Python

1.How To Get The Mode From A List In Python

Assume that we have the following list:

```
mylist = [1,1,1,2,2,3,3]
```

and we want to get the mode, i.e. the most frequent element. We can use the following trick using the max and the lambda key.

```
max(mylist, key = mylist.count)
```

And we get **1** since this was the mode in our list. In case where there is a draw in the mode and you want to get the minimum or the maximum number, you can sort the list as follows:

```
mylist = [1,1,1,2,2,3,3,3]
max(sorted(mylist), key = mylist.count)
```

And we get **1**

```
mylist = [1,1,1,2,2,3,3,3]
max(sorted(mylist, reverse=True), key = mylist.count)
```

And we get **3**

In the above example, we had two modes, 1 and 3. By adding the `sorted` function we were able to get the min and the max respectively. Finally, this approach works with string elements too.

```
mylist = ['a','a','b','b','b']
max(mylist, key = mylist.count)
```

And we get **'b'**

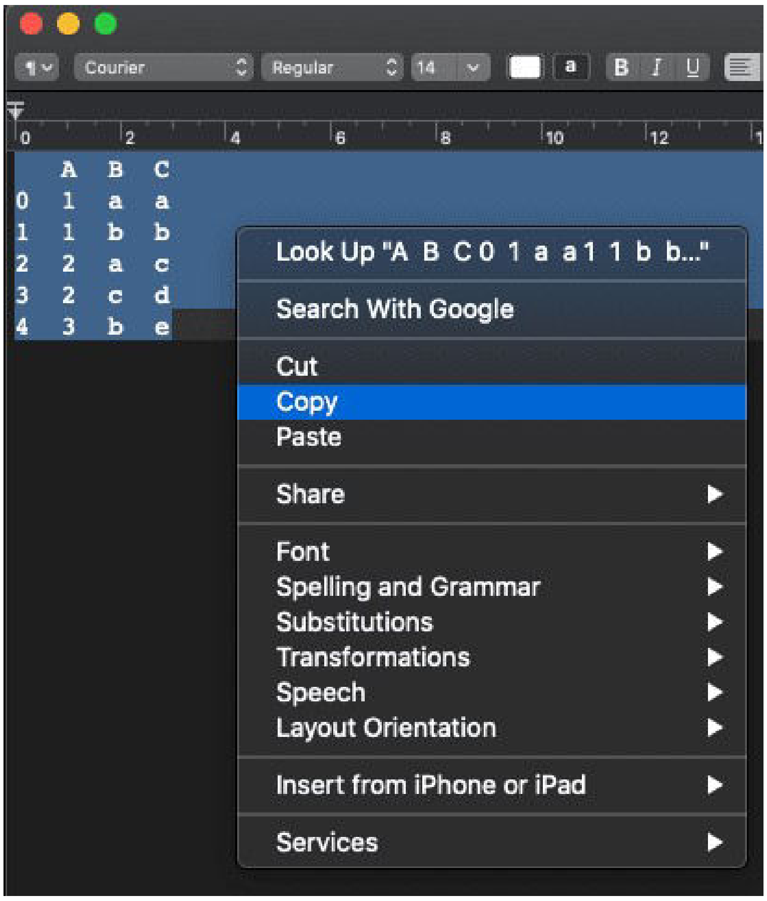
2.How To Disable All Warnings In Python

You can disable all python warnings by running the following code block.

```
import sys
if not sys.warnoptions:
    import warnings
    warnings.simplefilter("ignore")
```

