$2.(n_1-n_2)$
$n_1 * n_2$	$4.(n_1*n_2)$

7 3

Two's complement



A Valentine-shmalentine

WED

B THU is Fine!

C MON* please!

* AFTER midterm

$V_1 <^{i} V_2$

```
mov eax, <V1>
cmp eax, <V2>
jne not_less_than_i
less_than_i:
    mov eax, TRUE
    jmp exit_i
not_less_than_i:
    mov eax, FALSE
exit_i:
```

$v_1 \;\&\&\; v_2$

$!\, v$

if v_1 then v_2 else

$v_1 \;||\; v_2$ if v_1 then TRUE

else

v_2

$!\, v$ if v then FASSE

else TRUE

$V_1 + V_2$

Check v_1 is int

Check v_2 is int

```
mov eax, <V1>
add eax, <V2>
```

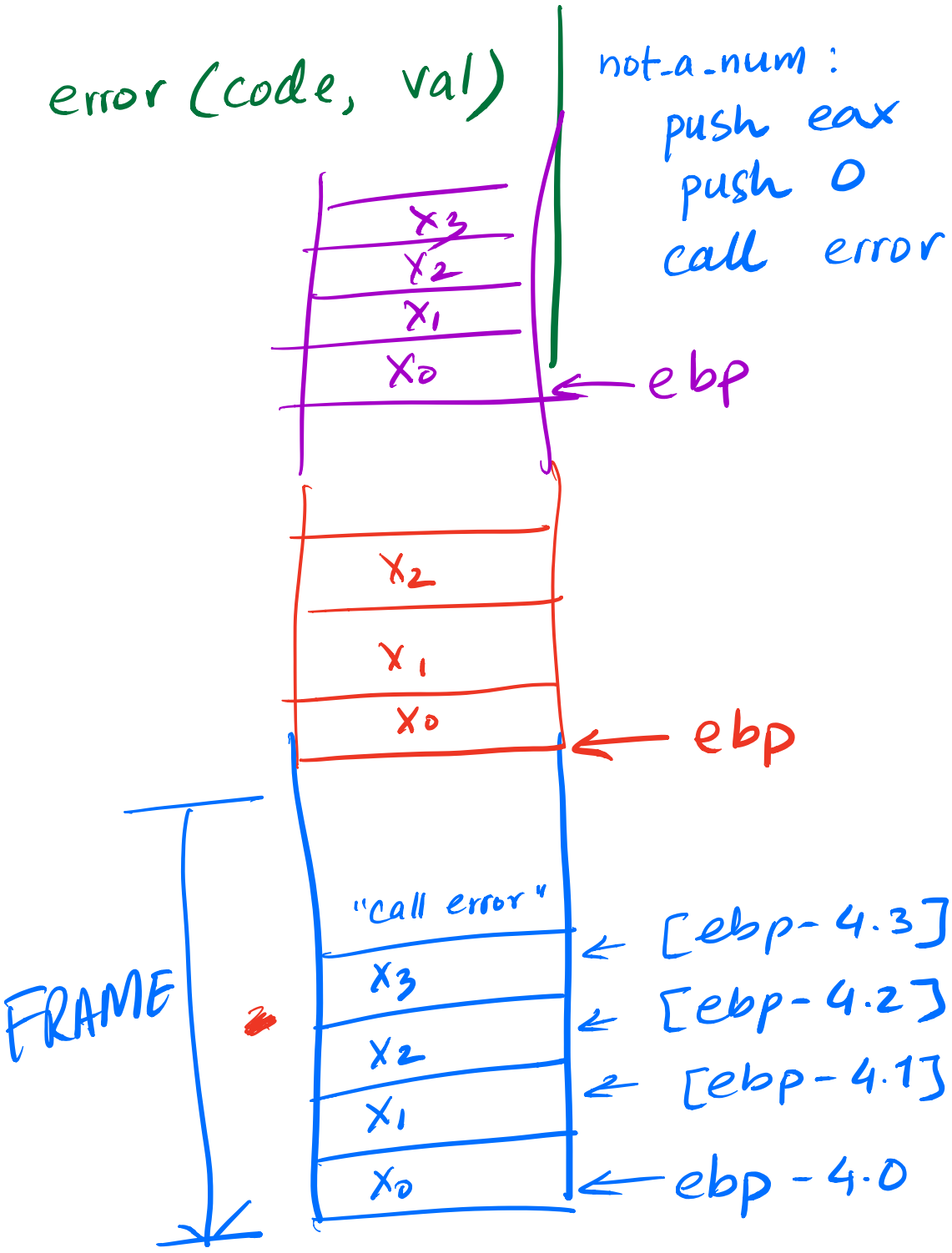
7 + true

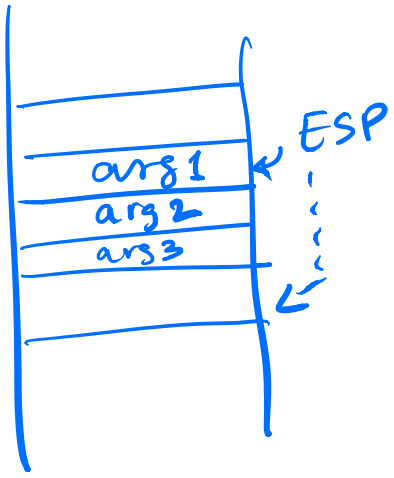
V_1 + V_2	V_1 && V_2
|| ||	|| ||
int int	boolen boolean

```
mov eax, <V>
mo  ebx, eax
and ebx, 1
cmp ebx, 0
jne not_a_number:
```

not_a_number:

