Logistics data analysis using R programming [202102-LSB5019-001]

Assignment 4

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#1) Load the price index .csv file attached via this assignment#########################

```
destfile<- "D:\\One\\OneDrive\\My research\\5th semester\\R\\Assignment 4\\food-price-index-September-2021-index-numbers-csv-tables.csv"
pricedata<- read.csv(destfile) #load the file
```

#2) Use 4 methods that you learned in the last two sessions to manipulate the dataset####

```
#2.1: read the data file and overview its content (library(data.table))
head(pricedata,n=3) # check the first 3 rows
```

```
##   Series_reference  Period Data_value STATUS   UNITS
## 1     CPIM.SAP0100 2006.06       3.11  FINAL Dollars
## 2     CPIM.SAP0100 2006.07       2.78  FINAL Dollars
## 3     CPIM.SAP0100 2006.08       2.43  FINAL Dollars
##                         Subject
## 1 Consumers Price Index - CPI
## 2 Consumers Price Index - CPI
## 3 Consumers Price Index - CPI
##                                                                         Group
## 1 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 2 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 3 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
##   Series_title_1
## 1   Oranges, 1kg
## 2   Oranges, 1kg
## 3   Oranges, 1kg
```

```
tail(pricedata,n=10)# check the last 10 rows
```

```
##       Series_reference  Period Data_value STATUS   UNITS
## 25954     CPIM.SAP0269 2020.12       3.08  FINAL Dollars
## 25955     CPIM.SAP0269 2021.01       3.10  FINAL Dollars
## 25956     CPIM.SAP0269 2021.02       3.09  FINAL Dollars
## 25957     CPIM.SAP0269 2021.03       3.10  FINAL Dollars
## 25958     CPIM.SAP0269 2021.04       3.08  FINAL Dollars
## 25959     CPIM.SAP0269 2021.05       3.12  FINAL Dollars
## 25960     CPIM.SAP0269 2021.06       3.16  FINAL Dollars
## 25961     CPIM.SAP0269 2021.07       3.10  FINAL Dollars
## 25962     CPIM.SAP0269 2021.08       3.13  FINAL Dollars
## 25963     CPIM.SAP0269 2021.09       3.16  FINAL Dollars
##                           Subject
## 25954 Consumers Price Index - CPI
## 25955 Consumers Price Index - CPI
## 25956 Consumers Price Index - CPI
## 25957 Consumers Price Index - CPI
## 25958 Consumers Price Index - CPI
## 25959 Consumers Price Index - CPI
## 25960 Consumers Price Index - CPI
## 25961 Consumers Price Index - CPI
## 25962 Consumers Price Index - CPI
## 25963 Consumers Price Index - CPI
##                                                                           Group
## 25954 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 25955 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 25956 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 25957 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 25958 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 25959 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 25960 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 25961 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 25962 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 25963 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
##                   Series_title_1
## 25954 Chewing gum, packet, each
## 25955 Chewing gum, packet, each
## 25956 Chewing gum, packet, each
## 25957 Chewing gum, packet, each
## 25958 Chewing gum, packet, each
## 25959 Chewing gum, packet, each
## 25960 Chewing gum, packet, each
## 25961 Chewing gum, packet, each
## 25962 Chewing gum, packet, each
## 25963 Chewing gum, packet, each
```

```
summary(pricedata) # summary of the object
```

```
##  Series_reference       Period       Data_value        STATUS
##  Length:25963       Min.   :2006   Min.   : 0.900   Length:25963
##  Class :character   1st Qu.:2010   1st Qu.: 2.640   Class :character
##  Mode  :character   Median :2014   Median : 3.660   Mode  :character
##                     Mean   :2014   Mean   : 5.432
##                     3rd Qu.:2018   3rd Qu.: 6.160
##                     Max.   :2021   Max.   :37.960
##                                    NA's   :82
##    UNITS             Subject             Group           Series_title_1
##  Length:25963       Length:25963       Length:25963       Length:25963
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##
##
##
##
```

```
dim(pricedata) # check the dimension
```

```
## [1] 25963     8
```

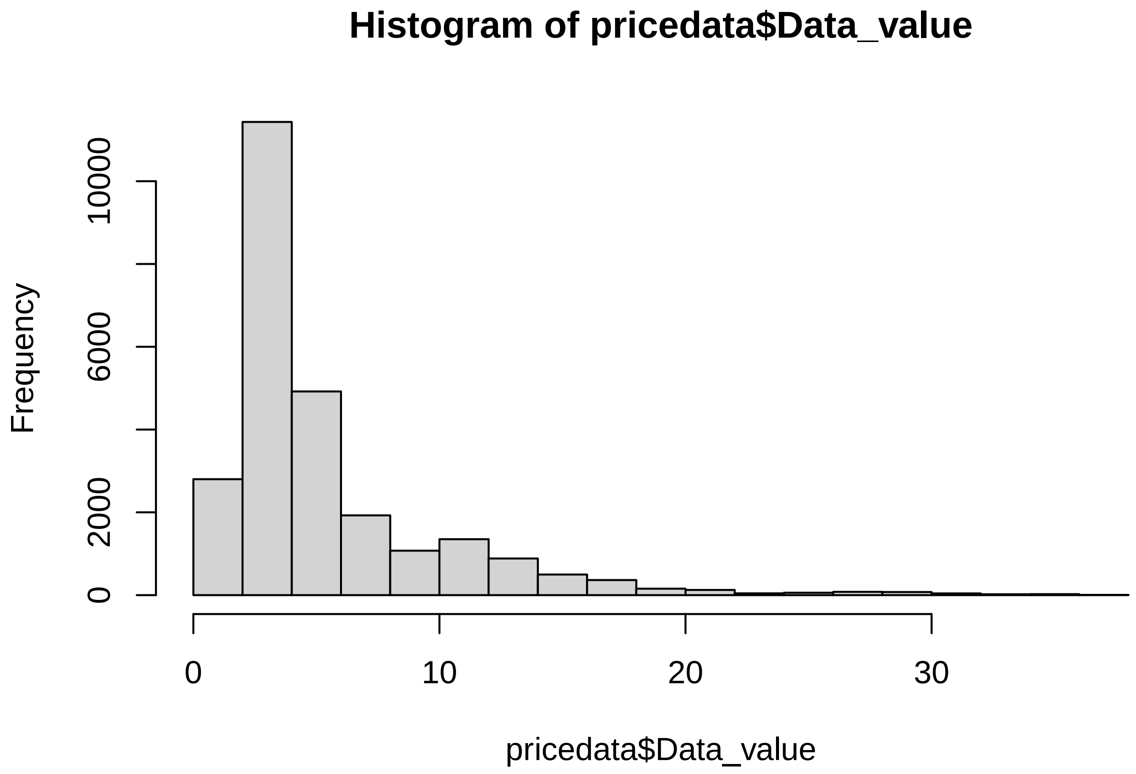
```
names(pricedata) # check the object names
```

```
## [1] "Series_reference" "Period"           "Data_value"       "STATUS"
## [5] "UNITS"            "Subject"          "Group"            "Series_title_1"
```

```
str(pricedata)# the structure
```

