Assignment: Programming Assignment 2: Lexical Scoping

Submit by January 24, 11:59 PM PT

Important Information
It is especially important to submit this assignment before the deadline, January 24, 11:59 PM PT, because it must be graded by others. If you submit late, there may not be enough classmates around to review your work. This makes it difficult - and in some cases, impossible - to produce a grade. Submit on time to avoid these risks.

Instructions

second programming assignment will require you to write an R function is able to cache potentially time-consuming computations. For example, taking the mean of a numeric vector is typically a fast operation. However, for a very long vector, it may take too long to compute the mean, especially if it has to be computed repeatedly (e.g. in a loop). If the contents of a vector are not changing, it may make sense to cache the value of the mean so that when we need it again, it can be looked up in the cache rather than recomputed. In this Programming Assignment will take advantage of the scoping rules of the R language and how they can be manipulated to preserve state inside of an R object.

Review criteria less

This assignment will be graded via peer assessment. During the evaluation phase, you must evaluate and grade the submissions of at least 4 of your classmates. If you do not complete at least 4 evaluations, your own assignment grade will be reduced by 20%.

Example: Caching the Mean of a Vector less

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In this example we introduce the <<- operator which can be used to assign a value to an object in an environment that is different from the current environment. Below are two functions 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

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

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

```
cachemean <- function(x, ...) {
        m <- x$getmean()
        if(!is.null(m)) {
                message("getting cached data")
                return(m)
        }
        data <- x$get()
        m <- mean(data, ...)
        x$setmean(m)
        m
}
```

Help Center