

May 22, 2026 Lecture

- Announcements

- office hours by appt., post google calendar link on Canvas.
- Monday holiday! → see you wednes.

- Agenda

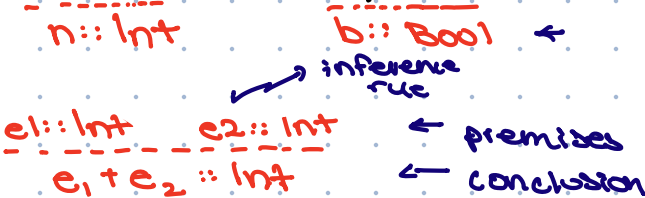
- Review type checking + type inference
- continue type system for mini nano

- If time: Polymorphic } more so  
 If time: unification } next week

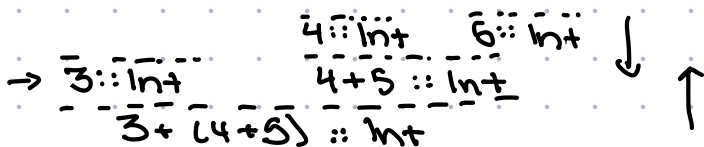
$e ::= n \mid b \mid x \mid e_1 + e_2 \mid x \rightarrow e \mid e_1 e_2$   
 let  $x = e_1$  in  $e_2$  → grammar  
 → let expressions

- $T$  for types  
 $T ::= \text{Int} \mid \text{Bool} \mid T_1 \rightarrow T_2$
- want some "typing relation"  
 o typing rules  $e :: T$
- 7 expressions in our grammar, that means that we will have 7 rules.

- our first rule!



- suppose  $3 + (4 + 5)$



- Variables

???

$x :: ???$

$\Gamma$ : Type environment

- example env:  $[(x, S), (f, \text{closure}), (y, Z), \dots]$

$\Gamma$ , Gamma

-  $e :: T$

Gamma  $\vdash e :: T$

$(x, T)$  in gamma

Gamma  $\vdash x :: T$

$(x, T)$  in  $\text{gamma}$

$\text{gamma} \vdash x :: T$

$\text{gamma} \vdash n :: \text{Int}$      $\text{gamma} \vdash b :: \text{Bool}$

$\text{gamma}_1 \vdash e_1 :: \text{Int}$      $\text{gamma}_2 \vdash e_2 :: \text{Int}$

$\text{gamma} \vdash e_1 + e_2 :: \text{Int}$

let  $x = 3$  in

let  $y = 4$  in

$x + y$

? type