```
## ’data.frame’:    25963 obs. of  8 variables:
##  $ Series_reference: chr  "CPIM.SAP0100" "CPIM.SAP0100" "CPIM.SAP0100" "CPIM.SAP0100" ...
##  $ Period          : num  2006 2006 2006 2006 2006 ...
##  $ Data_value      : num  3.11 2.78 2.43 2.42 3.04 3.24 3.27 3.18 3.74 4.21 ...
##  $ STATUS          : chr  "FINAL" "FINAL" "FINAL" "FINAL" ...
##  $ UNITS           : chr  "Dollars" "Dollars" "Dollars" "Dollars" ...
##  $ Subject         : chr  "Consumers Price Index - CPI" "Consumers Price Index - CPI" "Consumers Price Index - CPI" "Consumers Price In
##  $ Group           : chr  "Food Price Index Selected Monthly Weighted Average Prices for New Zealand" "Food Price Index Selected Monthl
##  $ Series_title_1  : chr  "Oranges, 1kg" "Oranges, 1kg" "Oranges, 1kg" "Oranges, 1kg" ...
```

```
#attributes(pricedata)# object's attributes
hist(pricedata$Data_value)# Use a histogram to display data distribution
```



```
table(pricedata$Data_value)[1:5] # Frequency of occurrence of the first 5 values
```

```
##
##  0.9 0.91 0.93 0.94 0.95
##    1    1    1    1    4
```

```
is.factor(pricedata$Series_title_1) # Determine whether it is factor data
```

```
## [1] FALSE
```

```r
#as.factor(pricedata$Series_title_1) # Convert to factor data

#2.2: Remove the missing data
colSums(is.na(pricedata))
```

```
## Series_reference           Period       Data_value           STATUS
##                0                0               82                0
##            UNITS          Subject            Group   Series_title_1
##                0                0                0                0
```

```r
#2.2.1 Method 1: na.omit()
good1<-na.omit(pricedata)
dim(good1)
```

```
## [1] 25881     8
```

```r
#2.2.2 Method 2: complete.cases()
good2<-pricedata[complete.cases(pricedata),]
dim(good2)
```

```
## [1] 25881     8
```

```r
#2.2.3 Method 3: is.na()
badrow<-which(rowSums(is.na(pricedata))>0) # Find the rows with missing values in the table "pricedata"
bad<-pricedata[badrow,] # Save these rows with missing values in a table "bad"
good3<-pricedata[-badrow,] # Save rows without missing values in the original table
dim(good3)
```

```
## [1] 25881     8
```

```r
#2.3: Modify table
#2.3.1 Change the factor name
names(good3)[1]<-"reference" # Change the factor name through the names() function
names(good3)[1]<-"Series_reference" #Change it back
```

```r
#2.3.2 Sorting
sordata<-sort(good1$Data_value,decreasing=TRUE)
head(sordata)
```

```
## [1] 37.96 37.49 36.91 36.38 36.14 36.11
```

```r
#2.3.3 Ordering
#Method 1: order
ordata<-good1[order(good1$Series_reference,good1$Data_value),]
head(ordata)
```

```
##     Series_reference  Period Data_value STATUS   UNITS
## 63      CPIM.SAP0100 2011.08       2.36  FINAL Dollars
## 99      CPIM.SAP0100 2014.08       2.36  FINAL Dollars
## 4       CPIM.SAP0100 2006.09       2.42  FINAL Dollars
## 3       CPIM.SAP0100 2006.08       2.43  FINAL Dollars
## 100     CPIM.SAP0100 2014.09       2.43  FINAL Dollars
## 16      CPIM.SAP0100 2007.09       2.47  FINAL Dollars
##                          Subject
## 63  Consumers Price Index - CPI
## 99  Consumers Price Index - CPI
## 4   Consumers Price Index - CPI
## 3   Consumers Price Index - CPI
## 100 Consumers Price Index - CPI
## 16  Consumers Price Index - CPI
##                                                                          Group
## 63  Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 99  Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 4   Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 3   Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 100 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 16  Food Price Index Selected Monthly Weighted Average Prices for New Zealand
##     Series_title_1
## 63    Oranges, 1kg
## 99    Oranges, 1kg
## 4     Oranges, 1kg
## 3     Oranges, 1kg
## 100   Oranges, 1kg
## 16    Oranges, 1kg
```

```
#Method 2: library(plyr)
library(plyr)
head(arrange(good1,Series_reference))
```

```
##   Series_reference  Period Data_value STATUS   UNITS
## 1     CPIM.SAP0100 2006.06       3.11  FINAL Dollars
## 2     CPIM.SAP0100 2006.07       2.78  FINAL Dollars
## 3     CPIM.SAP0100 2006.08       2.43  FINAL Dollars
## 4     CPIM.SAP0100 2006.09       2.42  FINAL Dollars
## 5     CPIM.SAP0100 2006.10       3.04  FINAL Dollars
## 6     CPIM.SAP0100 2006.11       3.24  FINAL Dollars
##                        Subject
## 1 Consumers Price Index - CPI
## 2 Consumers Price Index - CPI
## 3 Consumers Price Index - CPI
## 4 Consumers Price Index - CPI
## 5 Consumers Price Index - CPI
## 6 Consumers Price Index - CPI
##                                                                        Group
## 1 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 2 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 3 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 4 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 5 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 6 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
##   Series_title_1
## 1   Oranges, 1kg
## 2   Oranges, 1kg
## 3   Oranges, 1kg
## 4   Oranges, 1kg
## 5   Oranges, 1kg
## 6   Oranges, 1kg
```

