BIG DATA ANALYTICS

A PRACTICAL REPORT
ON
BIG DATA ANALYTICS

SUBMITTED BY
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Seat No:

UNDER THE GUIDANCE OF
PROF. AKBAR KHAN

Submitted in fulfillment of the requirements for qualifying
MSc.IT Part I Semester - II Examination 2024 - 2025

University of Mumbai
Department of Information Technology

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Department of Information Technology
M.Sc. (IT – SEMESTER II)

Certificate

This is to certify that Big Data Analytics Practical performed at R.D & S.H National & S.W.A. Science College by **Chetna Bhati** holding Seat No. _____studying Master of Science in Information Technology Semester – II has been satisfactorily completed as prescribed by the University of Mumbai, during the year 2024 – 2025.

Course Teacher **Coordinator Dept of I.T.**

External Examiner

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Practical 1

Aim: Implement Decision tree classification technique

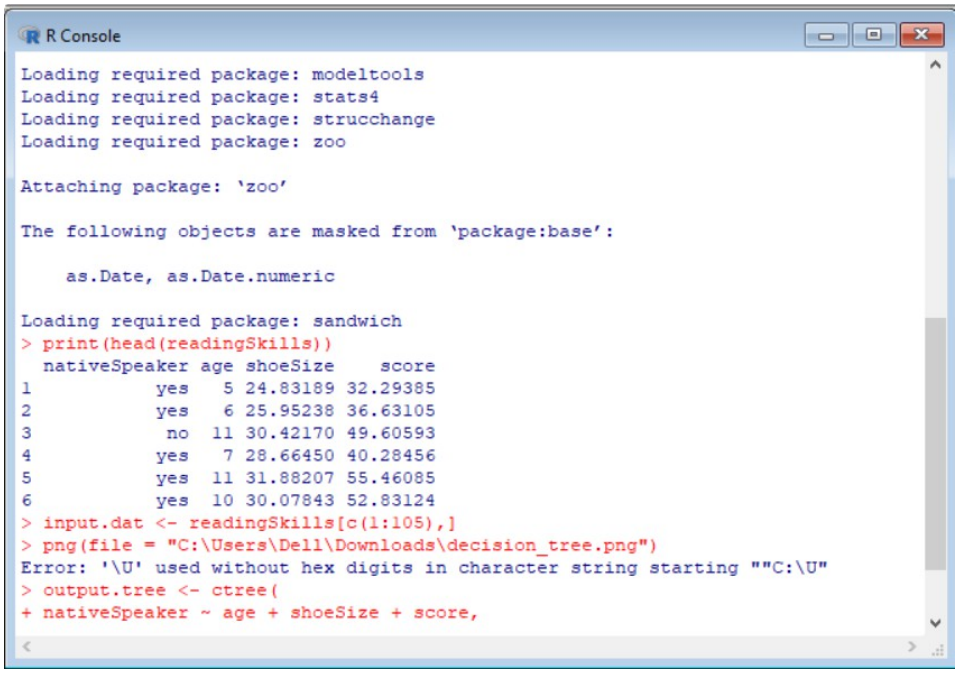
Writeup:

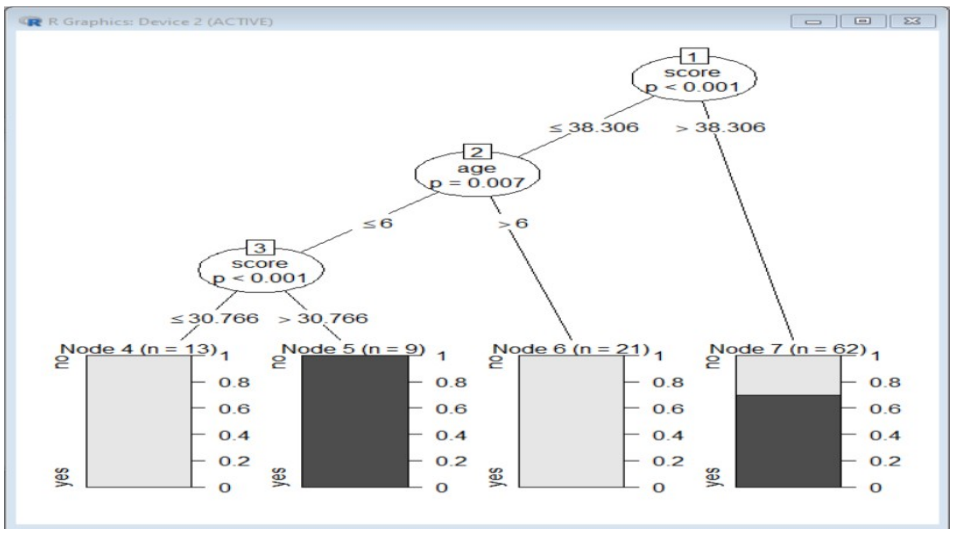
[A]: Implement Decision tree classification technique

Code:

```
library(party)
print(head(readingSkills))
input.dat <- readingSkills[c(1:105),]
png(file = "C:\Users\Dell\Downloads\decision_tree.png")
output.tree <- ctree(
nativeSpeaker ~ age + shoeSize + score,
data = input.dat)
plot(output.tree)
```

Output:





Practical 2 Aim:

Implement SVM classification technique Writeup:

[A]: Implement SVM classification technique
Code:

```
install.packages("caret")
library('caret')
heart <- read.csv("C:\\Users\\Dell\\Downloads\\heart.csv", sep = ',', header =
FALSE)
str(heart)
#split training and test dataset
intrain<- createDataPartition(y = heart$V14, p= 0.7, list = FALSE)
training <- heart[intrain,]
testing <- heart[-intrain,]
dim(training);
dim(testing); anyNA(heart)
summary(heart)
training[["V14"]] <- factor(training[["V14"]])
trctrl<- trainControl(method = "repeatedcv", number = 10, repeats = 3)
svm_Linear<- train(V14 ~., data = training, method =
"svmLinear",trControl=trctrl,preProcess = c("center", "scale"),tuneLength = 10)
svm_Linear
test_pred<- predict(svm_Linear, newdata = training)
test_pred
```

Output:

```
> str(heart)
'data.frame':   290 obs. of  14 variables:
 $ V1 : chr  "age" "60" "35" "41" ...
 $ V2 : chr  "sex" "1" "1" "0" ...
 $ V3 : chr  "cp" "3" "2" "1" ...
 $ V4 : chr  "trtbps" "145" "130" "130" ...
 $ V5 : chr  "chol" "233" "250" "204" ...
 $ V6 : chr  "fbs" "1" "0" "0" ...
 $ V7 : chr  "restecg" "0" "1" "0" ...
 $ V8 : chr  "thalachh" "150" "187" "172" ...
 $ V9 : chr  "exng" "0" "0" "0" ...
 $ V10: chr  "oldpeak" "2.3" "3.5" "1.4" ...
 $ V11: chr  "slp" "0" "0" "2" ...
 $ V12: chr  "caa" "0" "0" "0" ...
 $ V13: chr  "thall" "1" "2" "2" ...
 $ V14: chr  "output" "1" "1" "1" ...
> #split training and test dataset
> intrain<- createDataPartition(y = heart$V14, p= 0.7, list = FALSE)
Warning message:
In createDataPartition(y = heart$V14, p = 0.7, list = FALSE) :
  Some classes have a single record ( output ) and these will be selected for the sample
> training <- heart[intrain,]
> testing <- heart[-intrain,]
> dim(training);
[1] 204  14
> dim(testing);
[1] 86 14
> anyNA(heart)
[1] FALSE
> summary(heart)
      V1                 V2                 V3                 V4
 Length:290         Length:290         Length:290         Length:290
 Class :character   Class :character   Class :character   Class :character
 Mode  :character   Mode  :character   Mode  :character   Mode  :character
      V5                 V6                 V7                 V8
 Length:290         Length:290         Length:290         Length:290
 Class :character   Class :character   Class :character   Class :character
 Mode  :character   Mode  :character   Mode  :character   Mode  :character
      V9                V10                V11                V12
 Length:290         Length:290         Length:290         Length:290
 Class :character   Class :character   Class :character   Class :character
 Mode  :character   Mode  :character   Mode  :character   Mode  :character
     V13                V14
 Length:290         Length:290
```

```
> svm_Linear
Support Vector Machines with Linear Kernel

204 samples
 13 predictor
  3 classes: '0', '1', 'output'

Pre-processing: centered (345), scaled (345)
Resampling: Cross-Validated (10 fold, repeated 3 times)
Summary of sample sizes: 184, 185, 182, 184, 183, 183, ...
Resampling results:

  Accuracy   Kappa
  0.7657044  0.517642

Tuning parameter 'C' was held constant at a value of 1
> test_pred<- predict(svm_Linear, newdata = training)
> test_pred
  [1] output 1      1      1      1      1      1      1      1      1
 [11] 1      1      1      1      1      1      1      1      1      1
 [21] 1      1      1      1      1      1      1      1      1      1
 [31] 1      1      1      1      1      1      1      1      1      1
 [41] 1      1      1      1      1      1      1      1      1      1
 [51] 1      1      1      1      1      1      1      1      1      1
 [61] 1      1      1      1      1      1      1      1      1      1
 [71] 1      1      1      1      1      1      1      1      1      1
 [81] 1      1      1      1      1      1      1      1      1      1
 [91] 1      1      1      1      1      1      1      1      1      1
[101] 1      1      1      1      1      1      1      1      1      1
[111] 1      1      1      1      1      1      1      0      0      0
[121] 0      0      0      0      0      0      0      0      0      0
[131] 0      0      0      0      0      0      0      0      0      0
[141] 0      0      0      0      0      0      0      0      0      0
[151] 0      0      0      0      0      0      0      0      0      0
[161] 0      0      0      0      0      0      0      0      0      0
[171] 0      0      0      0      0      0      0      0      0      0
[181] 0      0      0      0      0      0      0      0      0      0
[191] 0      0      0      0      0      0      0      0      0      0
[201] 0      0      0      0
Levels: 0 1 output
>
```