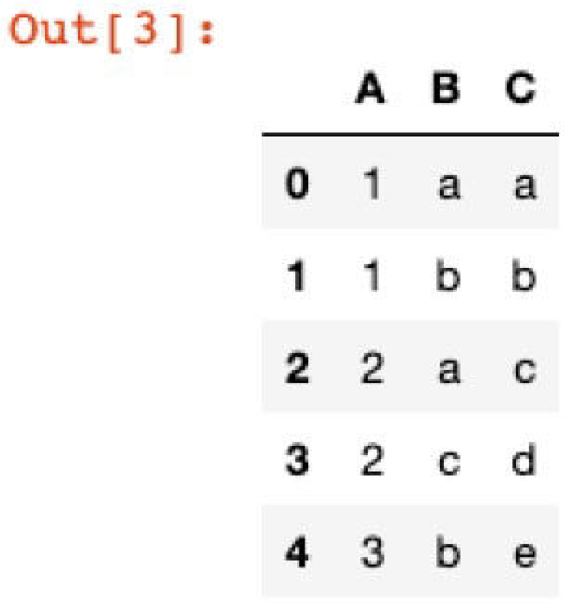
3.How to Copy Data And Paste Into A Pandas DataFrame

Firstly we need to copy the data-frame like data.



```
   A  B  C
0  1  a  a
1  1  b  b
2  2  a  c
3  2  c  d
4  3  b  e
```

Then, run the following:



Out[3]:

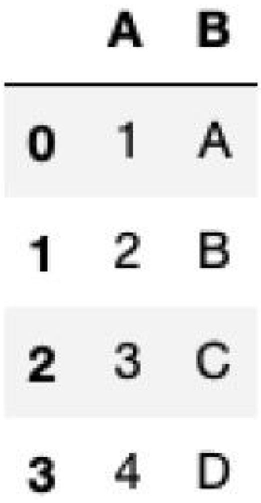
	A	B	C
0	1	a	a
1	1	b	b
2	2	a	c
3	2	c	d
4	3	b	e

4.How to Save Pandas Dataframes As Images

You can save Pandas Dataframes as images using the library dataframe-image. Then you can run:

```
import pandas as pd
import dataframe_image as dfi

df = pd.DataFrame({'A': [1,2,3,4],
                   'B':['A','B','C','D']})

dfi.export(df, 'dataframe.png')
```

Running the above, it will create a png image file with the dataframe as the image below.



	A	B
0	1	A
1	2	B
2	3	C
3	4	D

5.How To Add A Progress Bar Into Pandas Apply

When we are applying a function to a big Data-Frame, we can't see the progress of the function or an estimate on how long remains for the function to be applied to the whole dataset. We can solve this with the use of the **tqdm library**.

```
import pandas as pd
import numpy as np
from tqdm.notebook import tqdm
tqdm.pandas()

#dummy data
df=pd.DataFrame({"Value":np.random.normal(size=1500000)})
```

Let's apply a simple function to our data but instead of using **apply**, we will use the **progress_apply** function.

```
df['Value'].progress_apply(lambda x: x**2)
```

```
In [ ]: df['Value'].progress_apply(lambda x: x**2)
In [ ]:
In [ ]:
In [ ]:
In [ ]:
In [ ]:
```

R

6.Avoid Apply() Function In Large Datasets

When we are dealing with large datasets and there is a need to calculate some values like the `row/column min/max/rank/mean` etc we should avoid the `apply` function because it takes a lot of time. Instead, we can use the matrixStats package and its corresponding functions. Let's provide some comparisons.

Example of Minimum value per Row

Assume that we want to get the minimum value of each row from a `500 x 500` matrix. Let's compare the performance of the `apply` function from the `base` package versus the `rowMins` function from the `matrixStats` package.