```
#2.3.4 Adding new column
#Method 1
newdata<-transform(good1,price=(Data_value*100))# Add new column named "price"
head(newdata,n=3)
```

```
##   Series_reference  Period Data_value STATUS   UNITS
## 1     CPIM.SAP0100 2006.06       3.11  FINAL Dollars
## 2     CPIM.SAP0100 2006.07       2.78  FINAL Dollars
## 3     CPIM.SAP0100 2006.08       2.43  FINAL Dollars
##                      Subject
## 1 Consumers Price Index - CPI
## 2 Consumers Price Index - CPI
## 3 Consumers Price Index - CPI
##                                                                 Group
## 1 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 2 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 3 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
##   Series_title_1 price
## 1   Oranges, 1kg   311
## 2   Oranges, 1kg   278
## 3   Oranges, 1kg   243
```

```
#Method 2:
ID<-1:25881
df<-data.frame(ID,good3)# Add serial number column
head(df,n=3)
```

```
##   ID Series_reference  Period Data_value STATUS   UNITS
## 1  1     CPIM.SAP0100 2006.06       3.11  FINAL Dollars
## 2  2     CPIM.SAP0100 2006.07       2.78  FINAL Dollars
## 3  3     CPIM.SAP0100 2006.08       2.43  FINAL Dollars
##                      Subject
## 1 Consumers Price Index - CPI
## 2 Consumers Price Index - CPI
## 3 Consumers Price Index - CPI
##                                                                 Group
## 1 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 2 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 3 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
##   Series_title_1
## 1   Oranges, 1kg
## 2   Oranges, 1kg
## 3   Oranges, 1kg
```

```
#2.4: Subsetting the data set
#2.4.1 Remove the unwanted columns
newdata1<- good3[,-c(4:7)]# Remove columns with unique values
head(newdata1,n=3)
```

```
##   Series_reference  Period Data_value Series_title_1
## 1     CPIM.SAP0100 2006.06       3.11   Oranges, 1kg
## 2     CPIM.SAP0100 2006.07       2.78   Oranges, 1kg
## 3     CPIM.SAP0100 2006.08       2.43   Oranges, 1kg
```

```
#2.4.2 Select the desired column with conditions
# Method 1: Designated columns
newdata2<-good3[,c(1:3,8)]#Specify columns 1 to 3 and column 8
head(newdata2,n=3)
```

```
##   Series_reference  Period Data_value Series_title_1
## 1     CPIM.SAP0100 2006.06       3.11   Oranges, 1kg
## 2     CPIM.SAP0100 2006.07       2.78   Oranges, 1kg
## 3     CPIM.SAP0100 2006.08       2.43   Oranges, 1kg
```

```
# Method 2: Column containing key information
Olives<-pricedata[pricedata$Series_title_1=="Olives, jar, 400g",] # All rows where Series_reference is "Olives, jar, 400g"
head(Olives,n=2)
```

```
##       Series_reference  Period Data_value STATUS   UNITS
## 24604     CPIM.SAP0261 2017.10       4.41  FINAL Dollars
## 24605     CPIM.SAP0261 2017.11       4.48  FINAL Dollars
##                            Subject
## 24604 Consumers Price Index - CPI
## 24605 Consumers Price Index - CPI
##                                                                            Group
## 24604 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 24605 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
##          Series_title_1
## 24604 Olives, jar, 400g
## 24605 Olives, jar, 400g
```

```
# Method 3: The column containing the specified value
ndata<-newdata[newdata$price<=50 | newdata$price>=500,]#Columns less than or equal to 50, or greater than or equal to 500
head(ndata,n=2)
```

```
##     Series_reference  Period Data_value STATUS   UNITS
## 496     CPIM.SAP0102 2017.01       5.04  FINAL Dollars
## 561     CPIM.SAP0103 2007.02       5.28  FINAL Dollars
##                         Subject
## 496 Consumers Price Index - CPI
## 561 Consumers Price Index - CPI
##                                                                          Group
## 496 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 561 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
##     Series_title_1 price
## 496    Apples, 1kg   504
## 561 Kiwifruit, 1kg   528
```

```
# Method 4: The column containing the specified charactors
ndata<-good3[good3$Period %in% c("2021.09"),] # %in%
head(ndata,n=2)
```

```
##     Series_reference  Period Data_value STATUS   UNITS
## 184     CPIM.SAP0100 2021.09       3.49  FINAL Dollars
## 368     CPIM.SAP0101 2021.09       2.92  FINAL Dollars
##                         Subject
## 184 Consumers Price Index - CPI
## 368 Consumers Price Index - CPI
##                                                                          Group
## 184 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
## 368 Food Price Index Selected Monthly Weighted Average Prices for New Zealand
##     Series_title_1
## 184   Oranges, 1kg
## 368   Bananas, 1kg
```

```
# Method 5: Casting data frames:library(reshape2)
library(reshape2)
newdata3<-dcast(good3,Data_value~Series_reference)
```