Practical 3

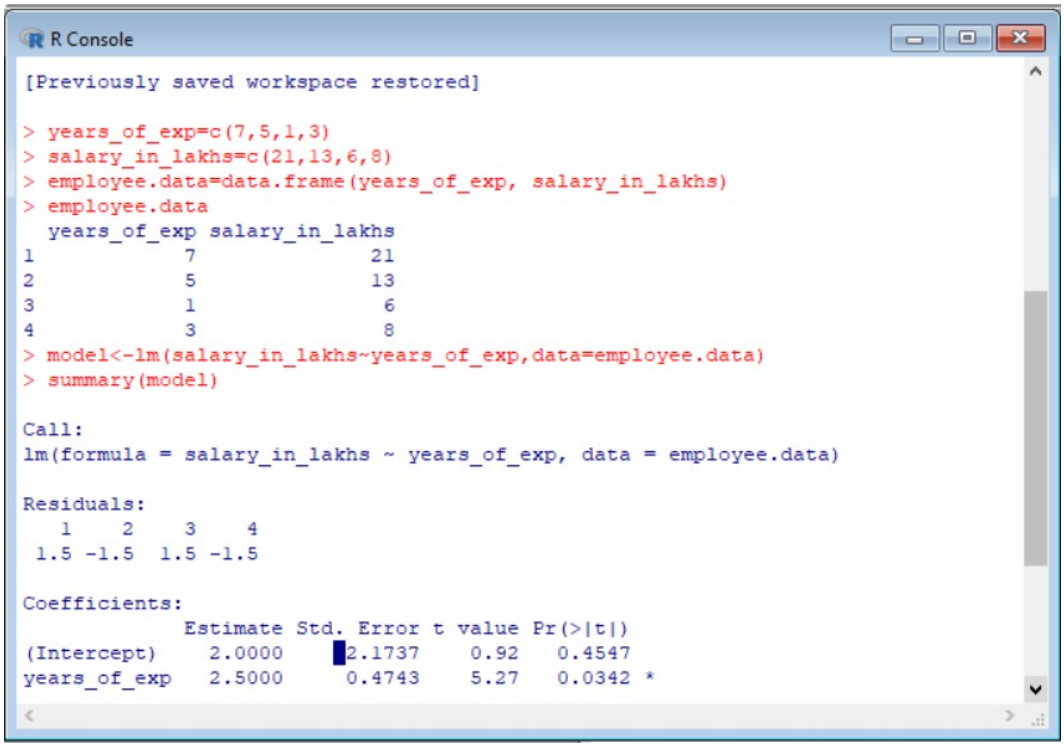
Aim: Implement Regression Model to import a data from web storage. Name the dataset and now do Linear Regression to find out relation between variables. Also check the model is fit or not.
Writeup:

[A]:Implement Regression Model to import a data from web storage. Name the dataset and now do Linear Regression to find out relation between variables. Also check the model is fit or not.

Code:

```
years_of_exp=c(7,5,1,3)
salary_in_lakhs=c(21,13,6,8)
employee.data=data.frame(years_of_exp, salary_in_lakhs)
employee.data
model<-lm(salary_in_lakhs~years_of_exp,data=employee.data)
summary(model)
plot(salary_in_lakhs~years_of_exp,data=employee.data)
abline(model)
```

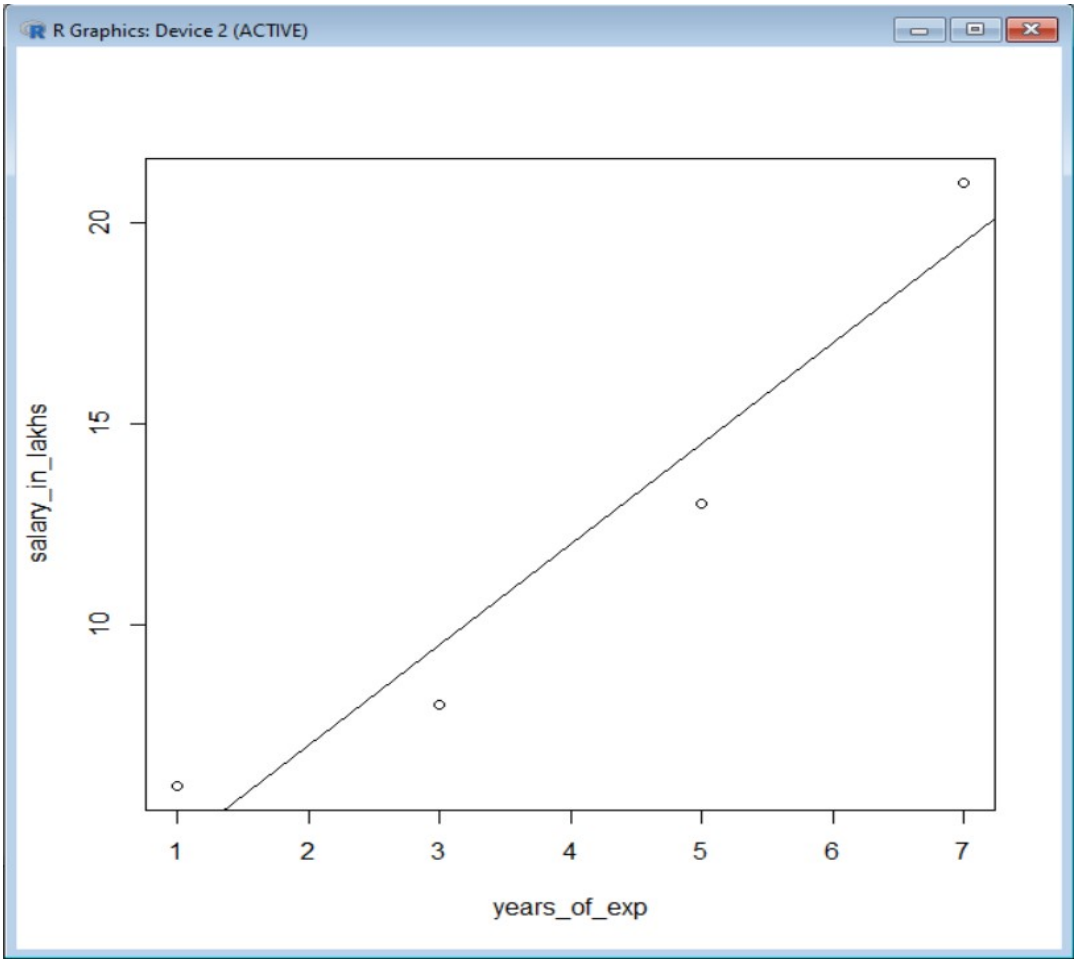
Output:



R Console

```
4            3               8
> model<-lm(salary_in_lakhs~years_of_exp,data=employee.data)
> summary(model)

Call:
lm(formula = salary_in_lakhs ~ years_of_exp, data = employee.data)

Residuals:
   1    2    3    4
 1.5 -1.5  1.5 -1.5

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)    2.0000     2.1737    0.92   0.4547
years_of_exp   2.5000     0.4743    5.27   0.0342 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.121 on 2 degrees of freedom
Multiple R-squared:  0.9328,    Adjusted R-squared:  0.8993
F-statistic: 27.78 on 1 and 2 DF,  p-value: 0.03417

> plot(salary_in_lakhs~years_of_exp,data=employee.data)
> abline(model)
>
```

R Graphics: Device 2 (ACTIVE)



Practical 4

Aim: Apply Multiple Regression on a dataset having a continuous independent variable.

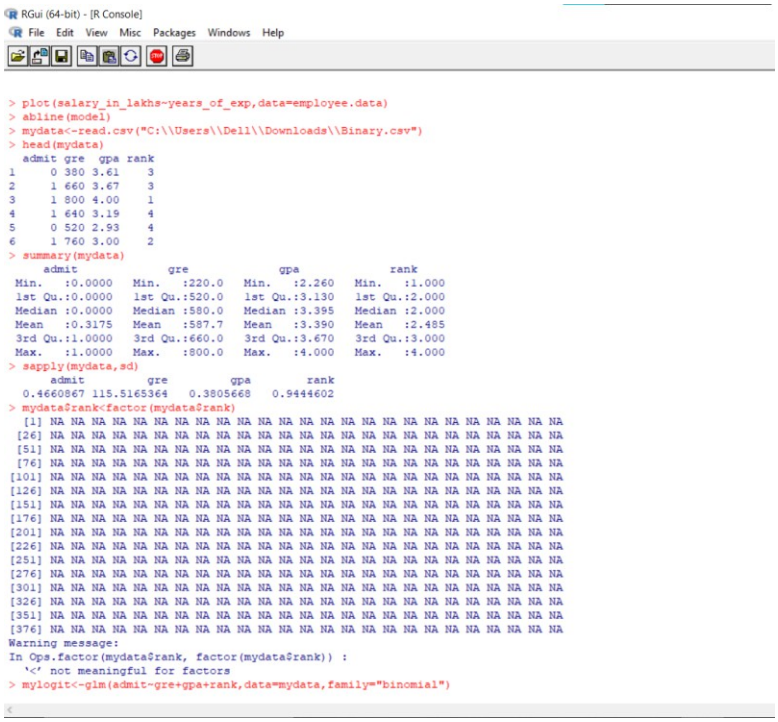
Writeup:

[A]: Apply Multiple Regression on a dataset having a continuous independent variable.