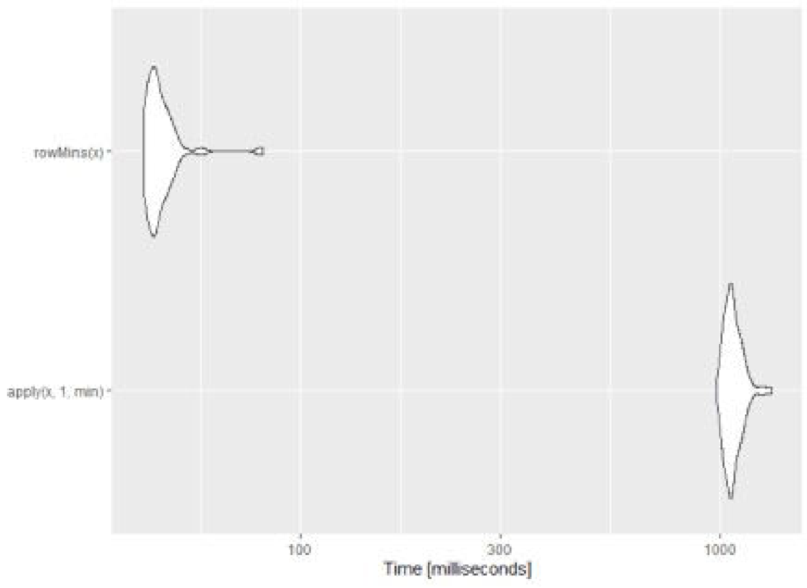
```
library(matrixStats)
library(microbenchmark)
library(ggplot2)

x <- matrix( rnorm(5000 * 5000), ncol = 5000 )

tm <- microbenchmark(apply(x,1,min),
                     rowMins(x),
                     times = 100L
                    )

tm
```

And we get:

```
Unit: milliseconds
             expr      min         lq       mean     median         uq       max
neval
 apply(x, 1, min) 981.6283 1034.98050 1078.04485 1065.4163 1107.9962 1327.9284
100
       rowMins(x)  42.1838   43.80065   46.55752   45.2255   47.6249   81.3097
100
```

As we can see from the output above, **the `apply` function was 23 times slower than the `rowMins`**. Below we represent the violin plot

```
autoplot(tm)
```



7.The Fastest Way To Read And Write Files In R

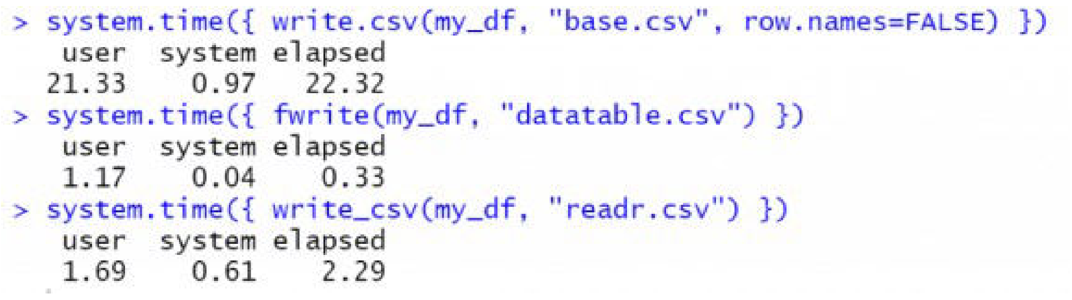
When we are dealing with large datasets, and we need to **write** many csv files or when the csv filethat we hand to **read** is huge, then the speed of the read and write command is important. We will compare the required time to write and read files of the following cases:

- base package
- data.table
- readr

Compare the Write times

We will work with a csv file of **1M rows** and **10 columns** which is approximately **180MB**. Let's create the sample data frame and write it to the hard disk. We will generate 10M observations from the Normal Distribution.

```
library(data.table)
library(readr)
library(microbenchmark)
library(ggplot2)

# create a 1M X 10 data frame

my_df<-data.frame(matrix(rnorm(1000000*10), 1000000,10))


# base
system.time({ write.csv(my_df, "base.csv", row.names=FALSE) })

# data.table
system.time({ fwrite(my_df, "datatable.csv") })

# readr
system.time({ write_csv(my_df, "readr.csv") })
```



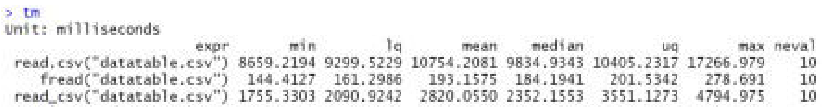
```
> system.time({ write.csv(my_df, "base.csv", row.names=FALSE) })
   user  system elapsed 
  21.33    0.97   22.32 
> system.time({ fwrite(my_df, "datatable.csv") })
   user  system elapsed 
   1.17    0.04    0.33 
> system.time({ write_csv(my_df, "readr.csv") })
   user  system elapsed 
   1.69    0.61    2.29 
```

