```r
> data[, YEARMONTH := year(DATE)*100 + month(DATE)]
> #### Define the measure calculations
> measureOverTime <- data[, .(totSales = sum(TOT_SALES),
+                 nCustomers = uniqueN(LYLTY_CARD_NBR),
+                 nTxnPerCust =uniqueN(TXN_ID)/uniqueN(LYLTY_CARD_NBR),
+                 nChipsPerTxn = sum(PROD_QTY)/uniqueN(TXN_ID),
+                 avgPricePerUnit = sum(TOT_SALES)/sum(PROD_QTY))
+              , by = c("STORE_NBR", "YEARMONTH")][order(STORE_NBR,YEARMONTH)]
>
> storesWithFullObs <- unique(measureOverTime[, .N, STORE_NBR][N == 12, STORE_NBR])
> preTrialMeasures<- measureOverTime[YEARMONTH < 201902 &
STORE_NBR %in%storesWithFullObs, ]
>
> calculateCorrelation <- function(inputTable, metricCol, storeComparison) {
+    calcCorrTable = data.table(Store1 = numeric(), Store2 = numeric(), corr_measure=
numeric())
+    storeNumbers <- unique(inputTable[, STORE_NBR])
+    for (i in storeNumbers) {
+        calculatedMeasure = data.table("Store1" = storeComparison,
+                        "Store2" = i,
+                        "corr_measure" = cor(inputTable[
+                          STORE_NBR == storeComparison,
+                          eval(metricCol)],
+                            inputTable[STORE_NBR == i, eval(metricCol)]))
+        calcCorrTable <- rbind(calcCorrTable, calculatedMeasure)}
+    return(calcCorrTable)}
>
> calculateMagnitudeDistance <- function(inputTable, metricCol, storeComparison){
+      calcDistTable = data.table(Store1 = numeric(), Store2 = numeric(), YEARMONTH
=numeric(), measure = numeric())
+      storeNumbers <- unique(inputTable[, STORE_NBR])
+      for (i in storeNumbers) {
+         calculatedMeasure = data.table("Store1" = storeComparison
+                        , "Store2" = i
+                        , "YEARMONTH" = inputTable[STORE_NBR ==storeComparison,
YEARMONTH]
+                        , "measure" = abs(inputTable[STORE_NBR ==storeComparison,
eval(metricCol)]
+                                - inputTable[STORE_NBR == i,eval(metricCol)])
+         )
+         calcDistTable <- rbind(calcDistTable, calculatedMeasure)
+      }
+ #### Standardise the magnitude distance so that the measure ranges from 0 to 1
+      minMaxDist <- calcDistTable[, .(minDist = min(measure), maxDist =max(measure)),
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+                          by = c("Store1", "YEARMONTH")]
+      distTable <-  merge(calcDistTable, minMaxDist, by = c("Store1", "YEARMONTH"))
+      distTable[, magnitudeMeasure := 1 - (measure - minDist)/(maxDist - minDist)]
+      finalDistTable <-  distTable[, .(mag_measure = mean(magnitudeMeasure)),
+                          by =.(Store1, Store2)]
+      return(finalDistTable)
+ }
>
> #### Use the functions for calculating correlation
> trial_store <-  77
> corr_nSales<- calculateCorrelation(preTrialMeasures, quote(totSales),trial_store)
> corr_nSales
     Store1 Store2 corr_measure
 1:    77     1  0.07521784
 2:    77     2 -0.26307873
 3:    77     3  0.80664364
 4:    77     4 -0.26329960
 5:    77     5 -0.11065231
 ---
256:    77   268  0.34475712
257:    77   269 -0.31573035
258:    77   270  0.31543042
259:    77   271  0.35548730
260:    77   272  0.11762158
> corr_nCustomers<- calculateCorrelation(preTrialMeasures, quote(nCustomers),trial_store)
> corr_nCustomers
     Store1 Store2 corr_measure
 1:    77     1  0.32216828
 2:    77     2 -0.57205090
 3:    77     3  0.83420743
 4:    77     4 -0.29563870
 5:    77     5  0.37065851
 ---
256:    77   268  0.36951700
257:    77   269 -0.47429252
258:    77   270 -0.13125910
259:    77   271  0.01962906
260:    77   272  0.22321747
> #### Use the functions for calculating magnitude
> magnitude_nSales<- calculateMagnitudeDistance(preTrialMeasures,quote(totSales),
trial_store)
> magnitude_nSales
     Store1 Store2 mag_measure
 1:    77     1  0.9532849
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  2:   77    2  0.9375792
  3:   77    3  0.3543149
  4:   77    4  0.1771353
  5:   77    5  0.5530434
 ---
256:   77   268  0.9607852
257:   77   269  0.4521340
258:   77   270  0.4460825
259:   77   271  0.5523175
260:   77   272  0.8850883
> magnitude_nCustomers <-
calculateMagnitudeDistance(preTrialMeasures,quote(nCustomers), trial_store)
> magnitude_nCustomers
    Store1 Store2 mag_measure
  1:   77    1  0.9403206
  2:   77    2  0.9246380
  3:   77    3  0.3450667
  4:   77    4  0.1895787
  5:   77    5  0.4811990
 ---
256:   77   268  0.9399068
257:   77   269  0.3435465
258:   77   270  0.3577249
259:   77   271  0.4834575
260:   77   272  0.9482070
>
> corr_weight<- 0.5
> score_nSales<- merge(corr_nSales, magnitude_nSales,
+               by = c("Store1","Store2"))[, scoreNSales := corr_measure * corr_weight +
mag_measure * (1-corr_weight)]
>
> score_nCustomers<- merge(corr_nCustomers, magnitude_nCustomers, by =
+                c("Store1", "Store2"))[, scoreNCust := corr_measure * corr_weight
+mag_measure * (1- corr_weight)]
> score_Control<- merge(score_nSales, score_nCustomers, by = c("Store1","Store2"))
> score_Control[, finalControlScore := scoreNSales * 0.5 + scoreNCust * 0.5]
> control_store<- score_Control[Store1 == trial_store,][order(-finalControlScore)][2, Store2]
> control_store
[1] 233
```