



# Local Definitions and Scope

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# Definitions

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- We've seen global definitions:
  - `(define answer 42)`  $::$  "42" is RHS
  - `(define (f x) (+ 1 x))`
- Today we'll look at local definitions:
  - `(local ((define answer 42)  
          (define (f x) (+ 1 x)))  
          (f answer))`  $::$  body



# Formalities

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- What does the BNF for local definitions look like?
  - $\langle \text{exp} \rangle ::= \dots \mid (\text{local } (\text{def}^+) \text{ exp})$
- Indentation style
- Semantics (informally)



# Why "local"?

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- Avoiding namespace pollution
  - Example: Our insert sort function
  - This is an example of encapsulation
  - How useful is this concept?
    - Reuse name, avoid complex contracts, organize, hiding implementation detail
- Avoiding repeated work
  - Consider:
    - ;; last-occurrence:
    - ;; x-value, [posn] -> y-value or false



# Variables and Scope

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- Recall:
  - `(local ((define answer1 42)`  
          `(define (f2 x3) (+ 1 x4)))`  
          `(f5 answer6))`
- Variable occurrences: 1-6
- Binding (or defining) occurrences: 1,2,3
- Use occurrences: 4,5,6
- Scopes: 1:(all of local statement) , 2:(all of local statement) , 3:(+1 x)