As we can see from the elapsed time, the `fwrite` from the `data.table` is **~70 times faster than the base package and ~7times faster than the `readr`**

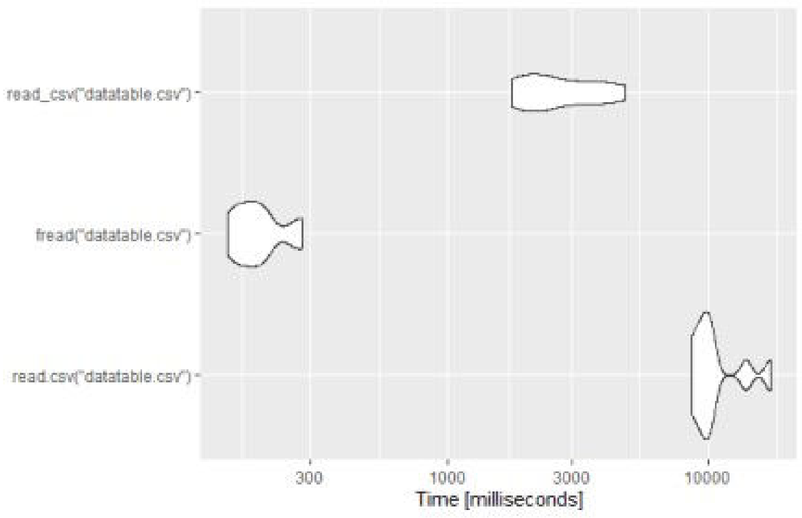
Compare the Read Times

Let's compare also the read times using the `microbenchmark` package.

```
tm <- microbenchmark(read.csv("datatable.csv"),
                     fread("datatable.csv"),
                     read_csv("datatable.csv"),
                     times = 10L
)

tm
autoplot(tm)
```



```
> tm
Unit: milliseconds
                      expr       min        lq       mean    median         uq       max neval
 read.csv("datatable.csv") 8659.2194 9299.5229 10754.2081 9834.9343 10405.2317 17266.979    10
    fread("datatable.csv")  144.4127  161.2986   193.1575  184.1941   201.5342   278.691    10
 read_csv("datatable.csv") 1755.3303 2090.9242  2820.0550 2352.1553  3551.1273  4794.975    10
```



As we can see, again the `fread` from the `data.table` package is around 40 times faster than the base package and 8.5 times faster than the `read_csv` from the `readr` package. So, if you want to read and write files fastly then you should choose the `data.table` package.

8.How To Compare Objects In R

In 2020, the guru Hadley Wickham, built a new package called waldo for comparing complex R objects and making it easy to detect the key differences. You can find detailed examples in tidyverse.org as well as at the github. Let's provide a simple example by comparing two data frames in R with waldo.

Compare 2 Data Frames in R

Let's create the new data frames:

```
library(waldo)


df1<-data.frame(X=c(1,2,3), Y=c("a","b","c"), A=c(3,4,5))
df2<-data.frame(X=c(1,2,3,4), Y=c("A","b","c","d"), Z=c("k","l","m","n"),
A=c("3","4","5","6"))
```