```
## Using Series_title_1 as value column: use value.var to override.
```

```
## Aggregation function missing: defaulting to length
```

```
head(newdata3,n=1)
```

```
##   Data_value CPIM.SAP0100 CPIM.SAP0101 CPIM.SAP0102 CPIM.SAP0103 CPIM.SAP0104
## 1        0.9            0            0            0            0            0
##   CPIM.SAP0105 CPIM.SAP0106 CPIM.SAP0107 CPIM.SAP0108 CPIM.SAP0109 CPIM.SAP0110
## 1            0            0            0            0            0            0
##   CPIM.SAP0111 CPIM.SAP0112 CPIM.SAP0113 CPIM.SAP0114 CPIM.SAP0115 CPIM.SAP0116
## 1            0            0            0            0            0            0
##   CPIM.SAP0117 CPIM.SAP0118 CPIM.SAP0120 CPIM.SAP0121 CPIM.SAP0123 CPIM.SAP0124
## 1            0            0            0            0            0            0
##   CPIM.SAP0125 CPIM.SAP0126 CPIM.SAP0127 CPIM.SAP0128 CPIM.SAP0129 CPIM.SAP0130
## 1            0            0            0            0            0            0
##   CPIM.SAP0131 CPIM.SAP0132 CPIM.SAP0134 CPIM.SAP0136 CPIM.SAP0137 CPIM.SAP0138
## 1            0            0            0            0            0            0
##   CPIM.SAP0139 CPIM.SAP0140 CPIM.SAP0142 CPIM.SAP0143 CPIM.SAP0144 CPIM.SAP0145
## 1            0            0            0            0            0            0
##   CPIM.SAP0146 CPIM.SAP0147 CPIM.SAP0148 CPIM.SAP0149 CPIM.SAP0151 CPIM.SAP0152
## 1            0            0            0            0            0            0
##   CPIM.SAP0153 CPIM.SAP0154 CPIM.SAP0155 CPIM.SAP0156 CPIM.SAP0157 CPIM.SAP0158
## 1            1            0            0            0            0            0
##   CPIM.SAP0159 CPIM.SAP0160 CPIM.SAP0161 CPIM.SAP0162 CPIM.SAP0164 CPIM.SAP0165
## 1            0            0            0            0            0            0
##   CPIM.SAP0166 CPIM.SAP0167 CPIM.SAP0168 CPIM.SAP0169 CPIM.SAP0170 CPIM.SAP0172
## 1            0            0            0            0            0            0
##   CPIM.SAP0173 CPIM.SAP0174 CPIM.SAP0176 CPIM.SAP0177 CPIM.SAP0178 CPIM.SAP0179
## 1            0            0            0            0            0            0
##   CPIM.SAP0180 CPIM.SAP0181 CPIM.SAP0182 CPIM.SAP0183 CPIM.SAP0184 CPIM.SAP0185
## 1            0            0            0            0            0            0
##   CPIM.SAP0186 CPIM.SAP0187 CPIM.SAP0188 CPIM.SAP0189 CPIM.SAP0190 CPIM.SAP0191
## 1            0            0            0            0            0            0
##   CPIM.SAP0192 CPIM.SAP0193 CPIM.SAP0194 CPIM.SAP0195 CPIM.SAP0197 CPIM.SAP0198
## 1            0            0            0            0            0            0
##   CPIM.SAP0199 CPIM.SAP0200 CPIM.SAP0201 CPIM.SAP0202 CPIM.SAP0203 CPIM.SAP0204
## 1            0            0            0            0            0            0
##   CPIM.SAP0205 CPIM.SAP0207 CPIM.SAP0208 CPIM.SAP0209 CPIM.SAP0210 CPIM.SAP0211
## 1            0            0            0            0            0            0
##   CPIM.SAP0212 CPIM.SAP0213 CPIM.SAP0214 CPIM.SAP0215 CPIM.SAP0216 CPIM.SAP0217
## 1            0            0            0            0            0            0
##   CPIM.SAP0219 CPIM.SAP0220 CPIM.SAP0221 CPIM.SAP0222 CPIM.SAP0223 CPIM.SAP0224
## 1            0            0            0            0            0            0
##   CPIM.SAP0225 CPIM.SAP0226 CPIM.SAP0227 CPIM.SAP0228 CPIM.SAP0229 CPIM.SAP0230
## 1            0            0            0            0            0            0
##   CPIM.SAP0231 CPIM.SAP0232 CPIM.SAP0233 CPIM.SAP0234 CPIM.SAP0235 CPIM.SAP0236
## 1            0            0            0            0            0            0
##   CPIM.SAP0238 CPIM.SAP0239 CPIM.SAP0240 CPIM.SAP0241 CPIM.SAP0242 CPIM.SAP0243
## 1            0            0            0            0            0            0
##   CPIM.SAP0244 CPIM.SAP0245 CPIM.SAP0246 CPIM.SAP0247 CPIM.SAP0248 CPIM.SAP0249
## 1            0            0            0            0            0            0
##   CPIM.SAP0251 CPIM.SAP0252 CPIM.SAP0253 CPIM.SAP0254 CPIM.SAP0256 CPIM.SAP0257
## 1            0            0            0            0            0            0
##   CPIM.SAP0258 CPIM.SAP0259 CPIM.SAP0260 CPIM.SAP0261 CPIM.SAP0262 CPIM.SAP0263
## 1            0            0            0            0            0            0
##   CPIM.SAP0264 CPIM.SAP0265 CPIM.SAP0266 CPIM.SAP0267 CPIM.SAP0268 CPIM.SAP0269
## 1            0            0            0            0            0            0
```

#3)Use the factor function for column “Series_title_1” and get the average for each product using the price values in column “Data_value” by sapply function####

```
#Method 1:
price1<-data.frame() # create a empty dataframe
n=1
fac<-factor(newdata2$Series_title_1,ordered=TRUE) # extract the factor names
while (n<=length(levels(fac))){
  fac1<-newdata2[(newdata2$Series_title_1 %in% c(levels(fac)[n])),] # search the factor names in Series_title_1 one by one
  x <- list(fac1$Data_value) # save the search results into x
  price1<-rbind(c(levels(fac)[n],sapply(x, FUN = mean)),price1) #using sapply to calculate the average price, then using rbind to save the
  n=n+1
}
names(price1)<-c("Product","Average Price") # set the columns names
price1 # display the final results
```

```
##                                                           Product
## 1   Yoghurt - flavoured, 150g pottle (supermarket only), pk of 6
## 2                                 Wholegrain bread, sliced, 700g
## 3                                  Wheatmeal bread, sliced, 700g
## 4                                                 Vinegar, 750ml
## 5                                Two minute noodles, multipack,5
## 6                         Tuna - canned (supermarket only), 185g
## 7                                         Tomatoes, canned, 400g
## 8                                                  Tomatoes, 1kg
## 9                                    Tomato sauce - canned, 560g
## 10                                                 Tea, takeaway
## 11                      Tea bags, flavoured or herbal, box of 25
## 12                       Tea bags (supermarket only), box of 100
## 13                               Takeaway muffins and buns, each
## 14                                                  Sweets, 200g
## 15                             Sultanas (supermarket only), 375g
## 16                                          Sugar - white, 1.5kg
## 17                                   Sports energy drinks, 350ml
## 18                                   Sports energy drinks, 250ml
## 19                                      Spaghetti - canned, 420g
## 20                                              Soy sauce, 300ml
## 21                                Soy milk, unflavoured, 1 litre
## 22                                            Soup, canned, 500g
## 23                                           Soft drinks, poured
## 24                                            Soft drinks, 600ml
## 25                                        Soft drink, 1.5 litres
## 26                                                 Sausages, 1kg
## 27                                    Sandwich, fresh or toasted
## 28             Salmon, imported, pink, canned, unflavoured, 210g
## 29                                                  Salami, 100g
## 30                               Salad, takeaway, vegetable, 1kg
## 31                                   Salad, leaf, packaged, 150g
## 32                  Roasting pork, fresh, chilled or frozen, 1kg
## 33       Roasting lamb and hogget, fresh, chilled or frozen, 1kg
## 34              Rice - long grain, white (supermarket only), 1kg
## 35                                                  Pumpkin, 1kg
## 36                                  Prepared meals, frozen, 340g
## 37                                          Prawns, frozen, 700g
## 38                                                 Potatoes, 1kg
## 39                                     Potato fries, frozen, 1kg
## 40                                           