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

Assignment 4

QIA WANG
(91219618)

2021-11-04

#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	Subject	Group	Series_title_1
CPIM.SAP01002	2006.06	3.11	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Oranges, 1kg
CPIM.SAP01002	2006.07	2.78	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Oranges, 1kg

Series_reference	Period	Data_value	STATUS	UNITS	Subject	Group	Series_title_1
CPIM.SAP01002	2006.08	2.43	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Oranges, 1kg

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

	Series_reference	Period	Data_value	STATUS	UNITS	Subject	Group	Series_title_1
25954	CPIM.SAP02629	2020.12	3.08	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Chewing gum, packet, each
25955	CPIM.SAP02629	2021.01	3.10	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Chewing gum, packet, each
25956	CPIM.SAP02629	2021.02	3.09	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Chewing gum, packet, each
25957	CPIM.SAP02629	2021.03	3.10	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Chewing gum, packet, each
25958	CPIM.SAP02629	2021.04	3.08	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Chewing gum, packet, each
25959	CPIM.SAP02629	2021.05	3.12	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Chewing gum, packet, each
25960	CPIM.SAP02629	2021.06	3.16	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Chewing gum, packet, each
25961	CPIM.SAP02629	2021.07	3.10	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Chewing gum, packet, each
25962	CPIM.SAP02629	2021.08	3.13	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Chewing gum, packet, each
25963	CPIM.SAP02629	2021.09	3.16	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	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
```

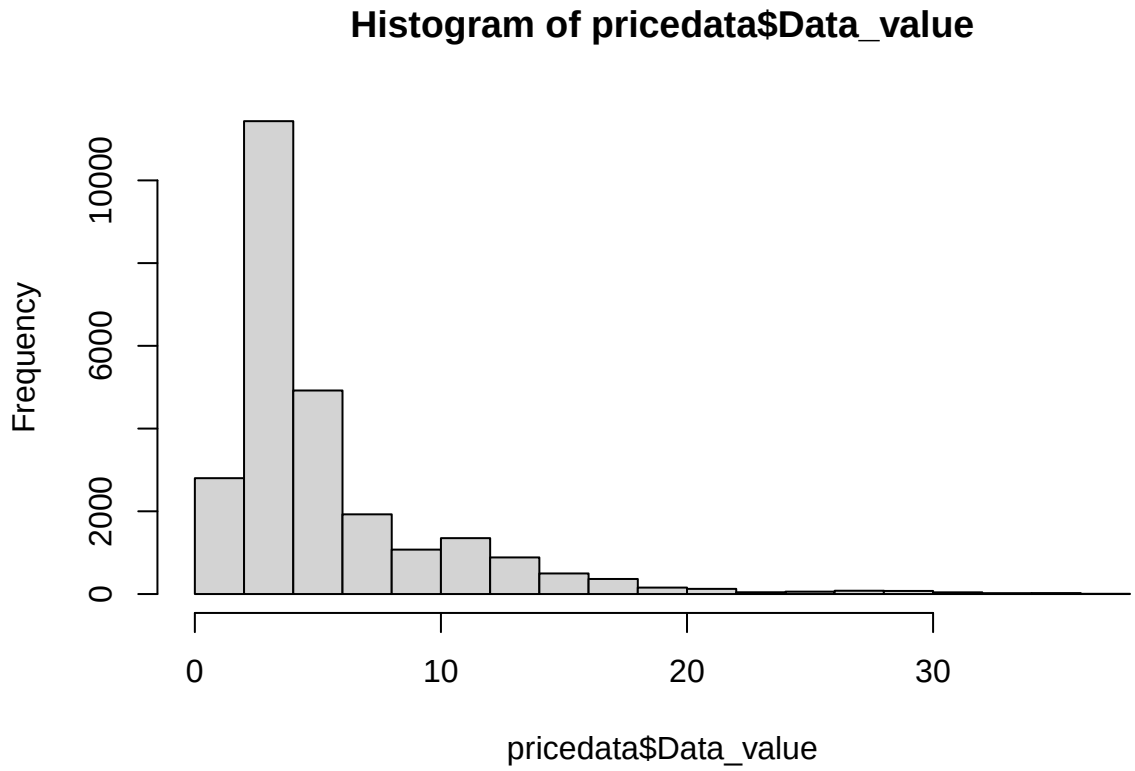
```
names(pricedata) # check the object names
```