The **df1:**

```
  X Y A
1 1 a 3
2 2 b 4
3 3 c 5
```

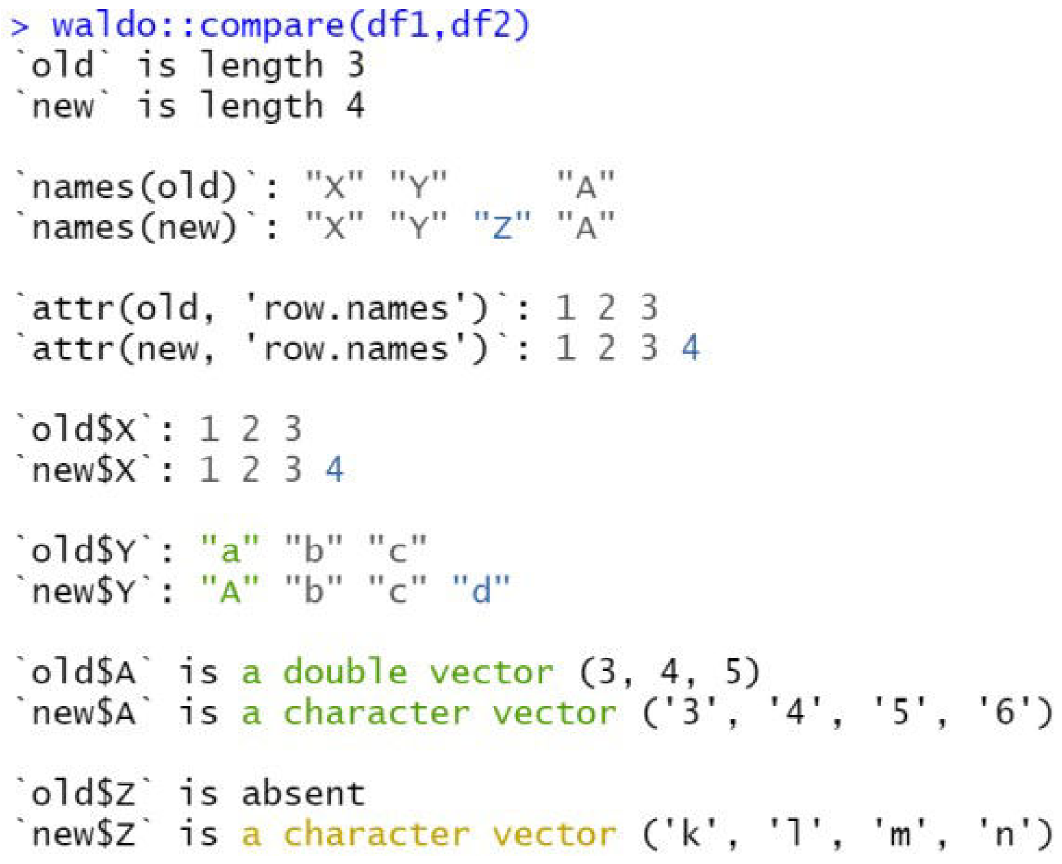
And the **df2:**

```
  X Y Z A
1 1 A k 3
2 2 b l 4
3 3 c m 5
4 4 d n 6
```

Let’s compare them:

```
waldo::compare(df1,df2)
```

And we get:



```
> waldo::compare(df1,df2)
`old` is length 3
`new` is length 4

`names(old)`: "X" "Y"     "A"
`names(new)`: "X" "Y" "Z" "A"

`attr(old, 'row.names')`: 1 2 3
`attr(new, 'row.names')`: 1 2 3 4

`old$X`: 1 2 3
`new$X`: 1 2 3 4

`old$Y`: "a" "b" "c"
`new$Y`: "A" "b" "c" "d"

`old$A` is a double vector (3, 4, 5)
`new$A` is a character vector ('3', '4', '5', '6')

`old$Z` is absent
`new$Z` is a character vector ('k', 'l', 'm', 'n')
```

As we can see it captures all the differences and the output is in a friendly format of different colors depending on the difference. More particularly, it captures that:

- The df1 has 3 rows where df2 has 2
- The df2 has an extra column name and it shows where is the difference in the order.
- It shows the rows names and the differences
- It compares each column, X, Y, A, Z
- It detected the difference in the data type of column A where in the first is double and in the second is character
- It returns that there is a new column called Z.

9.How To Install And Load Packages Dynamically

When we share an R script file with someone else, we assumed that they have already installed the required R packages. However, this is not always the case and for that reason, I strongly suggest adding this piece of code to every shared R script which requires a package. Let’s assume that your code requires the following three packages: “**readxl**“, “**dplyr**“, “**multcomp**” .