How to CALL error


error (code, val)
not_a_num :
push eax
push 0
call error
x3
x2
x1
x0
ebp
x2
x1
x0
ebp
"call error"
[ebp-4.3]
x3
[ebp-4.2]
x2
[ebp-4.1]
x1
x0
ebp-4.0
FRAME




```
push argN
  ⋮
push arg3
push arg2
push arg1
call foo
add esp, 4*N
```

UNDECIDABLE

This sentence
is a
lie!

FEWEST stack slots need to exec

A. 0
B. 1
C. 2
D. 3
E. 4

if true:

let x = 1
    y = 2
    z = 3
    a = x+y
in
    a+2

else:
    0

if (8) cond:
(10) e_1

else:
(15) e_2

A. max(vars cond, vars e_1, vars e_2)

B. vars cond (8) + max(vars e_1, vars e_2) (2

A. 15 B. 23

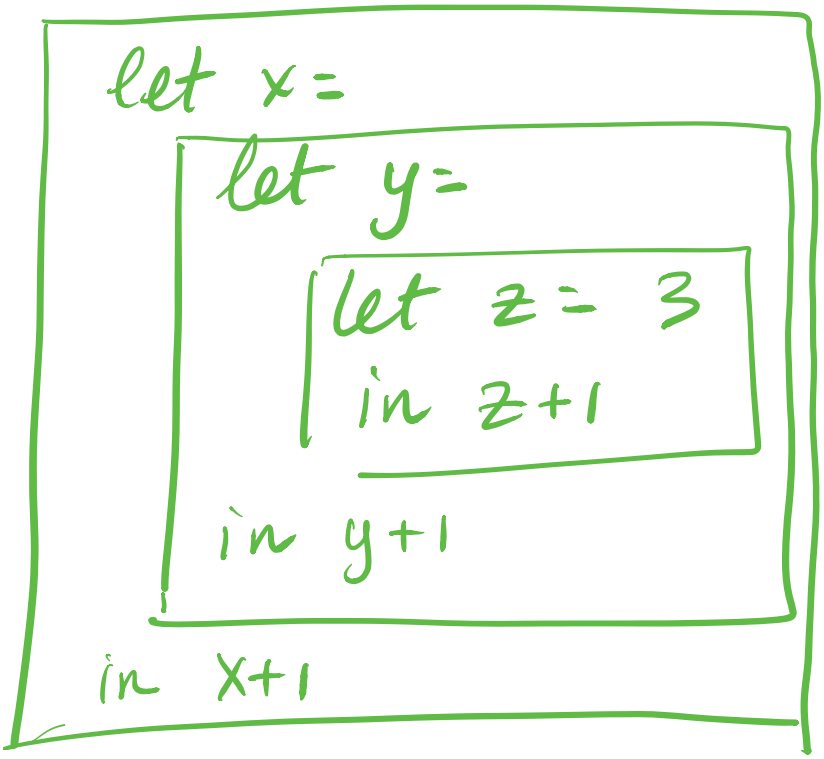
A. 0

B. 1

C. 2

D. 3

E. 4



let $\underset{=}{x} = \overset{(55)}{\boxed{e_1}}$

in $e_2^{(3)}$

$n_1 + n_2$

$1 + n_1 + n_2$

$\max(n_1, n_2)$

$\boxed{\max(n_1, 1+n_2)}$