Week 3 - Caching Data

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In this example we introduce the «- operatior which can be used to assign a value to an object in an environment that is different from the current environment. Below are two functons that are used to create a special object that stores a numeric vector and cache's its mean.

The first function, makeVector creates a special "vector", which is really a list containing a function to

1. set the value of the vector
2. get the value of the vector
3. set the value of the mean
4. get the value of the mean

What is happening here is that we actually create a vector that has some embedded functions, **set**, **get**, **setmean** and **getmean**.

These can be called (as you will see later) from the variable, and from here we we can run those funcitons updating the values of the variable.

```
makeVector <- function(x = numeric()) {
    m <- NULL
    set <- function(y) { ## The set value function
        x <<- y
        m <<- NULL
    }
    get <- function() x ## The get value function
    setmean <- function(mean) m <<- mean ## The set mean function
    getmean <- function() m ## The get mean function

    ## Lists the functions
    list(set = set, get = get,
         setmean = setmean,
         getmean = getmean)
}
```

The second function calculates the mean of the special "vector" created with the first function. However, it first checks to see if the mean has already been calcualted. If so, it gets the mean from the cache and skips the computation. Otherwise, it calcuates the mean of the data and sets the value of mean in the cache via the setmean function.

```
cachemean <- function(x, ...) {
    m <- x$getmean() ## Check to see if the mean has been set
    if(!is.null(m)) { ## If the mean has been set, then return the value
        message("getting cached data")
        return(m)
    }
```

```
    ## Else set the value of mean
    data <- x$get()
    m <- mean(data, ...)
    x$setmean(m)
    m
}
```

Now lets test the functions

First we set the value of the vector

```
testVector <- makeVector(c(10, 20, 30, 40, 50, 60, 70, 80, 90, 100))
```

Then we can check that the vector exists

```
testVector$get()
```

```
##  [1]  10  20  30  40  50  60  70  80  90 100
```

Now that we can see that the vector exists we can set the mean

```
testVector$setmean(mean(testVector$get()))
```

Now that the mean has been set, we can check the value of mean

```
testVector$getmean()
```

```
## [1] 55
```