

## Answers to Big-Step Exercises, #1



|                                   |             |
|-----------------------------------|-------------|
| 8 ↓ 8 [value]                     |             |
| 2 ↓ 2 [value]                     |             |
| (< 8 2) ↓ #f                      | [less-than] |
| 3 ↓ 3 [value]                     |             |
| 4 ↓ 4 [value]                     |             |
| (+ 3 4) ↓ 7                       | [addition]  |
| (if (< 8 2) (+ #f 5) (+ 3 4)) ↓ 7 |             |

  

|                                   |               |
|-----------------------------------|---------------|
| 1 ↓ 1 [value]                     |               |
| 2 ↓ 2 [value]                     |               |
| (+ 1 2) ↓ 3                       | [addition]    |
| 3 ↓ 3 [value]                     |               |
| 7 ↓ 7 [value]                     |               |
| (- 3 7) ↓ -4                      | [subtraction] |
| (if (+ 1 2) (- 3 7) (/ 9 0)) ↓ -4 |               |

Expr/dec solns 1

## Answers to Big-Step Exercises, #2



|   |                  |
|---|------------------|
| 1 ↓ 1 [value]                           |                  |
| 2 ↓ 2 [value]                           |                  |
| (< 1 2) ↓ #t                            | [less-than]      |
| 3 ↓ 3 [value]                           |                  |
| 4 ↓ 4 [value]                           |                  |
| (* 3 4) ↓ 12                            | [multiplication] |
| (if (< 1 2) (* 3 4) (/ 5 6)) ↓ 12       |                  |
| 7 ↓ 7 [value]                           |                  |
| (+ (if (< 1 2) (* 3 4) (/ 5 6)) 7) ↓ 19 |                  |

  

|                   |               |
|-------------------|---------------|
| 1 ↓ 1 [value]     |               |
| 2 ↓ 2 [value]     |               |
| (if 1 2 3) ↓ 2    | [if-nonfalse] |
| #t ↓ #t [value]   |               |
| (+ (if 1 2 3) #t) |               |

Stuck here! Can't apply [addition] rule because #t is not a number in (+ 2 #t). This models a dynamic type checking error.

Expr/dec solns 2

## Answers to Small-Step Exercises, #1



```
(if {(< 8 2)} (+ #f 5) (+ 3 4))
=> {(if #f (+ #f 5) (+ 3 4))} [less than]
=> {( * 3 4 )} [if false]
=> 12 [multiplication]
```

  

```
(if {(+ 1 2)} (- 3 7) (/ 9 0))
=> (if 3 (- 3 7) (/ 9 0)) [addition]
=> {(- 3 7)} [if nonfalse]
=> -4 [subtraction]
```

Expr/dec solns 3

## Answers to Small-Step Exercises, #2



```
(+ (if {(< 1 2)} (* 3 4) (/ 5 6)) 7)
=> (+ (if #t (* 3 4) (/ 5 6)) 7) [less than]
=> (+ {( * 3 4 )} 7) [if nonfalse]
=> {(+ 12 7)} [multiplication]
=> 19 [addition]
```

  

```
(+ {(if 1 2 3)} #t)
=> (+ 2 #t) [if nonfalse]
```

Stuck here! Can't apply [addition] rule because #t is not a number in (+ 2 #t). This models a dynamic type checking error.

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