

Scheme

Announcements

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- "The greatest single programming language ever designed."
 - Alan Kay, co-inventor of Smalltalk and OOP (from the user interface video)

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> (quotient (+ 8 7) 5)
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(Demo)

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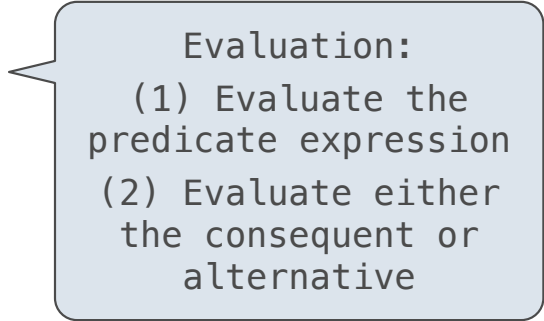
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Scheme Interpreters

(Demo)

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Two equivalent expressions:

`(define (plus4 x) (+ x 4))`

`(define plus4 (lambda (x) (+ x 4)))`



Lambda Expressions

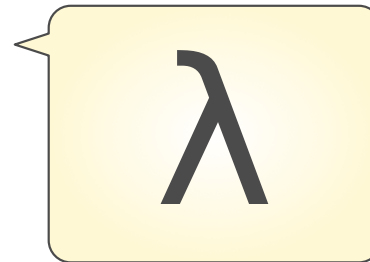
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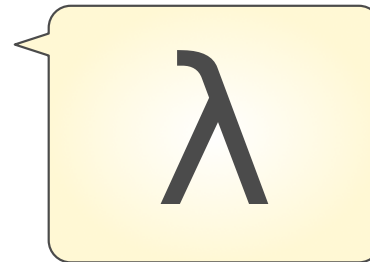
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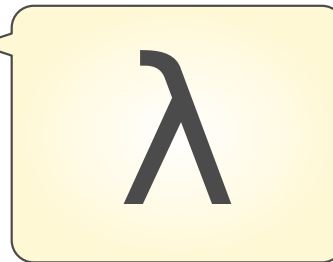
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More Special Forms

Cond & Begin

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The `cond` special form that behaves like `if-elif-else` statements in Python

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```
if x > 10:  
    print('big')  
elif x > 5:  
    print('medium')  
else:  
    print('small')
```

Cond & Begin

The `cond` special form that behaves like `if-elif-else` statements in Python

```
if x > 10:
    print('big')
elif x > 5:
    print('medium')
else:
    print('small')
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```
(cond ((> x 10) (print 'big'))
      ((> x 5)  (print 'medium'))
      (else     (print 'small')))
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if x > 10:		
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print('medium')	((> x 5) (print 'medium'))	((> x 5) 'medium)
else:	(else (print 'small'))	(else 'small'))))
print('small')		

The `begin` special form combines multiple expressions into one expression

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print('medium')	((> x 5) (print 'medium'))	((> x 5) 'medium)
else:	(else (print 'small'))	(else 'small'))))
print('small')		

The begin special form combines multiple expressions into one expression

```
if x > 10:
    print('big')
    print('guy')
else:
    print('small')
    print('fry')
```

Cond & Begin

The cond special form that behaves like if-elif-else statements in Python

if x > 10:		
print('big')		(print
elif x > 5:	(cond ((> x 10) (print 'big'))	(cond ((> x 10) 'big)
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The begin special form combines multiple expressions into one expression

if x > 10:	(cond ((> x 10) (begin (print 'big) (print 'guy)))
print('big')	(else (begin (print 'small) (print 'fry))))
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print('guy')	
else:	(if (> x 10) (begin
print('small')	(print 'big)
print('fry')	(print 'guy'))
	(begin
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b = 2 + 2  
c = math.sqrt(a * a + b * b)
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a and b are still bound down here
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(define c (let ((a 3)
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  (sqrt (+ (* a a) (* b b)))))
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(define c (let ((a 3)
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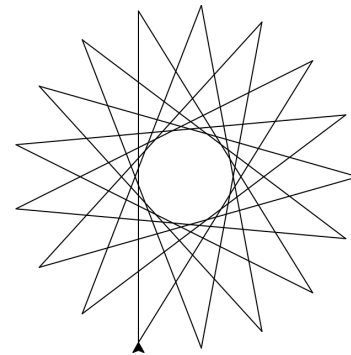
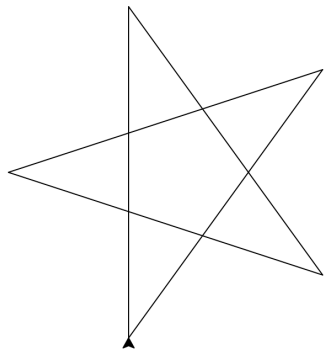
*a and b are **not** bound down here*

Turtle Graphics

Drawing Stars

`(forward 100)` or `(fd 100)` draws a line

`(right 90)` or `(rt 90)` turns 90 degrees



(Demo)

Sierpinski's Triangle

(Demo)