Potato crisps, 150g
## 41                                        Pork - loin chops, 1kg
## 42                                               Pizza, takeaway
## 43       Pizza, fresh or frozen, with any standard topping, each
## 44            Pineapple, pieces, in juice or syrup, canned, 425g
## 45                                                Pineapple, 1kg
## 46                         Peas - frozen (supermarket only), 1kg
## 47                                                    Pears, 1kg
## 48                               Peanuts, blanched, salted, 250g
## 49                            Peanut butter, not salt free, 375g
## 50                     Peaches - canned (supermarket only), 410g
## 51                    Pastry, frozen sheets, puff or flaky, 800g
## 52                              Pasta sauces, tomato based, 500g
## 53                                                 Parsnips, 1kg
## 54                          Packaged meal, pasta and sauce, 130g
## 55                                     Packaged cake slice, 300g
## 56                                                  Oranges, 1kg
## 57   Orange juice, not apple based, 1 litre - Cheapest Available
## 58                                                   Onions, 1kg
## 59                                             Olives, jar, 400g
## 60           Olive oil, pure, not extra virgin or light, 1 litre
## 61                                      Mussels, marinated, 375g
## 62                                            Mussels, live, 1kg
## 63                                                Mushrooms, 1kg
## 64                                      Muesli/cereal bars, 200g
## 65                              Muesli, natural or toasted, 750g
## 66                                 Mixed vegetables, frozen, 1kg
## 67                              Milk, calcium enriched, 2 litres
## 68                         Milk - standard homogenised, 2 litres
## 69          Meat pies, chilled, 6 or 8 pack - Cheapest Available
## 70                                          Meat pie - hot, each
## 71                                             Mayonnaise, 380ml
## 72                                  Margarine/table spread, 500g
## 73                                                Mandarins, 1kg
## 74                                                  Lettuce, 1kg
## 75                                             Lamb - chops, 1kg
## 76                                                   Kumara, 1kg
## 77                                                Kiwifruit, 1kg
## 78                                                     Jam, 375g
## 79                                          Infant formula, 900g
## 80                     Ice cream novelty, chocolate coated, each
## 81                            Ice cream bought in bulk, 2 litres
## 82                                  Ice block, water based, each
## 83                                             Hummus dip, 200g
## 84                                       Hot chips, hot wedges
## 85                                 Honey, clover, creamed, 500g
## 86                                   Ham, sliced or shaved, 1kg
## 87                                        Grapes, green or red
## 88         Fruit juice - apple based (supermarket only), 3 litre
## 89             Fruit flavoured drink powder, multipack of 3 to 5
## 90                    Fried and other takeaway chicken, 5 pieces
## 91          Fresh pasta, tortellini or other filled type, 300g
## 92                               Fresh herbs, packaged, chilled
## 93                                              Fresh fish, 1kg
## 94                       Flour - white (supermarket only), 1.5kg
## 95                    Flat bread - pita, tortilla, or other type
## 96                          Fish fillets, frozen, multipack, 500g
## 97                               Fish and chips, One fish/chips
## 98                                     Eggs, free range, 6 pack
## 99                                                  Eggs, dozen
## 100                                    Drinking chocolate, 300g
## 101                   Dried pasta, spaghetti or other type, 500g
## 102                               Dried mixed herbs, 10g to 15g
## 103                                        Dessert, frozen, 500g
## 104                                               Cucumber, 1kg
## 105                            Cream, 300ml - Cheapest Available
## 106                                             Courgettes, 1kg
## 107                   Corned beef, fresh, chilled or frozen, 1kg
## 108                                           Corn flakes, 500g
## 109                                      Cookie, takeaway, each
## 110                                       Coffee, takeway, each
## 111                                        Coffee, ground, 200g
## 112                                      Coffee - instant, 100g
## 113                               Chocolate, boxed, loose, 250g
## 114                                 Chocolate novelty bars, 50g
## 115         Chocolate blocks, convenience stores, 100g to 250g
## 116                   Chocolate - block (supermarket only), 250g
## 117              Chilled fruit juice or smoothies, 1 to 1.5 litre
## 118          Chicken, whole, frozen, No. 15 - Cheapest Available
## 119          Chicken, cooked, whole, No. 15 - Cheapest Available
## 120  Chicken pieces (excluding breast), boneless or bone in, 1kg
## 121                                 Chicken nuggets, frozen, 1kg
## 122                                          Chicken breast, 1kg
## 123                                    Chewing gum, packet, each
## 124                               Cheese, processed slices, 250g
## 125                                      Cheese, camembert, 125g
## 126                Cheese - mild cheddar (supermarket only), 1kg
## 127                                                  Celery, 1kg
## 128                                             Cauliflower, 1kg
## 129                                                 Carrots, 1kg
## 130                              Capsicums, green, else red, 1kg
## 131                                 Cakes and biscuits, takeaway
## 132                                                 Cabbage, 1kg
## 133                                        Butter - salted, 500g
## 134                 Burger, with or without accompaniments, each
## 135                                                Broccoli, 1kg
## 136                               Breakfast drink, 250ml, 6 pack
## 137                                      Breakfast biscuits, 1kg
## 138                          Bread rolls, hamburger buns, 6 pack
## 139                               Bread rolls, filled, hot, each
## 140                              Bread - white sliced loaf, 600g
## 141                                         Bottled water, 750ml
## 142                             Biscuits, savoury, crackers 250g
## 143     Biscuits, plain (eg arrowroot, ginger, malt, wine), 250g
## 144                                   Biscuits - chocolate, 200g
## 145                                        Berries, frozen, 500g
## 146                         Beef steak - porterhouse/sirloin, 1kg
## 147                                      Beef steak - blade, 1kg
## 148                                            Beef - mince, 1kg
## 149                                                   Beans, 1kg
## 150                                                 Bananas, 1kg
## 151              Bacon - middle rashers (supermarket only), 700g
## 152                                              Baby food, 110g
## 153                                                 Avocado, 1kg
## 154                                        Apricots, dried, 100g
## 155                                                  Apples, 1kg
##         Average Price
## 1   4.90027173913044
## 2   3.47221590909091
## 3           2.858125
## 4   2.46852272727273
## 5   2.47290322580645
## 6   2.43489130434783
## 7           1.303125
## 8   6.22304347826087
