

Property Observers

Property observers observe and respond to changes in a property's value.

Property observers are called every time a property's value is set, even if the new value is the same as the property's current value.

You can add property observers in the following places:

- Stored properties that you define
- Stored properties that you inherit
- Computed properties that you inherit

For an inherited property, you add a property observer by overriding that property in a subclass. For a computed property that you define, use the property's setter to observe and respond to value changes, instead of trying to create an observer.

Overriding properties is described in [Overriding](#).

You have the option to define either or both of these observers on a property:

- `willSet` is called just before the value is stored.
- `didSet` is called immediately after the new value is stored.

If you implement a `willSet` observer, it's passed the new property value as a constant parameter. You can specify a name for this parameter as part of your `willSet` implementation. If you don't write the parameter name and parentheses within your implementation, the parameter is made available with a default parameter name of `newValue`.

Similarly, if you implement a `didSet` observer, it's passed a constant parameter containing the old property value. You can name the parameter or use the default parameter name of `oldValue`. If you assign a value to a property within its own `didSet` observer, the new value that you assign replaces the one that was just set.

Note:

The `willSet` and `didSet` observers of superclass properties are called when a property is set in a subclass initializer, after the superclass initializer has been called. They aren't called while a class is setting its own properties, before the superclass initializer has been called.

For more information about initializer delegation, see [Initializer Delegation for Value Types](#) and [Initializer Delegation for Class Types](#).

Here's an example of `willSet` and `didSet` in action. The example below defines a new class called `StepCounter`, which tracks the total number of steps that a person takes while walking. This class might be used with input data from a pedometer or other step counter to keep track of a person's exercise during their daily routine:

```
class StepCounter {
    var totalSteps: Int = 0 {
        willSet (newTotalSteps) {
            print("About to set totalSteps to \(newTotalSteps)")
        }
        didSet {
            if totalSteps > oldValue {
                print("Added \(totalSteps - oldValue) steps")
            }
        }
    }
}

let stepCounter = StepCounter ()
stepCounter.totalSteps = 200
// About to set totalSteps to 200
// Added 200 steps
stepCounter.totalSteps = 360
// About to set totalSteps to 360
// Added 160 steps
stepCounter.totalSteps = 896
// About to set totalSteps to 896
// Added 536 steps
```

The `StepCounter` class declares a `totalSteps` property of type `Int`. This is a stored property with `willSet` and `didSet` observers.

The `willSet` and `didSet` observers for `totalSteps` are called whenever the property is assigned a new value. This is true even if the new value is the same as the current value.

This example's `willSet` observer uses a custom parameter name of `newTotalSteps` for the upcoming new value. In this example, it simply prints out the value that's about to be set.

The `didSet` observer is called after the value of `totalSteps` is updated. It compares the new value of `totalSteps` against the old value. If the total number of steps has increased, a message is printed to indicate how many new steps have been taken. The `didSet` observer doesn't provide a custom parameter name for the old value, and the default name of `oldValue` is used instead.

Note

If you pass a property that has observers to a function as an in-out parameter, the `willSet` and `didSet` observers are always called. This is because of the copy-in copy-out memory model for in-out parameters: The value is always written back to the property at the end of the function. For a detailed discussion of the behavior of in-out parameters, see [In-Out Parameters](#).