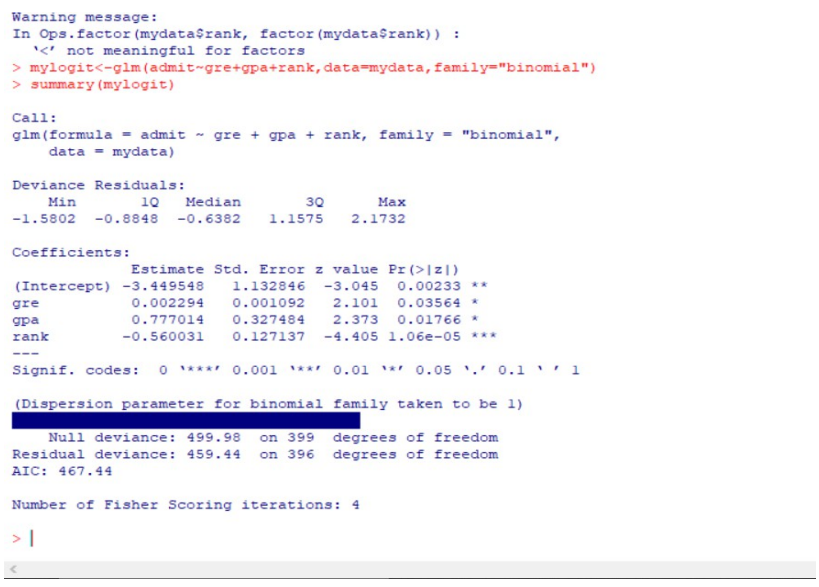
Code:

```
mydata<-read.csv("C:\\Users\\Dell\\Downloads\\Binary.csv")
head(mydata)
summary(mydata)
sapply(mydata,sd)
mydata$rank<factor(mydata$rank)
mylogit<-glm(admit~gre+gpa+rank,data=mydata,family="binomial")
summary(mylogit)
```

Output:



```
RGui (64-bit) - [R Console]
File Edit View Misc Packages Windows Help

> plot(salary_in_lakhs~years_of_exp,data=employee.data)
> abline(model)
> mydata<-read.csv("C:\\Users\\Dell\\Downloads\\Binary.csv")
> head(mydata)
  admit gre  gpa rank
1     0 380 3.61    3
2     1 660 3.67    3
3     1 800 4.00    1
4     1 640 3.19    4
5     0 520 2.93    4
6     1 760 3.00    2
> summary(mydata)
     admit             gre             gpa             rank
 Min.   :0.0000   Min.   :220.0   Min.   :2.260   Min.   :1.000
 1st Qu.:0.0000   1st Qu.:520.0   1st Qu.:3.130   1st Qu.:2.000
 Median :0.0000   Median :580.0   Median :3.395   Median :2.000
 Mean   :0.3175   Mean   :587.7   Mean   :3.390   Mean   :2.485
 3rd Qu.:1.0000   3rd Qu.:660.0   3rd Qu.:3.670   3rd Qu.:3.000
 Max.   :1.0000   Max.   :800.0   Max.   :4.000   Max.   :4.000
> sapply(mydata,sd)
     admit        gre        gpa       rank
 0.4660867 115.5165364   0.3805668   0.9444602
> mydata$rank<factor(mydata$rank)
  [1] NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA
 [26] NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA
 [51] NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA
 [76] NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA
[101] NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA
[126] NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA
[151] NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA
[176] NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA
[201] NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA
[226] NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA
[251] NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA
[276] NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA
[301] NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA
[326] NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA
[351] NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA
[376] NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA
Warning message:
In Ops.factor(mydata$rank, factor(mydata$rank)) :
  '<' not meaningful for factors
> mylogit<-glm(admit~gre+gpa+rank,data=mydata,family="binomial")
```



```
Warning message:
In Ops.factor(mydata$rank, factor(mydata$rank)) :
  '<' not meaningful for factors
> mylogit<-glm(admit~gre+gpa+rank,data=mydata,family="binomial")
> summary(mylogit)

Call:
glm(formula = admit ~ gre + gpa + rank, family = "binomial",
    data = mydata)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-1.5802  -0.8848  -0.6382   1.1575   2.1732

Coefficients:
             Estimate Std. Error z value Pr(>|z|)
(Intercept) -3.449548   1.132846  -3.045  0.00233 **
gre          0.002294   0.001092   2.101  0.03564 *
gpa          0.777014   0.327484   2.373  0.01766 *
rank        -0.560031   0.127137  -4.405 1.06e-05 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 499.98  on 399  degrees of freedom
Residual deviance: 459.44  on 396  degrees of freedom
AIC: 467.44

Number of Fisher Scoring iterations: 4

>
```

Practical 5

Aim: Build a Classification Model.

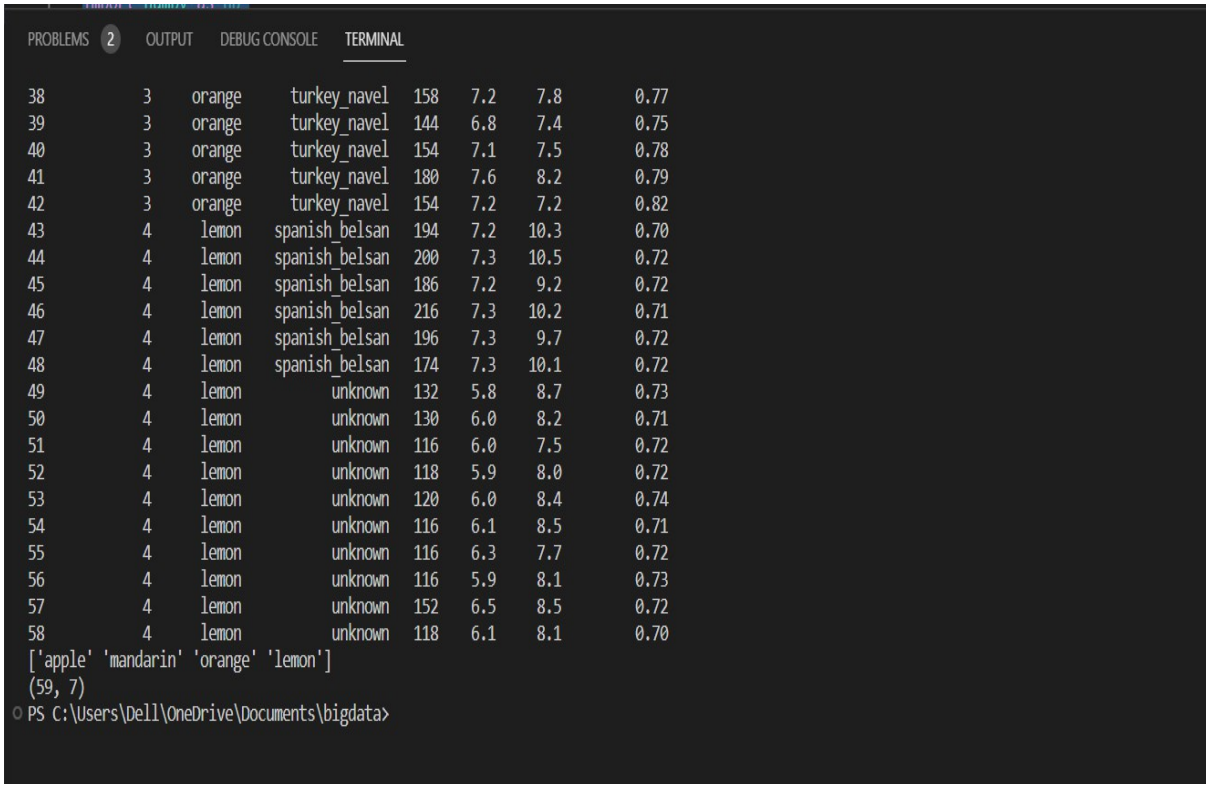
Writeup:

[A]: Build a Classification Model.

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt

fruits=pd.read_table('C:\\Users\\Dell\OneDrive\\Documents\\Rahul
Kewat\\IPCV\\images\\fruit_data_with_colors.txt')
fruits.head()
print(fruits)
print(fruits['fruit_name'].unique())
print(fruits.shape)
```

Output:

```
PROBLEMS 2  OUTPUT  DEBUG CONSOLE  TERMINAL

PS C:\Users\Dell\OneDrive\Documents\bigdata> & C:/Users/Dell/AppData/Local/Programs/Python/Python310/python.exe c:/Users/Dell/OneDrive/Documents/bi
gdata/classification.py
    fruit_label fruit_name     fruit_subtype  mass  width  height  color_score
0             1      apple      granny_smith   192    8.4     7.3         0.55
1             1      apple      granny_smith   180    8.0     6.8         0.59
2             1      apple      granny_smith   176    7.4     7.2         0.60
3             2   mandarin          mandarin    86    6.2     4.7         0.80
4             2   mandarin          mandarin    84    6.0     4.6         0.79
5             2   mandarin          mandarin    80    5.8     4.3         0.77
6             2   mandarin          mandarin    80    5.9     4.3         0.81
7             2   mandarin          mandarin    76    5.8     4.0         0.81
8             1      apple          braeburn   178    7.1     7.8         0.92
9             1      apple          braeburn   172    7.4     7.0         0.89
10            1      apple          braeburn   166    6.9     7.3         0.93
11            1      apple          braeburn   172    7.1     7.6         0.92
12            1      apple          braeburn   154    7.0     7.1         0.88
13            1      apple  golden_delicious   164    7.3     7.7         0.70
14            1      apple  golden_delicious   152    7.6     7.3         0.69
15            1      apple  golden_delicious   156    7.7     7.1         0.69
16            1      apple  golden_delicious   156    7.6     7.5         0.67
17            1      apple  golden_delicious   168    7.5     7.6         0.73
18            1      apple       cripps_pink   162    7.5     7.1         0.83
19            1      apple       cripps_pink   162    7.4     7.2         0.85
20            1      apple       cripps_pink   160    7.5     7.5         0.86
21            1      apple       cripps_pink   156    7.4     7.4         0.84
22            1      apple       cripps_pink   140    7.3     7.1         0.87
23            1      apple       cripps_pink   170    7.6     7.9         0.88
24            3     orange     spanish_jumbo   342    9.0     9.4         0.75
25            3     orange     spanish_jumbo   356    9.2     9.2         0.75
26            3     orange     spanish_jumbo   362    9.6     9.2         0.74
27            3     orange  selected_seconds   204    7.5     9.2         0.77
28            3     orange  selected_seconds   140    6.7     7.1         0.72
29            3     orange  selected_seconds   160    7.0     7.4         0.81
30            3     orange  selected_seconds   158    7.1     7.5         0.79
31            3     orange  selected_seconds   210    7.8     8.0         0.82
32            3     orange  selected_seconds   164    7.2     7.0         0.80
33            3     orange      turkey_navel   190    7.5     8.1         0.74
34            3     orange      turkey_navel   142    7.6     7.8         0.75
35            3     orange      turkey_navel   150    7.1     7.9         0.75
36            3     orange      turkey_navel   160    7.1     7.6         0.76
37            3     orange      turkey_navel   154    7.3     7.3         0.79
```



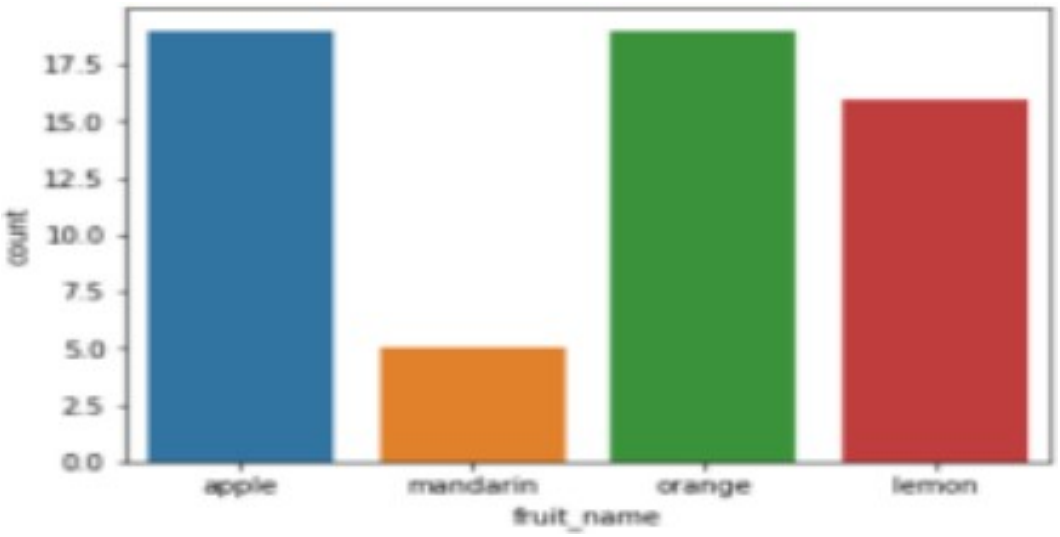
```
PROBLEMS 2   OUTPUT   DEBUG CONSOLE   TERMINAL

38          3     orange      turkey_navel   158   7.2    7.8        0.77
39          3     orange      turkey_navel   144   6.8    7.4        0.75
40          3     orange      turkey_navel   154   7.1    7.5        0.78
41          3     orange      turkey_navel   180   7.6    8.2        0.79
42          3     orange      turkey_navel   154   7.2    7.2        0.82
43          4      lemon    spanish_belsan   194   7.2   10.3        0.70
44          4      lemon    spanish_belsan   200   7.3   10.5        0.72
45          4      lemon    spanish_belsan   186   7.2    9.2        0.72
46          4      lemon    spanish_belsan   216   7.3   10.2        0.71
47          4      lemon    spanish_belsan   196   7.3    9.7        0.72
48          4      lemon    spanish_belsan   174   7.3   10.1        0.72
49          4      lemon           unknown   132   5.8    8.7        0.73
50          4      lemon           unknown   130   6.0    8.2        0.71
51          4      lemon           unknown   116   6.0    7.5        0.72
52          4      lemon           unknown   118   5.9    8.0        0.72
53          4      lemon           unknown   120   6.0    8.4        0.74
54          4      lemon           unknown   116   6.1    8.5        0.71
55          4      lemon           unknown   116   6.3    7.7        0.72
56          4      lemon           unknown   116   5.9    8.1        0.73
57          4      lemon           unknown   152   6.5    8.5        0.72
58          4      lemon           unknown   118   6.1    8.1        0.70
['apple' 'mandarin' 'orange' 'lemon']
(59, 7)
PS C:\Users\Dell\OneDrive\Documents\bigdata>
```

[B]: Fruit Type Distribution

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
fruits = pd.read_table("C:\\Users\\Dell\\OneDrive\\Documents\\Rahul
Kewat\\IPCV\\images\\fruit_data_with_colors.txt")
a=fruits.groupby("fruit_name").size()
print(a)

a["fruit_name"]=a.index
sns.countplot(x="fruit_name",data=fruits)
plt.show
```

Output:

```
PROBLEMS 2  OUTPUT  DEBUG CONSOLE  TERMINAL

PS C:\Users\Dell\OneDrive\Documents\bigdata> & C:/Users/Dell/AppData/Local/Programs/Python/Python310/python.exe c:/Users/Dell/OneDrive/Documents/bi
gdata/distribustion.py
fruit_name
apple       19
lemon       16
mandarin     5
orange      19
dtype: int64
PS C:\Users\Dell\OneDrive\Documents\bigdata>
```



Practical 6

Aim: Build a Clustering Model

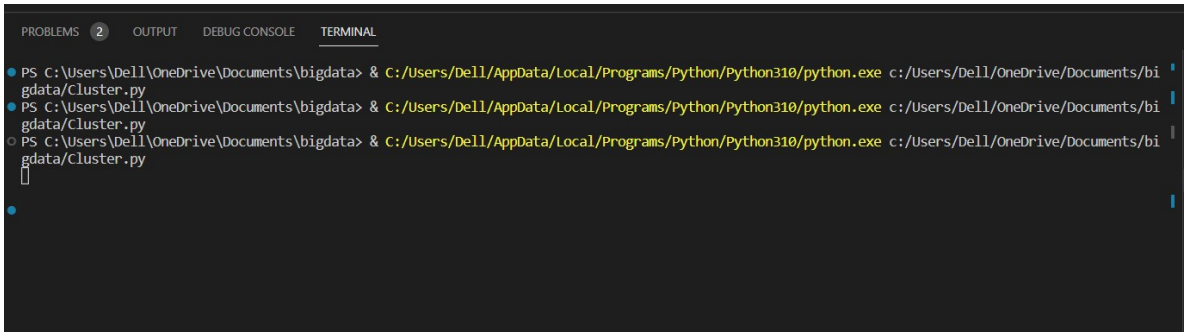
Writeup:

[A]: Build a Clustering Model

Code:

```
from numpy import unique
from numpy import where
from sklearn.datasets import make_classification
from sklearn.cluster import KMeans
# synthetic classification dataset
from numpy import where
from sklearn.datasets import make_classification
from matplotlib import pyplot
# define dataset
X, y = make_classification(n_samples=1000, n_features=2, n_informative=2,
n_redundant=0, n_clusters_per_class=1, random_state=4)
# create scatter plot for samples from each class
for class_value in range(2):
 # get row indexes for samples with this class
 row_ix = where(y == class_value)
 # create scatter of these samples
pyplot.scatter(X[row_ix, 0], X[row_ix, 1])
# show the plot
pyplot.show()
```

Output:



