

Register Allocation

let $a = 2$ in
let $b = 3$ in
 $a + b$.

```
mov eax, 4  
mov ecx, eax  
mov eax, 6  
mov edx, eax  
mov eax, ecx  
add eax, edx
```

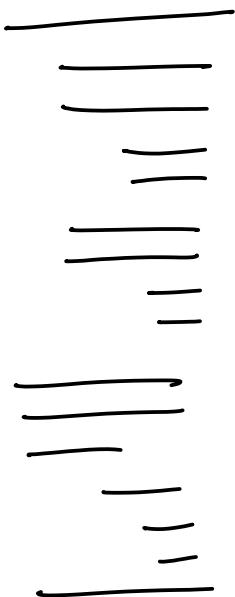
let $a =$
let $b = 5$ in
let $c = 7$ in

$b + c$ $\{b: -4, c: -8\}$

ⁱⁿ
let $d = 2$ in
 $a * d$ $\{a: -4\}$

$\{a: -4, d: -8\}$

let $a = 4$ in



Objective:

find assignment from vars
to registers / memory

“ a is no longer needed”

liveness analysis

Define graph:

V = variables in prog

E = interference edges

let b =

let c = 4 in

let d = 2 in] c
c + d] d

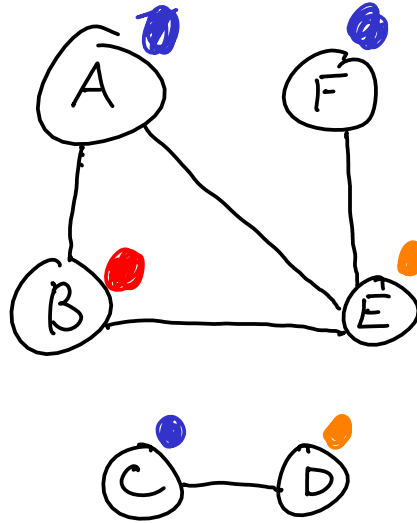
in

let a = 5 in

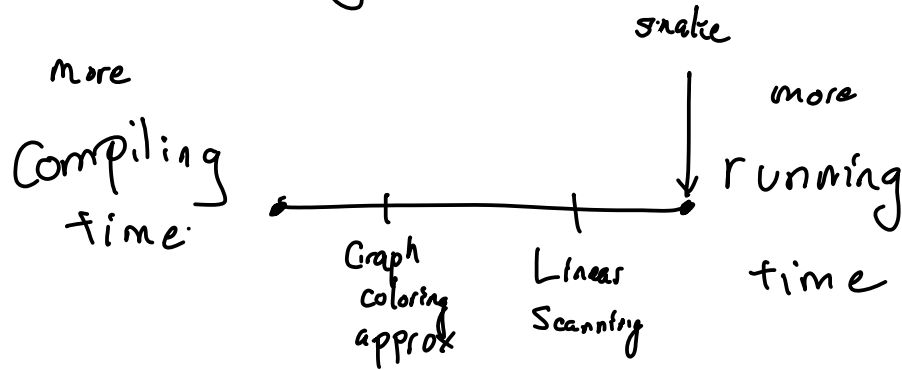
let e = 7 in] a] b

let f = b + a in] a] b] e

f * e] f] e



JIT — just-in-time



Linear Scanning

- When you need to allocate space
 - if you have a register: use it
 - otherwise, move oldest variable in a register to memory; then, use that register

in terms of creation time
- When you can free space
 - if the space is a register, go fetch newest var from memory