## 9             2.9875
## 10  3.06651428571429
## 11  3.11479166666667
## 12  4.46673913043478
## 13  3.32445714285714
## 14  2.89829545454545
## 15  2.13211956521739
## 16   2.5729347826087
## 17  3.38666666666667
## 18  2.00816091954023
## 19  1.52820652173913
## 20  2.42147727272727
## 21  3.31993710691824
## 22  3.10096590909091
## 23  2.70982857142857
## 24  3.55005681818182
## 25   2.4108152173913
## 26  8.86021739130435
## 27  4.23857923497268
## 28  3.05823863636364
## 29  3.33085227272727
## 30  10.2270454545455
## 31  4.55195402298851
## 32          10.35375
## 33  15.0443181818182
## 34  2.41782608695652
## 35  2.62926136363636
## 36  5.57732954545455
## 37  17.3305747126437
## 38  1.74945652173913
## 39  3.35647727272727
## 40  1.83653225806452
## 41  15.8085869565217
## 42  13.4677714285714
## 43  5.48782608695652
## 44  1.77642045454545
## 45  3.27767295597484
## 46  2.51298913043478
## 47  3.77738636363636
## 48  3.37978260869565
## 49  2.85184782608696
## 50  1.60722826086957
## 51  5.09971590909091
## 52  2.99357954545455
## 53  5.71886363636364
## 54  2.55664772727273
## 55  3.55767045454545
## 56  3.38483695652174
## 57  2.66715447154472
## 58  2.08147727272727
## 59  4.35395833333333
## 60             11.87
## 61  5.90585227272727
## 62  3.90267045454545
## 63  11.0333152173913
## 64  2.94754716981132
## 65  5.28607954545455
## 66  3.40534090909091
## 67  5.10647727272727
## 68  3.38614130434783
## 69  6.06869318181818
## 70  3.70109289617486
## 71  3.32630434782609
## 72  2.33983695652174
## 73  5.26215909090909
## 74  4.39777173913043
## 75          14.21875
## 76  5.29005681818182
## 77  3.73782608695652
## 78  2.61482954545455
## 79  19.2929545454545
## 80  3.18278409090909
## 81  5.58818181818182
## 82  2.12897727272727
## 83  3.74578616352201
## 84  2.97497142857143
## 85            7.0625
## 86  13.6776086956522
## 87  7.47982954545455
## 88  4.17677419354839
## 89         1.2555625
## 90  11.3387428571429
## 91  4.59138364779874
## 92  3.79395833333333
## 93  29.3965340909091
## 94   1.9429347826087
## 95  4.13422764227642
## 96  7.32454545454545
## 97  5.94857923497268
## 98  4.71025157232704
## 99  3.73086956521739
## 100 3.92744318181818
## 101 1.88415094339623
## 102 2.36358695652174
## 103 6.35062893081761
## 104 7.79380681818182
## 105 2.23369318181818
## 106 8.75363636363636
## 107 9.55392045454546
## 108 3.38647727272727
## 109 1.87668571428571
## 110 3.57508571428571
## 111 6.31471590909091
## 112 5.55038043478261
## 113 8.46767045454545
## 114 1.42545454545455
## 115 4.53426136363636
## 116  3.9604347826087
## 117 4.58635220125786
## 118 8.09931818181818
## 119 11.5759748427673
## 120 8.14747126436782
## 121 11.0632520325203
## 122 13.9584090909091
## 123        2.7241875
## 124 3.50022727272727
## 125 4.27681818181818
## 126 9.10239130434783
## 127 3.31965909090909
## 128 3.42727272727273
## 129 2.13630434782609
## 130 12.7696022727273
## 131 3.63411428571429
## 132 1.97684782608696
## 133 3.97826086956522
## 134           4.5976
## 135 5.91711956521739
## 136 7.71287356321839
## 137 5.62391304347826
## 138 2.78448863636364
## 139 6.27622857142857
## 140 1.32326086956522
## 141 2.02994565217391
## 142         3.160625
## 143 2.21698863636364
## 144 2.83195652173913
## 145 6.49983739837398
## 146 26.2638586956522
## 147 15.6879347826087
## 148 12.6989130434783
## 149 12.8588636363636
## 150 2.74076086956522
## 151 12.0044318181818
## 152 1.09664772727273
## 153 9.78926136363636
## 154 2.19308943089431
## 155 2.83760869565217
```

```r
#Method 2:
splitmean <- function(newdata2) { #build a function by split and sapply function
  s <- split( newdata2, newdata2$Series_title_1) # split the data by Series_title_1
  sapply( s, function(x) mean(x$Data_value) )# calculate the average price
}
price<-splitmean(newdata2) # call the function
price # display the final results
```

```
##                                                   Apples, 1kg
##                                                      2.837609
##                                         Apricots, dried, 100g
##                                                      2.193089
##                                                  Avocado, 1kg
##                                                      9.789261
##                                               Baby food, 110g
##                                                      1.096648
##               Bacon - middle rashers (supermarket only), 700g
##                                                     12.004432
##                                                  Bananas, 1kg
##                                                      2.740761
##                                                    Beans, 1kg
##                                                     12.858864
##                                             Beef - mince, 1kg
##                                                     12.698913
##                                       Beef steak - blade, 1kg
##                                                     15.687935
##                         Beef steak - porterhouse/sirloin, 1kg
##                                                     26.263859
##                                         Berries, frozen, 500g
##                                                      6.499837
##                                    Biscuits - chocolate, 200g
##                                                      2.831957
##      Biscuits, plain (eg arrowroot, ginger, malt, wine), 250g
##                                                      2.216989
##                              Biscuits, savoury, crackers 250g
##                                                      3.160625
##                                          Bottled water, 750ml
##                                                      2.029946
##                               Bread - white sliced loaf, 600g
##                                                      1.323261
##                                Bread rolls, filled, hot, each
##                                                      6.276229
##                           Bread rolls, hamburger buns, 6 pack
##                                                      2.784489
##                                       Breakfast biscuits, 1kg
##                                                      5.623913
##                                Breakfast drink, 250ml, 6 pack
##                                                      7.712874
##                                                 Broccoli, 1kg
##                                                      5.917120
##                  Burger, with or without accompaniments, each
##                                                      4.597600
##                                         Butter - salted, 500g
##                                                      3.978261
##                                                  Cabbage, 1kg
##                                                      1.976848
##                                  Cakes and biscuits, takeaway
##                                                      3.634114
##                               Capsicums, green, else red, 1kg
##                                                     12.769602
##                                                  Carrots, 1kg
##                                                      2.136304
##                                              Cauliflower, 1kg
##                                                      3.427273
##                                                   Celery, 1kg
##                                                      3.319659
##                 Cheese - mild cheddar (supermarket only), 1kg
##                                                      9.102391
##                                       Cheese, camembert, 125g
##                                                      4.276818
##                                Cheese, processed slices, 250g
##                                                      