The script below checks, if the package exists, and if not, then it installs it and finally it loads it to R

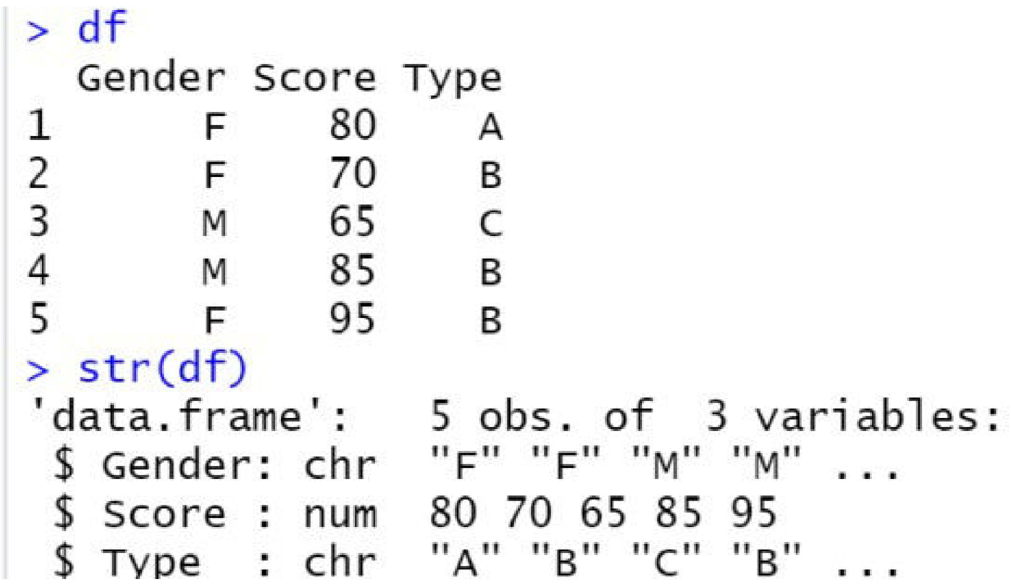
```
mypackages<-c("readxl", "dplyr", "multcomp")

for (p in mypackages){
  if(!require(p, character.only = TRUE)){
    install.packages(p)
    library(p, character.only = TRUE)
  }
  }
```

10.How To Convert All Character Variables To Factors

Let’s say that we want to convert all Character Variables to Factors and we are dealing with a large data frame of many columns which means that is not practical to convert them one by one. Thus, our approach is to detect the “**char**” variables and to convert them to “Factors”.

Let’s provide a toy example:

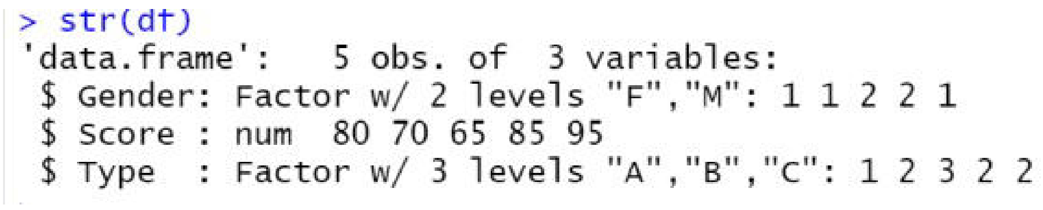
```
df<-data.frame(Gender = c("F", "F", "M","M","F"),
               Score  = c(80, 70, 65, 85, 95),
               Type = c("A","B","C","B","B"))
```



```
> df
  Gender Score Type
1      F    80    A
2      F    70    B
3      M    65    C
4      M    85    B
5      F    95    B
> str(df)
'data.frame':	5 obs. of  3 variables:
 $ Gender: chr  "F" "F" "M" "M" ...
 $ Score : num  80 70 65 85 95
 $ Type  : chr  "A" "B" "C" "B" ...
```

As we can see, the `Gender` and `Type` are `char` variables. Let’s convert them to factors.

```
df[sapply(df, is.character)] <- lapply(df[sapply(df, is.character)],
as.factor)
```



```
> str(df)
'data.frame':	5 obs. of  3 variables:
 $ Gender: Factor w/ 2 levels "F","M": 1 1 2 2 1
 $ Score : num  80 70 65 85 95
 $ Type  : Factor w/ 3 levels "A","B","C": 1 2 3 2 2
```