```
## [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
```

```r
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
```

```
#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

#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
```

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

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

Series_reference	Period	Data_value	STATUS	UNITS	Subject	Group	Series_title_1
CPIM.SAP01002	2006.06	3.11	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Oranges, 1kg
CPIM.SAP01002	2006.07	2.78	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Oranges, 1kg
CPIM.SAP01002	2006.08	2.43	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Oranges, 1kg
CPIM.SAP01002	2006.09	2.42	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Oranges, 1kg
CPIM.SAP01002	2006.10	3.04	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Oranges, 1kg
CPIM.SAP01002	2006.11	3.24	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	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	Subject	Group	Series_title_1	price
CPIM.SAP01002	2006.06	3.11	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Oranges, 1kg	311
CPIM.SAP01002	2006.07	2.78	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Oranges, 1kg	278
CPIM.SAP01002	2006.08	2.43	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	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	Subject	Group	Series_title_1
1	CPIM.SAP0100	2006.06	3.11	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Oranges, 1kg
2	CPIM.SAP0100	2006.07	2.78	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Oranges, 1kg
3	CPIM.SAP0100	2006.08	2.43	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	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
CPIM.SAP0100	2006.06	3.11	Oranges, 1kg
CPIM.SAP0100	2006.07	2.78	Oranges, 1kg
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
CPIM.SAP0100	2006.06	3.11	Oranges, 1kg
CPIM.SAP0100	2006.07	2.78	Oranges, 1kg
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	Subject	Group	Series_title_1
24604	CPIM.SAP0261	2017.10	4.41	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Olives, jar, 400g
24605	CPIM.SAP0261	2017.11	4.48	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	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	Subject	Group	Series_title_1	price
496	CPIM.SAP0102	2017.01	5.04	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Apples, 1kg	504
561	CPIM.SAP0103	2007.02	5.28	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	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	Subject	Group	Series_title_1
184	CPIM.SAP0100	2021.09	3.49	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	Oranges, 1kg
368	CPIM.SAP0101	2021.09	2.92	FINAL	Dollars	Consumers Price Index - CPI	Food Price Index Selected Monthly Weighted Average Prices for New Zealand	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
```

```
newdata3[1:3,1:5]
```

Data_value	CPIM.SAP0100	CPIM.SAP0101	CPIM.SAP0102	CPIM.SAP0103
0.90	0	0	0	0
0.91	0	0	0	0
0.93	0	0	0	0

```
library(xlsx)# save the results into xlsx file
```

```
## java.home option:

## JAVA_HOME environment variable: D:/Program Files (x86)/Java/jdk1.8.0_144/jre

## Warning in fun(libname, pkgname): Java home setting is INVALID, it will be ignored.
## Please do NOT set it unless you want to override system settings.
```

```
write.xlsx(newdata3,"D:\\One\\OneDrive\\ \\newdata3.xlsx",sheetName="newdata3",append=TRUE)
```

#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$Data_value) # save the search results into x
  price1<-rbind(c(levels(fac)[n],sapply(x, FUN = mean)),price1) #using sapply to calculate the average price, then using rbind to save the
  n=n+1
}
names(price1)<-c("Product","Average Price") # set the columns names
price1$No.<-1:length(price1$Product)# generate a index column
library(dplyr)
```

```
##
##     'dplyr'

## The following objects are masked from 'package:plyr':
##
##     arrange, count, desc, failwith, id, mutate, rename, summarise,
##     summarize