3.500227
##                                     Chewing gum, packet, each
##                                                      2.724188
##                                           Chicken breast, 1kg
##                                                     13.958409
##                                  Chicken nuggets, frozen, 1kg
##                                                    11.063252
##  Chicken pieces (excluding breast), boneless or bone in, 1kg
##                                                     8.147471
##          Chicken, cooked, whole, No. 15 - Cheapest Available
##                                                    11.575975
##          Chicken, whole, frozen, No. 15 - Cheapest Available
##                                                     8.099318
##             Chilled fruit juice or smoothies, 1 to 1.5 litre
##                                                     4.586352
##                   Chocolate - block (supermarket only), 250g
##                                                     3.960435
##           Chocolate blocks, convenience stores, 100g to 250g
##                                                     4.534261
##                                  Chocolate novelty bars, 50g
##                                                     1.425455
##                                Chocolate, boxed, loose, 250g
##                                                     8.467670
##                                       Coffee - instant, 100g
##                                                     5.550380
##                                         Coffee, ground, 200g
##                                                     6.314716
##                                        Coffee, takeway, each
##                                                     3.575086
##                                       Cookie, takeaway, each
##                                                     1.876686
##                                            Corn flakes, 500g
##                                                     3.386477
##                   Corned beef, fresh, chilled or frozen, 1kg
##                                                     9.553920
##                                              Courgettes, 1kg
##                                                     8.753636
##                            Cream, 300ml - Cheapest Available
##                                                     2.233693
##                                                Cucumber, 1kg
##                                                     7.793807
##                                        Dessert, frozen, 500g
##                                                     6.350629
##                                Dried mixed herbs, 10g to 15g
##                                                     2.363587
##                   Dried pasta, spaghetti or other type, 500g
##                                                     1.884151
##                                     Drinking chocolate, 300g
##                                                     3.927443
##                                                  Eggs, dozen
##                                                     3.730870
##                                     Eggs, free range, 6 pack
##                                                     4.710252
##                               Fish and chips, One fish/chips
##                                                     5.948579
##                        Fish fillets, frozen, multipack, 500g
##                                                     7.324545
##                   Flat bread - pita, tortilla, or other type
##                                                     4.134228
##                      Flour - white (supermarket only), 1.5kg
##                                                     1.942935
##                                              Fresh fish, 1kg
##                                                    29.396534
##                               Fresh herbs, packaged, chilled
##                                                     3.793958
##           Fresh pasta, tortellini or other filled type, 300g
##                                                     4.591384
##                   Fried and other takeaway chicken, 5 pieces
##                                                    11.338743
##            Fruit flavoured drink powder, multipack of 3 to 5
##                                                     1.255562
##        Fruit juice - apple based (supermarket only), 3 litre
##                                                     4.176774
##                                         Grapes, green or red
##                                                     7.479830
##                                   Ham, sliced or shaved, 1kg
##                                                    13.677609
##                                 Honey, clover, creamed, 500g
##                                                     7.062500
##                                        Hot chips, hot wedges
##                                                     2.974971
##                                             Hummus dip, 200g
##                                                     3.745786
##                                 Ice block, water based, each
##                                                      2.128977
##                            Ice cream bought in bulk, 2 litres
##                                                      5.588182
##                     Ice cream novelty, chocolate coated, each
##                                                      3.182784
##                                          Infant formula, 900g
##                                                     19.292955
##                                                     Jam, 375g
##                                                      2.614830
##                                                Kiwifruit, 1kg
##                                                      3.737826
##                                                   Kumara, 1kg
##                                                      5.290057
##                                             Lamb - chops, 1kg
##                                                     14.218750
##                                                  Lettuce, 1kg
##                                                      4.397772
##                                                Mandarins, 1kg
##                                                      5.262159
##                                  Margarine/table spread, 500g
##                                                      2.339837
##                                             Mayonnaise, 380ml
##                                                      3.326304
##                                          Meat pie - hot, each
##                                                      3.701093
##         Meat pies, chilled, 6 or 8 pack - Cheapest Available
##                                                      6.068693
##                         Milk - standard homogenised, 2 litres
##                                                      3.386141
##                              Milk, calcium enriched, 2 litres
##                                                      5.106477
##                                 Mixed vegetables, frozen, 1kg
##                                                      3.405341
##                              Muesli, natural or toasted, 750g
##                                                      5.286080
##                                      Muesli/cereal bars, 200g
##                                                      2.947547
##                                                Mushrooms, 1kg
##                                                     11.033315
##                                           Mussels, live, 1kg
##                                                     3.902670
##                                     