mutable data

define

versus

set!

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An **identifier**
  is a name used in the code.

A **binding**
  is a connection to a value.

A **variable**
  is an identifier + binding.

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How do functions retain access to objects that existed when the function was created?

The interpreter creates a **closure**.

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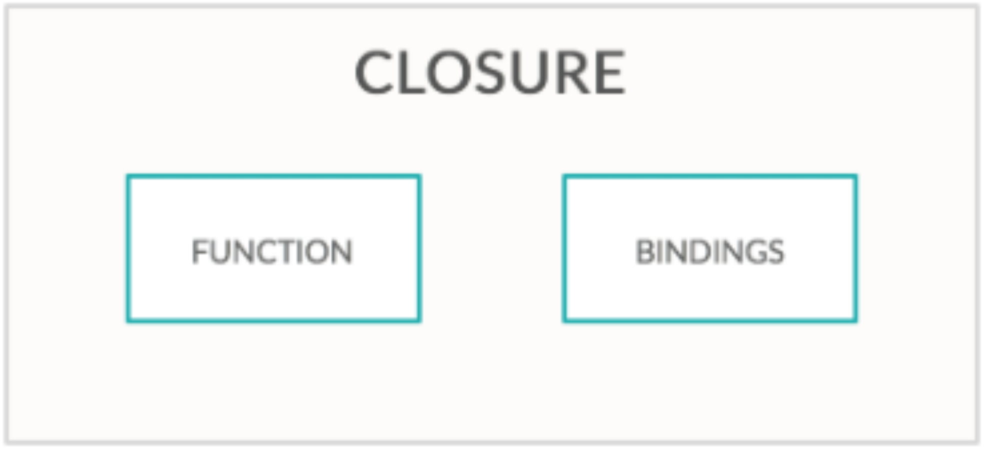
A closure is a data structure:



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Now we can understand how the **region** of a variable is ***not*** the same as the **scope** of the variable.

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```
(define make-counter
  (lambda ()
    (let ((n 0))
      (lambda ()
        (set! n (add1 n))
        n))))
```

[demo in Dr. Racket]

```
(let ((n 42))
  (let ((clock-tick (make-counter)))
    ...
    (clock-tick)
    ... ))
.
```

One approach is to use

message-passing style

Create a function that receives a symbol as its argument and uses the symbol to choose which procedure to run.

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```
(case transaction
  ('withdraw ...)
  ('deposit  ...))
```

is equivalent to

```
(cond ((eq? transaction 'withdraw) ...)
      ((eq? transaction 'deposit ) ...))
```

.