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
price1 <-select(price1, "No.", "Product", "Average Price")# rearrange the order of columns
price1 # display the final results
```

No.	Product	Average Price
1	Yoghurt - flavoured, 150g pottle (supermarket only), pk of 6	4.90027173913044
2	Wholegrain bread, sliced, 700g	3.47221590909091
3	Wheatmeal bread, sliced, 700g	2.858125
4	Vinegar, 750ml	2.46852272727273
5	Two minute noodles, multipack,5	2.47290322580645
6	Tuna - canned (supermarket only), 185g	2.43489130434783
7	Tomatoes, canned, 400g	1.303125
8	Tomatoes, 1kg	6.22304347826087
9	Tomato sauce - canned, 560g	2.9875
10	Tea, takeaway	3.06651428571429
11	Tea bags, flavoured or herbal, box of 25	3.11479166666667
12	Tea bags (supermarket only), box of 100	4.46673913043478
13	Takeaway muffins and buns, each	3.32445714285714
14	Sweets, 200g	2.89829545454545
15	Sultanas (supermarket only), 375g	2.13211956521739
16	Sugar - white, 1.5kg	2.5729347826087

No.	Product	Average Price
17	Sports energy drinks, 350ml	3.38666666666667
18	Sports energy drinks, 250ml	2.00816091954023
19	Spaghetti - canned, 420g	1.52820652173913
20	Soy sauce, 300ml	2.42147727272727
21	Soy milk, unflavoured, 1 litre	3.31993710691824
22	Soup, canned, 500g	3.10096590909091
23	Soft drinks, poured	2.70982857142857
24	Soft drinks, 600ml	3.55005681818182
25	Soft drink, 1.5 litres	2.4108152173913
26	Sausages, 1kg	8.86021739130435
27	Sandwich, fresh or toasted	4.23857923497268
28	Salmon, imported, pink, canned, unflavoured, 210g	3.05823863636364
29	Salami, 100g	3.33085227272727
30	Salad, takeaway, vegetable, 1kg	10.2270454545455
31	Salad, leaf, packaged, 150g	4.55195402298851
32	Roasting pork, fresh, chilled or frozen, 1kg	10.35375
33	Roasting lamb and hogget, fresh, chilled or frozen, 1kg	15.0443181818182
34	Rice - long grain, white (supermarket only), 1kg	2.41782608695652
35	Pumpkin, 1kg	2.62926136363636
36	Prepared meals, frozen, 340g	5.57732954545455
37	Prawns, frozen, 700g	17.3305747126437
38	Potatoes, 1kg	1.74945652173913
39	Potato fries, frozen, 1kg	3.35647727272727
40	Potato crisps, 150g	1.83653225806452
41	Pork - loin chops, 1kg	15.8085869565217
42	Pizza, takeaway	13.4677714285714
43	Pizza, fresh or frozen, with any standard topping, each	5.48782608695652
44	Pineapple, pieces, in juice or syrup, canned, 425g	1.77642045454545
45	Pineapple, 1kg	3.27767295597484
46	Peas - frozen (supermarket only), 1kg	2.51298913043478
47	Pears, 1kg	3.77738636363636
48	Peanuts, blanched, salted, 250g	3.37978260869565
49	Peanut butter, not salt free, 375g	2.85184782608696
50	Peaches - canned (supermarket only), 410g	1.60722826086957
51	Pastry, frozen sheets, puff or flaky, 800g	5.09971590909091
52	Pasta sauces, tomato based, 500g	2.99357954545455
53	Parsnips, 1kg	5.71886363636364

No.	Product	Average Price
54	Packaged meal, pasta and sauce, 130g	2.55664772727273
55	Packaged cake slice, 300g	3.55767045454545
56	Oranges, 1kg	3.38483695652174
57	Orange juice, not apple based, 1 litre - Cheapest Available	2.66715447154472
58	Onions, 1kg	2.08147727272727
59	Olives, jar, 400g	4.35395833333333
60	Olive oil, pure, not extra virgin or light, 1 litre	11.87
61	Mussels, marinated, 375g	5.90585227272727
62	Mussels, live, 1kg	3.90267045454545
63	Mushrooms, 1kg	11.0333152173913
64	Muesli/cereal bars, 200g	2.94754716981132
65	Muesli, natural or toasted, 750g	5.28607954545455
66	Mixed vegetables, frozen, 1kg	3.40534090909091
67	Milk, calcium enriched, 2 litres	5.10647727272727
68	Milk - standard homogenised, 2 litres	3.38614130434783
69	Meat pies, chilled, 6 or 8 pack - Cheapest Available	6.06869318181818
70	Meat pie - hot, each	3.70109289617486
71	Mayonnaise, 380ml	3.32630434782609
72	Margarine/table spread, 500g	2.33983695652174
73	Mandarins, 1kg	5.26215909090909
74	Lettuce, 1kg	4.39777173913043
75	Lamb - chops, 1kg	14.21875
76	Kumara, 1kg	5.29005681818182
77	Kiwifruit, 1kg	3.73782608695652
78	Jam, 375g	2.61482954545455