Mussels, marinated, 375g
##                                                     5.905852
##          Olive oil, pure, not extra virgin or light, 1 litre
##                                                    11.870000
##                                            Olives, jar, 400g
##                                                     4.353958
##                                                  Onions, 1kg
##                                                     2.081477
##  Orange juice, not apple based, 1 litre - Cheapest Available
##                                                     2.667154
##                                                 Oranges, 1kg
##                                                     3.384837
##                                    Packaged cake slice, 300g
##                                                     3.557670
##                         Packaged meal, pasta and sauce, 130g
##                                                     2.556648
##                                                Parsnips, 1kg
##                                                     5.718864
##                             Pasta sauces, tomato based, 500g
##                                                     2.993580
##                   Pastry, frozen sheets, puff or flaky, 800g
##                                                     5.099716
##                    Peaches - canned (supermarket only), 410g
##                                                     1.607228
##                           Peanut butter, not salt free, 375g
##                                                     2.851848
##                              Peanuts, blanched, salted, 250g
##                                                     3.379783
##                                                   Pears, 1kg
##                                                     3.777386
##                        Peas - frozen (supermarket only), 1kg
##                                                     2.512989
##                                               Pineapple, 1kg
##                                                     3.277673
##           Pineapple, pieces, in juice or syrup, canned, 425g
##                                                     1.776420
##      Pizza, fresh or frozen, with any standard topping, each
##                                                      5.487826
##                                               Pizza, takeaway
##                                                     13.467771
##                                        Pork - loin chops, 1kg
##                                                     15.808587
##                                           Potato crisps, 150g
##                                                      1.836532
##                                     Potato fries, frozen, 1kg
##                                                      3.356477
##                                                 Potatoes, 1kg
##                                                      1.749457
##                                          Prawns, frozen, 700g
##                                                     17.330575
##                                  Prepared meals, frozen, 340g
##                                                      5.577330
##                                                  Pumpkin, 1kg
##                                                      2.629261
##              Rice - long grain, white (supermarket only), 1kg
##                                                      2.417826
##       Roasting lamb and hogget, fresh, chilled or frozen, 1kg
##                                                     15.044318
##                  Roasting pork, fresh, chilled or frozen, 1kg
##                                                     10.353750
##                                   Salad, leaf, packaged, 150g
##                                                      4.551954
##                               Salad, takeaway, vegetable, 1kg
##                                                     10.227045
##                                                  Salami, 100g
##                                                      3.330852
##             Salmon, imported, pink, canned, unflavoured, 210g
##                                                      3.058239
##                                    Sandwich, fresh or toasted
##                                                      4.238579
##                                                 Sausages, 1kg
##                                                      8.860217
##                                        Soft drink, 1.5 litres
##                                                      2.410815
##                                            Soft drinks, 600ml
##                                                      3.550057
##                                           Soft drinks, poured
##                                                      2.709829
##                                            Soup, canned, 500g
##                                                      3.100966
##                                Soy milk, unflavoured, 1 litre
##                                                      3.319937
##                                              Soy sauce, 300ml
##                                                      2.421477
##                                      Spaghetti - canned, 420g
##                                                      1.528207
##                                   Sports energy drinks, 250ml
##                                                      2.008161
##                                   Sports energy drinks, 350ml
##                                                      3.386667
##                                          Sugar - white, 1.5kg
##                                                      2.572935
##                             Sultanas (supermarket only), 375g
##                                                      2.132120
##                                                  Sweets, 200g
##                                                      2.898295
##                               Takeaway muffins and buns, each
##                                                      3.324457
##                       Tea bags (supermarket only), box of 100
##                                                      4.466739
##                      Tea bags, flavoured or herbal, box of 25
##                                                      3.114792
##                                                 Tea, takeaway
##                                                      3.066514
##                                   Tomato sauce - canned, 560g
##                                                      2.987500
##                                                 Tomatoes, 1kg
##                                                      6.223043
##                                        Tomatoes, canned, 400g
##                                                      1.303125
##                        Tuna - canned (supermarket only), 185g
##                                                      2.434891
##                               Two minute noodles, multipack,5
##                                                      2.472903
##                                                Vinegar, 750ml
##                                                      2.468523
##                                 Wheatmeal bread, sliced, 700g
##                                                      2.858125
##                                Wholegrain bread, sliced, 700g
##                                                      3.472216
## Yoghurt - flavoured, 150g pottle (supermarket only), pk of 6
##                                                      4.900272
```

#4) Push the r file into your GitHub like before and submit your GitHub link like prior assignments####

When you read this, I have finished uploading.

Thanks for your patience!

THE END