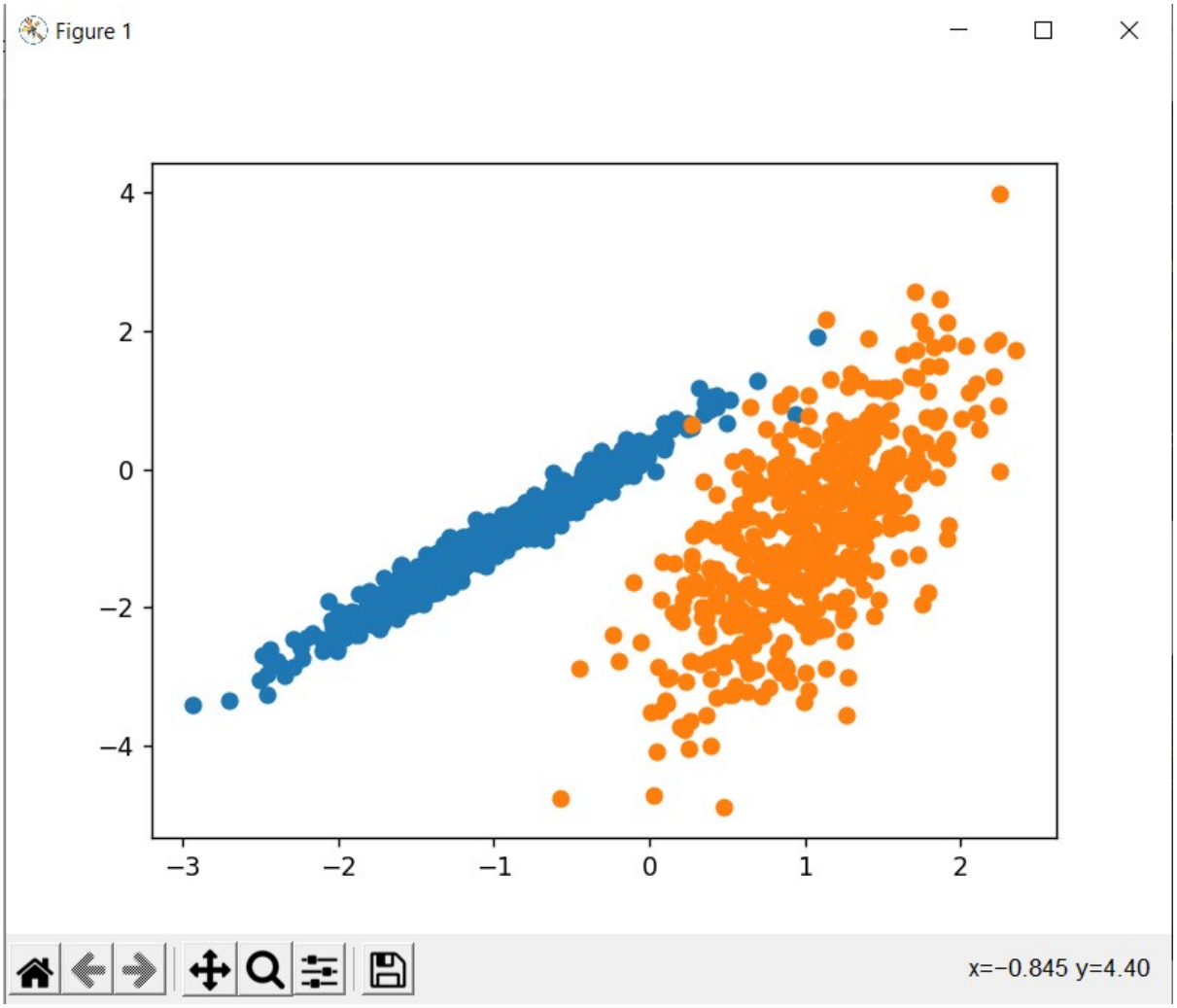


Figure 1
4
2
0
−2
−4
−3
−2
−1
0
1
2
x=−0.845 y=4.40

Practical 7

Aim: Install, configure and run Hadoop and HDFS and explore HDFS

Writeup:

Pre-requisites:

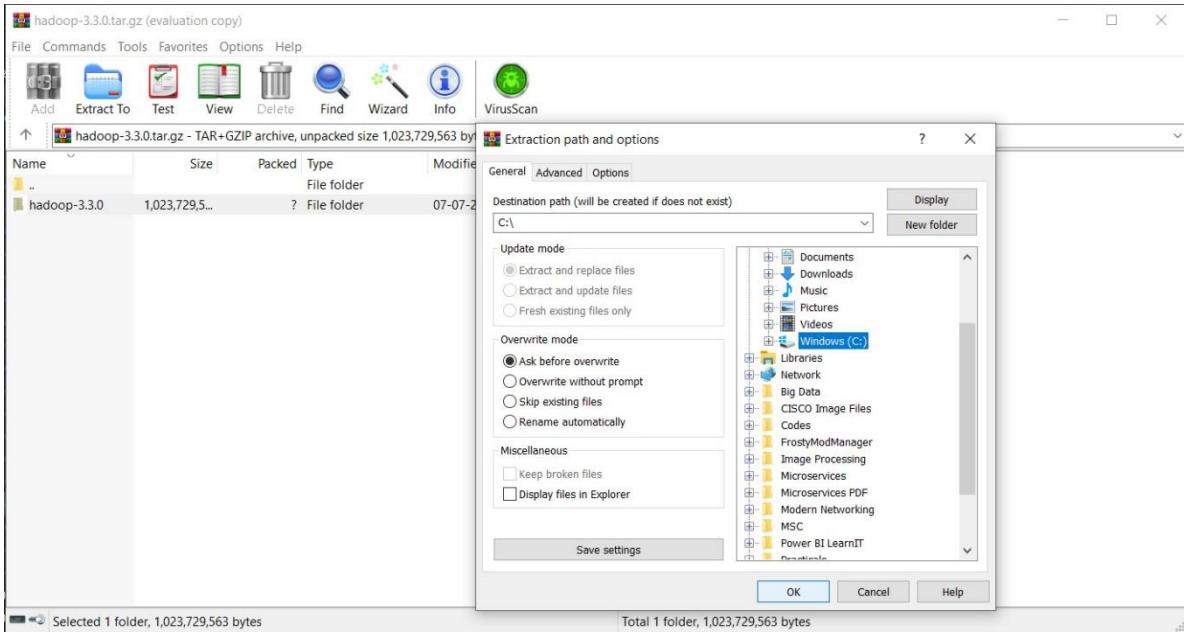
- **Java JDK 8.0**
- **Apache Hadoop 3.3.4 from (https://www.apache.org/dyn/closer.cgi/hadoop/common/hadoop-3.3.4/hadoop-3.3.4-src.tar.gz)**

Step 1: Check Java version with command **javac -version.**
Open command prompt and type the above command.

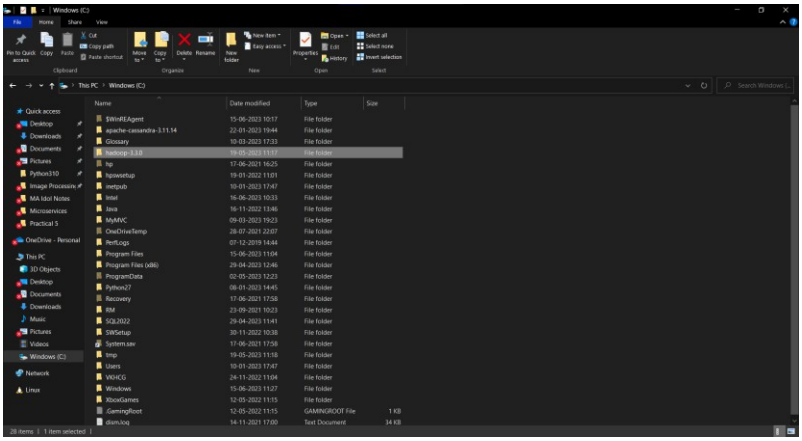
Output:

```
Microsoft Windows [Version 10.0.19045.3086]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Sheldon>javac -version
javac 1.8.0_352

C:\Users\Sheldon>
```

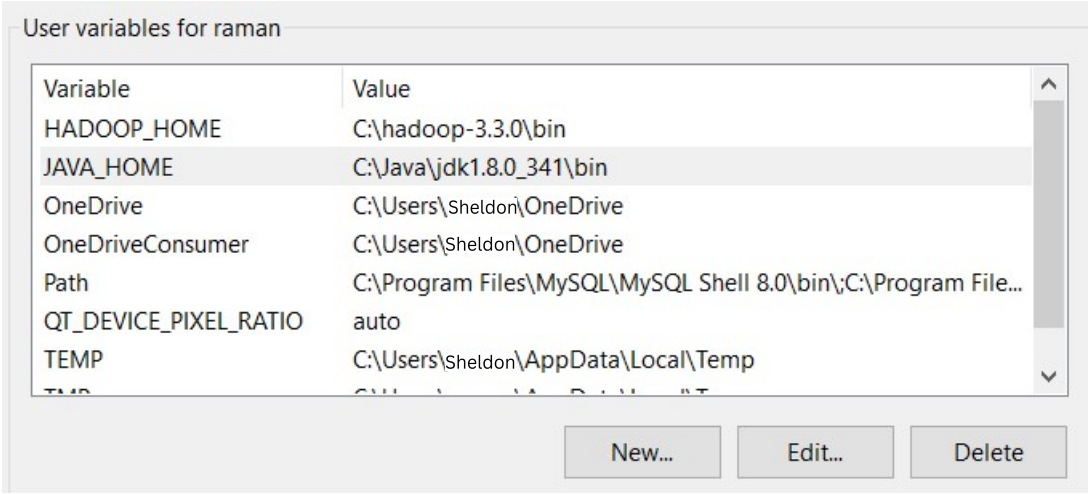
Step 2: Extract the Hadoop files from the compressed folder to the C- Drive Directory



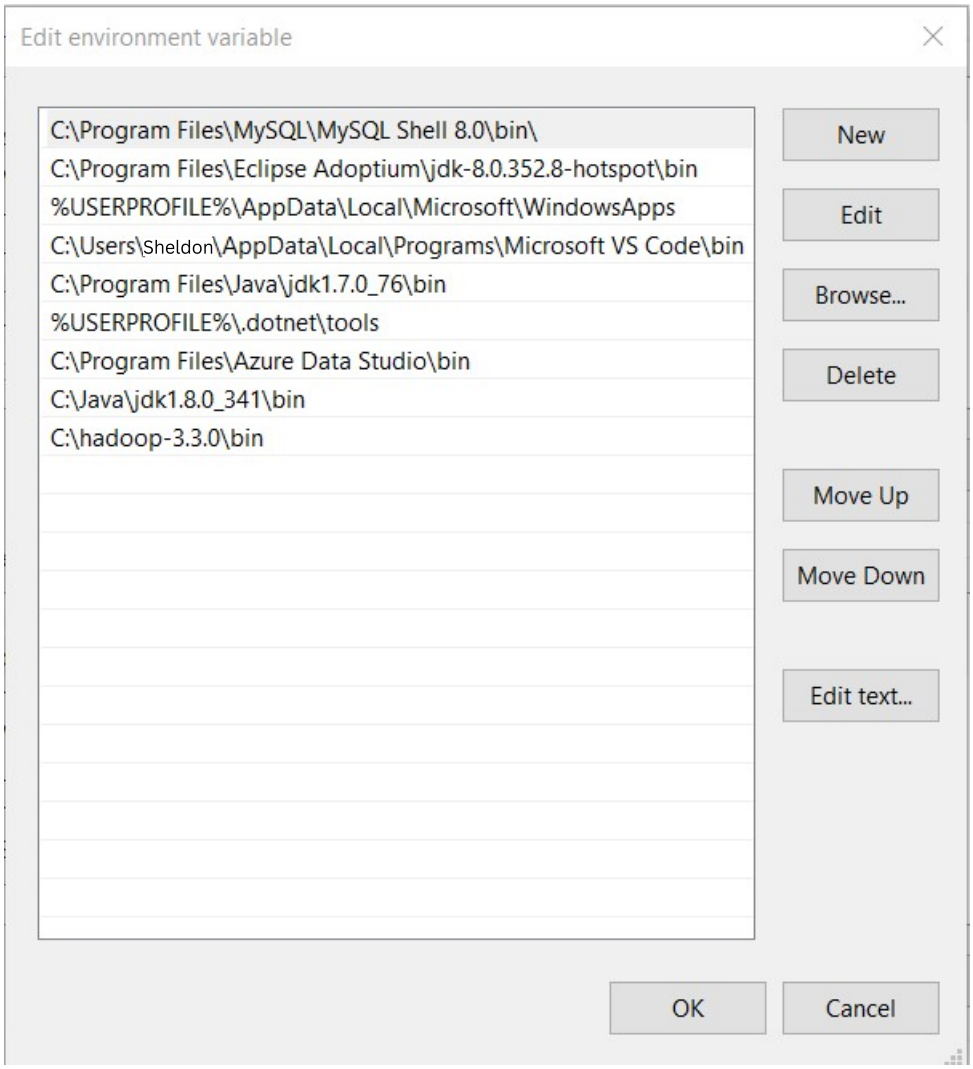
Ensure that both the Hadoop Folder as well as the JAVA folder are in the Main Directory of the C-Drive.