79	Infant formula, 900g	19.2929545454545
80	Ice cream novelty, chocolate coated, each	3.18278409090909
81	Ice cream bought in bulk, 2 litres	5.58818181818182
82	Ice block, water based, each	2.12897727272727
83	Hummus dip, 200g	3.74578616352201
84	Hot chips, hot wedges	2.97497142857143
85	Honey, clover, creamed, 500g	7.0625
86	Ham, sliced or shaved, 1kg	13.6776086956522
87	Grapes, green or red	7.47982954545455
88	Fruit juice - apple based (supermarket only), 3 litre	4.17677419354839
89	Fruit flavoured drink powder, multipack of 3 to 5	1.2555625
90	Fried and other takeaway chicken, 5 pieces	11.3387428571429

No.	Product	Average Price
91	Fresh pasta, tortellini or other filled type, 300g	4.59138364779874
92	Fresh herbs, packaged, chilled	3.79395833333333
93	Fresh fish, 1kg	29.3965340909091
94	Flour - white (supermarket only), 1.5kg	1.9429347826087
95	Flat bread - pita, tortilla, or other type	4.13422764227642
96	Fish fillets, frozen, multipack, 500g	7.32454545454545
97	Fish and chips, One fish/chips	5.94857923497268
98	Eggs, free range, 6 pack	4.71025157232704
99	Eggs, dozen	3.73086956521739
100	Drinking chocolate, 300g	3.92744318181818
101	Dried pasta, spaghetti or other type, 500g	1.88415094339623
102	Dried mixed herbs, 10g to 15g	2.36358695652174
103	Dessert, frozen, 500g	6.35062893081761
104	Cucumber, 1kg	7.79380681818182
105	Cream, 300ml - Cheapest Available	2.23369318181818
106	Courgettes, 1kg	8.75363636363636
107	Corned beef, fresh, chilled or frozen, 1kg	9.55392045454546
108	Corn flakes, 500g	3.38647727272727
109	Cookie, takeaway, each	1.87668571428571
110	Coffee, takeway, each	3.57508571428571
111	Coffee, ground, 200g	6.31471590909091
112	Coffee - instant, 100g	5.55038043478261
113	Chocolate, boxed, loose, 250g	8.46767045454545
114	Chocolate novelty bars, 50g	1.42545454545455
115	Chocolate blocks, convenience stores, 100g to 250g	4.53426136363636
116	Chocolate - block (supermarket only), 250g	3.9604347826087
117	Chilled fruit juice or smoothies, 1 to 1.5 litre	4.58635220125786
118	Chicken, whole, frozen, No. 15 - Cheapest Available	8.09931818181818
119	Chicken, cooked, whole, No. 15 - Cheapest Available	11.5759748427673
120	Chicken pieces (excluding breast), boneless or bone in, 1kg	8.14747126436782
121	Chicken nuggets, frozen, 1kg	11.0632520325203
122	Chicken breast, 1kg	13.9584090909091
123	Chewing gum, packet, each	2.7241875
124	Cheese, processed slices, 250g	3.50022727272727
125	Cheese, camembert, 125g	4.27681818181818
126	Cheese - mild cheddar (supermarket only), 1kg	9.10239130434783
127	Celery, 1kg	3.31965909090909

No.	Product	Average Price
128	Cauliflower, 1kg	3.42727272727273
129	Carrots, 1kg	2.13630434782609
130	Capsicums, green, else red, 1kg	12.7696022727273
131	Cakes and biscuits, takeaway	3.63411428571429
132	Cabbage, 1kg	1.97684782608696
133	Butter - salted, 500g	3.97826086956522
134	Burger, with or without accompaniments, each	4.5976
135	Broccoli, 1kg	5.91711956521739
136	Breakfast drink, 250ml, 6 pack	7.71287356321839
137	Breakfast biscuits, 1kg	5.62391304347826
138	Bread rolls, hamburger buns, 6 pack	2.78448863636364
139	Bread rolls, filled, hot, each	6.27622857142857
140	Bread - white sliced loaf, 600g	1.32326086956522
141	Bottled water, 750ml	2.02994565217391
142	Biscuits, savoury, crackers 250g	3.160625
143	Biscuits, plain (eg arrowroot, ginger, malt, wine), 250g	2.21698863636364
144	Biscuits - chocolate, 200g	2.83195652173913
145	Berries, frozen, 500g	6.49983739837398
146	Beef steak - porterhouse/sirloin, 1kg	26.2638586956522
147	Beef steak - blade, 1kg	15.6879347826087
148	Beef - mince, 1kg	12.6989130434783
149	Beans, 1kg	12.8588636363636
150	Bananas, 1kg	2.74076086956522
151	Bacon - middle rashers (supermarket only), 700g	12.0044318181818
152	Baby food, 110g	1.09664772727273
153	Avocado, 1kg	9.78926136363636
154	Apricots, dried, 100g	2.19308943089431
155	Apples, 1kg	2.83760869565217

```
#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