Step 3: Configure the Environment Variables for **JAVA_HOME** and **HADOOP_HOME**.



Also check the Path attribute within the environment variables and create the necessary locations for Hadoop and Java.



Step 4: Configuring Hadoop Files.

- Edit file C:/Hadoop-3.3.0/etc/hadoop/core-site.xml

Code:

```
<configuration>
        <property>
                <name>fs.defaultFS</name>
                <value>hdfs://localhost:9000</value>
        </property>
</configuration>
```

Paste the above code within the configuration file.

- Rename “mapred-site.xml.template” to “mapred-site.xml” and edit this file C:/Hadoop3.3.0/etc/hadoop/mapred-site.xml

Code:

```
<configuration>
        <property>
                <name>mapreduce.framework.name</name>
                <value>yarn</value>
        </property>
</configuration>
```

Paste the above code within the configuration file.

- **Creating Folders:-**
  - Create folder "data" under "C:\Hadoop-3.3.0"
  - Create folder "datanode" under "C:\Hadoop-3.3.0\data"
  - Create folder "namenode" under "C:\Hadoop-3.3.0\data"

- Edit file C:\Hadoop-3.3.0/etc/hadoop/hdfs-site.xml

Code:

```
<configuration>
        <property>
                <name>dfs.replication</name>
                <value>1</value>
        </property>
        <property>
                <name>dfs.namenode.name.dir</name>
                <value>/hadoop-3.3.0/data/namenode</value>
        </property>
        <property>
                 <name>dfs.datanode.data.dir</name>
                 <value>/hadoop-3.3.0/data/datanode</value>
        </property>
</configuration>
```

Paste the above code in the configuration file.

- Edit file C:/Hadoop-3.3.0/etc/hadoop/yarn-site.xml

Code:

```
<configuration>
        <property>
                <name>yarn.nodemanager.aux-services</name>
                <value>mapreduce_shuffle</value>
        </property>
        <property>
                <name>yarn.nodemanager.auxservices.mapreduce.shuffle.class</name>
                <value>org.apache.hadoop.mapred.ShuffleHandler</value>
        </property>
```

</configuration>

Paste the above code in the configuration file.

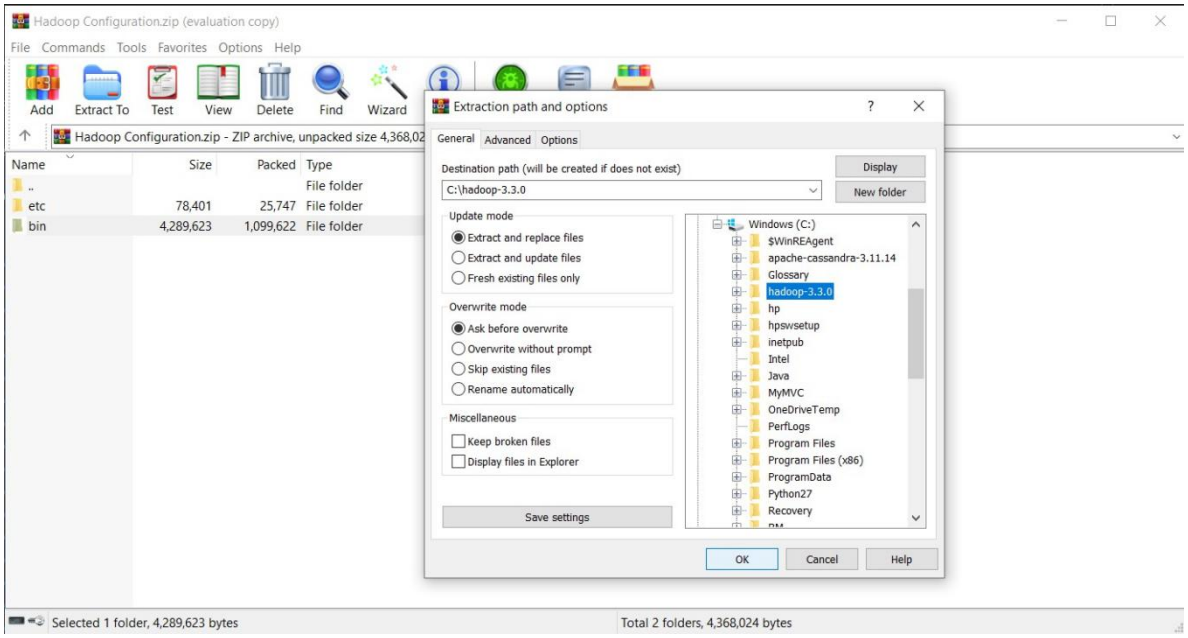
- Edit file C:/Hadoop-3.3.0/etc/hadoop/hadoop-env.cmd

Search for the line:- "**JAVA_HOME=%JAVA_HOME%**" Replace the above line with **set JAVA_HOME = C:\Java\jdk version you have downloaded\"**
It should look like this:

```
@rem The java implementation to use.  Required.
set JAVA_HOME=C:\Java\jdk1.8.0_341\
```

Step 5: Hadoop Configurations

- From the Downloaded Hadoop configuration file extract the **bin** folder and replace it with the **bin** folder in the Hadoop Main Directory.



Step 6: Starting Hadoop

- In the Hadoop File Directory, Open a cmd and type in the command **hdfs namenode -format**This is done to test if the instance is working.

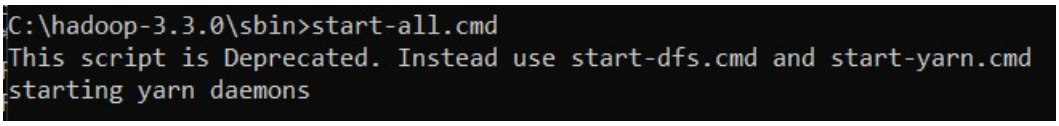
Output:

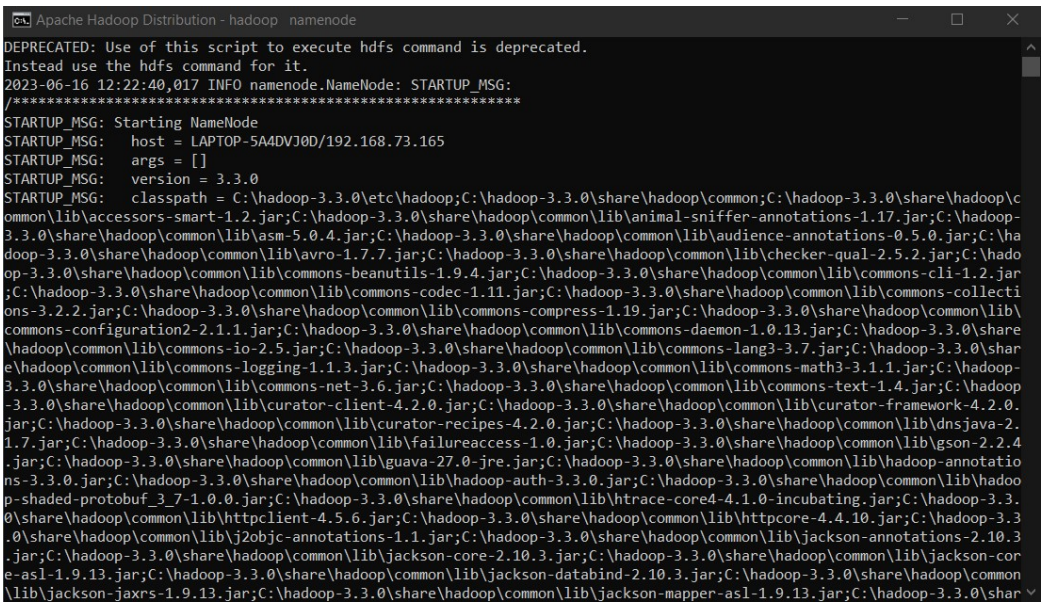
Step 7: Testing Hadoop

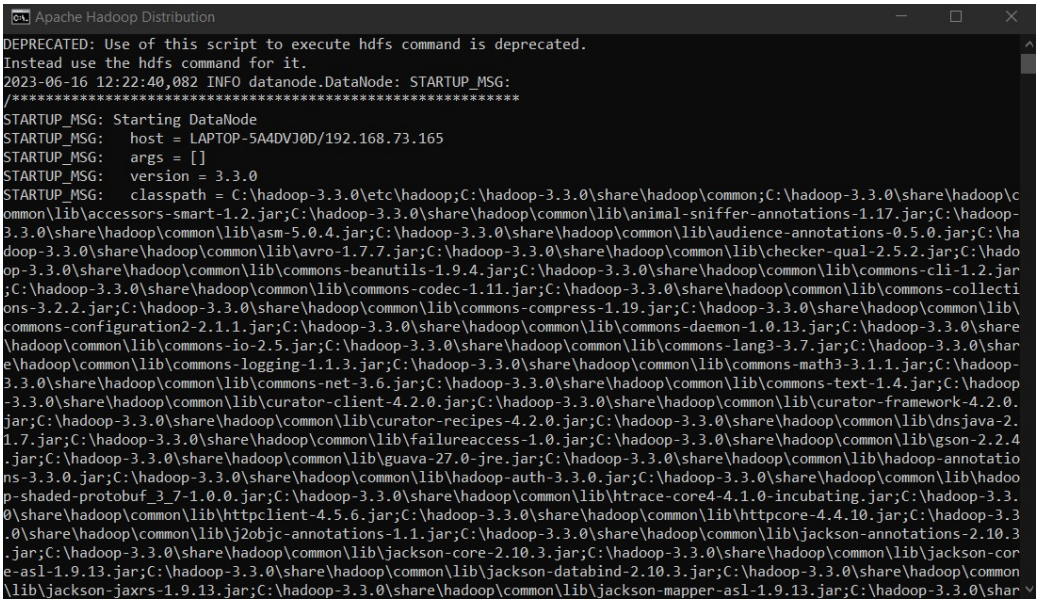
Now within the same cmd created in the previous step change the directory to the **sbin** file within Hadoop.
Type the command: **start-all.cmd**
After execution of the command there should be four instances created:

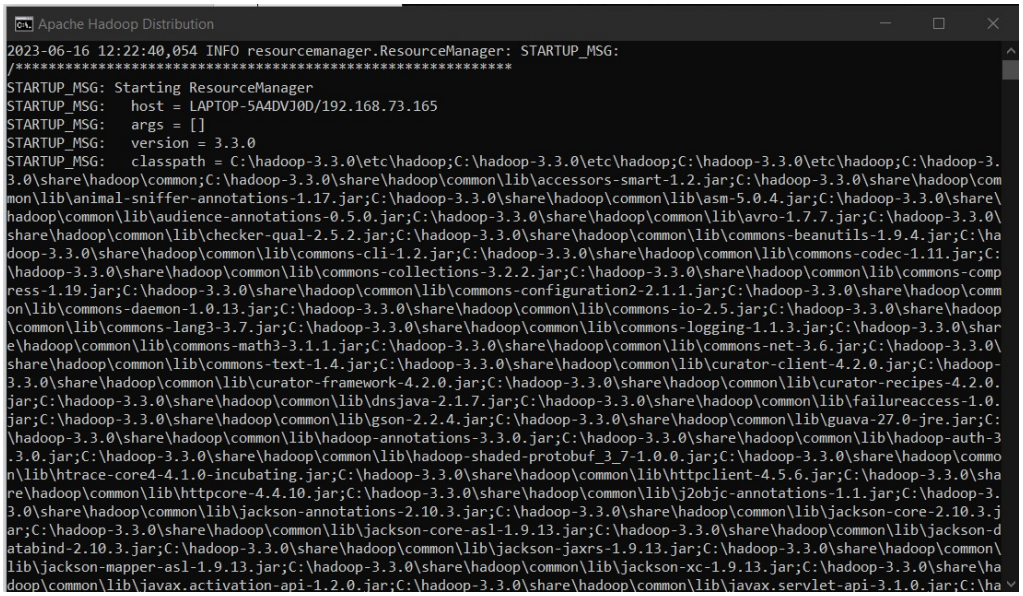
- **Hadoop Namenode**
- **Hadoop datanode**
- **YARN Resource Manager**
- **YARN Node Manager**

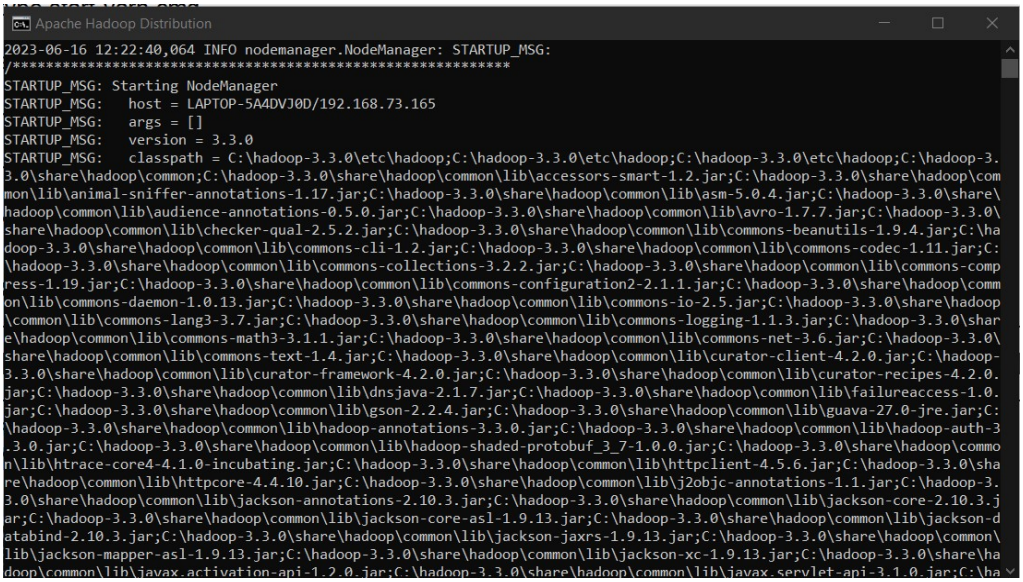
Output:






Apache Hadoop Distribution
DEPRECATED: Use of this script to execute hdfs command is deprecated.
Instead use the hdfs command for it.
2023-06-16 12:22:40,082 INFO datanode.DataNode: STARTUP_MSG:
/**
STARTUP_MSG: Starting DataNode
STARTUP_MSG: host = LAPTOP-5A4DVJ0D/192.168.73.165
STARTUP_MSG: args = []
STARTUP_MSG: version = 3.3.0
STARTUP_MSG: classpath = C:\hadoop-3.3.0\etc\hadoop;C:\hadoop-3.3.0\share\hadoop\common;C:\hadoop-3.3.0\share\hadoop\common\lib\accessors-smart-1.2.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\animal-sniffer-annotations-1.17.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\asm-5.0.4.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\audience-annotations-0.5.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\avro-1.7.7.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\checker-qual-2.5.2.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-beanutils-1.9.4.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-cli-1.2.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-codec-1.11.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-collections-3.2.2.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-compress-1.19.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-configuration2-2.1.1.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-daemon-1.0.13.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-io-2.5.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-lang3-3.7.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-logging-1.1.3.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-math3-3.1.1.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-net-3.6.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-text-1.4.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\curator-client-4.2.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\curator-framework-4.2.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\curator-recipes-4.2.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\dnsjava-2.1.7.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\failureaccess-1.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\gson-2.2.4.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\guava-27.0-jre.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\hadoop-annotations-3.3.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\hadoop-auth-3.3.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\hadoop-shaded-protobuf_3_7-1.0.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\htrace-core4-4.1.0-incubating.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\httpclient-4.5.6.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\httpcore-4.4.10.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\j2objc-annotations-1.1.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-annotations-2.10.3.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-core-2.10.3.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-core-asl-1.9.13.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-databind-2.10.3.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-jaxrs-1.9.13.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-mapper-asl-1.9.13.jar;C:\hadoop-3.3.0\shar


Apache Hadoop Distribution
2023-06-16 12:22:40,054 INFO resourcemanager.ResourceManager: STARTUP_MSG:
/**
STARTUP_MSG: Starting ResourceManager
STARTUP_MSG: host = LAPTOP-5A4DVJ0D/192.168.73.165
STARTUP_MSG: args = []
STARTUP_MSG: version = 3.3.0
STARTUP_MSG: classpath = C:\hadoop-3.3.0\etc\hadoop;C:\hadoop-3.3.0\etc\hadoop;C:\hadoop-3.3.0\etc\hadoop;C:\hadoop-3.3.0\share\hadoop\common;C:\hadoop-3.3.0\share\hadoop\common\lib\accessors-smart-1.2.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\animal-sniffer-annotations-1.17.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\asm-5.0.4.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\audience-annotations-0.5.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\avro-1.7.7.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\checker-qual-2.5.2.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-beanutils-1.9.4.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-cli-1.2.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-codec-1.11.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-collections-3.2.2.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-compress-1.19.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-configuration2-2.1.1.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-daemon-1.0.13.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-io-2.5.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-lang3-3.7.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-logging-1.1.3.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-math3-3.1.1.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-net-3.6.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-text-1.4.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\curator-client-4.2.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\curator-framework-4.2.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\curator-recipes-4.2.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\dnsjava-2.1.7.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\failureaccess-1.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\gson-2.2.4.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\guava-27.0-jre.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\hadoop-annotations-3.3.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\hadoop-auth-3.3.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\hadoop-shaded-protobuf_3_7-1.0.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\htrace-core4-4.1.0-incubating.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\httpclient-4.5.6.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\httpcore-4.4.10.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\j2objc-annotations-1.1.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-annotations-2.10.3.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-core-2.10.3.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-core-asl-1.9.13.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-databind-2.10.3.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-jaxrs-1.9.13.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-mapper-asl-1.9.13.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-xc-1.9.13.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\javax.activation-api-1.2.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\javax.servlet-api-3.1.0.jar;C:\ha


Apache Hadoop Distribution
2023-06-16 12:22:40,064 INFO nodemanager.NodeManager: STARTUP_MSG:
/**
STARTUP_MSG: Starting NodeManager
STARTUP_MSG: host = LAPTOP-5A4DVJ0D/192.168.73.165
STARTUP_MSG: args = []
STARTUP_MSG: version = 3.3.0
STARTUP_MSG: classpath = C:\hadoop-3.3.0\etc\hadoop;C:\hadoop-3.3.0\etc\hadoop;C:\hadoop-3.3.0\etc\hadoop;C:\hadoop-3.3.0\share\hadoop\common;C:\hadoop-3.3.0\share\hadoop\common\lib\accessors-smart-1.2.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\animal-sniffer-annotations-1.17.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\asm-5.0.4.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\audience-annotations-0.5.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\avro-1.7.7.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\checker-qual-2.5.2.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-beanutils-1.9.4.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-cli-1.2.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-codec-1.11.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-collections-3.2.2.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-compress-1.19.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-configuration2-2.1.1.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-daemon-1.0.13.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-io-2.5.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-lang3-3.7.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-logging-1.1.3.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-math3-3.1.1.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-net-3.6.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\commons-text-1.4.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\curator-client-4.2.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\curator-framework-4.2.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\curator-recipes-4.2.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\dnsjava-2.1.7.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\failureaccess-1.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\gson-2.2.4.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\guava-27.0-jre.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\hadoop-annotations-3.3.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\hadoop-auth-3.3.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\hadoop-shaded-protobuf_3_7-1.0.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\htrace-core4-4.1.0-incubating.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\httpclient-4.5.6.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\httpcore-4.4.10.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\j2objc-annotations-1.1.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-annotations-2.10.3.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-core-2.10.3.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-core-asl-1.9.13.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-databind-2.10.3.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-jaxrs-1.9.13.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-mapper-asl-1.9.13.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\jackson-xc-1.9.13.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\javax.activation-api-1.2.0.jar;C:\hadoop-3.3.0\share\hadoop\common\lib\javax.servlet-api-3.1.0.jar;C:\ha

Practical 8

Aim: Implement an application that stores big data in MongoDB and manipulate it using Python.

Writeup:

- **Insert data :**

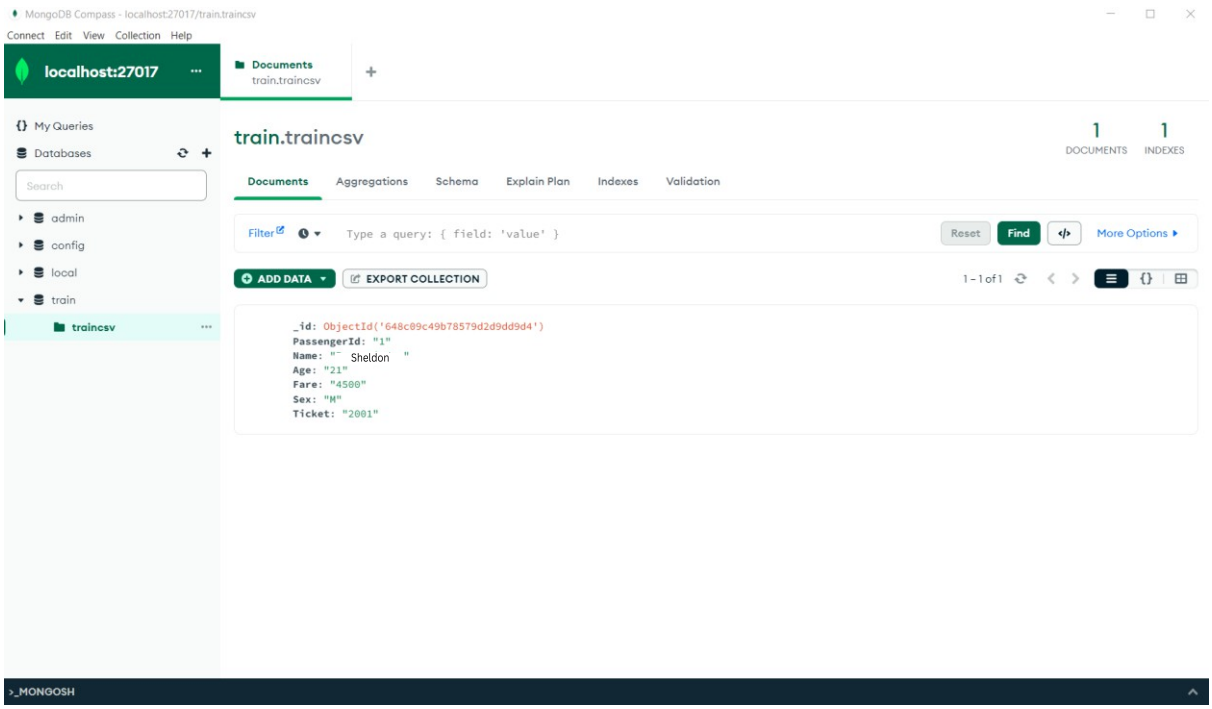
Code:

```
from pymongo import MongoClient
client= MongoClient('localhost:27017')
db = client.train

def insert():
    try:
        Id =input(' Enter traincsv Passenger Id: ')
        Name =input('Enter Name: ')
        Age =input('Enter age: ')
        Fare =input('Enter Fare: ')
        Sex =input('Enter Sex: ')
        Ticket =input('Enter Ticket: ')
        db.traincsv.insert_one(
            {
                "PassengerId": Id,
                "Name":Name,
                "Age":Age,
                "Fare":Fare,
                "Sex":Sex,
                "Ticket":Ticket,
                })
        print("\nInserted data successfully\n")

    except Exception as e:
        print(str(e))

insert()
```

Output:

```
PS C:\Users\Sheldon\BigData> python '.\INSERT Operation.py'
 Enter traincsv Passenger Id: 1
Enter Name: Sheldon
Enter age: 21
Enter Fare: 4500
Enter Sex: M
Enter Ticket: 2001

Inserted data successfully

PS C:\Users\Sheldon\BigData>
```

Confirm that the data has been inserted by using MongoDB Compass to check whether the data has been inserted into the database.



- **Find Data:**

Code:

```
from pymongo import MongoClient
client= MongoClient('localhost:27017')
db = client.train

def read():
    try:
        TrainCol =db.traincsv.find()
        print("All Data From Train \n")

        for Train in TrainCol:
            print(Train)

    except Exception as e:
        print(str(e))

read()
```

Output:

```
PS C:\Users\Sheldon\BigData> python '.\FIND Operation.py'
All Data From Train

{'_id': ObjectId('648c09c49b78579d2d9dd9d4'), 'PassengerId': '1', 'Name': ' Sheldon ', 'Age': '21', 'Fare': '4500', 'Sex': 'M', 'Ticket': '2001'}
PS C:\Users\Sheldon\BigData>
```

- **Update Data:**

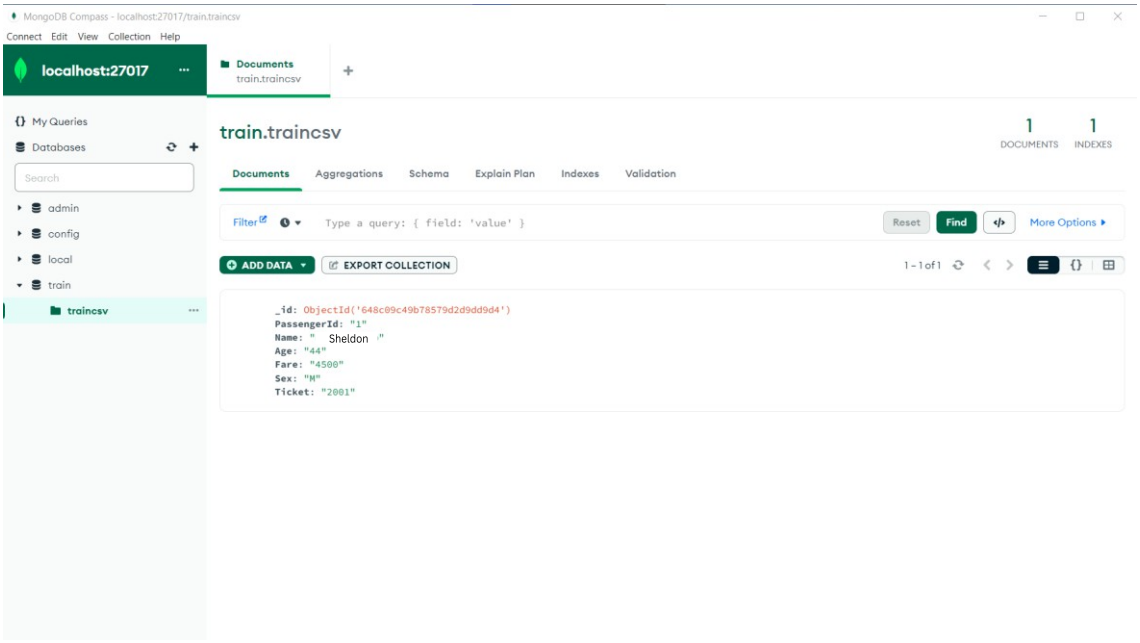
Code:

```
from pymongo import MongoClient
client= MongoClient('localhost:27017')
db = client.train

def update():
    try:
        name = input("Enter the Name to Update: ")
        age = input("Enter the Age to Update: ")

        db.traincsv.update_one({"Name": name},
                               {"$set": {"Age": age} }
                                )

        print("Record has been Updated")

    except Exception as e:
        print(str(e))

update()
```

Output:

```
PS C:\Users\Sheldon\BigData> python '.\UPDATE Operation.py'
Enter the Name to Update: Sheldon
Enter the Age to Update: 44
Record has been Updated
PS C:\Users\Sheldon\BigData>
```

Check on Mongo Compass as well



- **Delete Data:**

Code:

```
from pymongo import MongoClient

client = MongoClient("localhost:27017")

db = client.train

def delete():
    try:
        value = input("\n Enter the Name to Delete: ")
        db.traincsv.delete_one({"Name":value})
        print("\n DELETION SUCCESSFUL \n")

    except Exception as e:
        print(str(e))

delete()
```

Output:

```
PS C:\Users\Sheldon\BigData> python '.\DELETE Operation.py'
 Enter the Name to Delete: Sheldon

 DELETION SUCCESSFUL

PS C:\Users\Sheldon\BigData>
```

Check on Mongo Compass as well