MASTER OF COMPUTER APPLICATIONS

BIG DATA ANALYTICS LAB

LAB REPORT

III SEMESTER

Faculty In-Charge

Prof. R Padmaja

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SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

(Approved by AICTE, New Delhi, Affiliated to JNTUA, Anantapuramu)

Murukambattu, Chittoor-517127

2023-2024

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

Chittoor-517127

MCA DEPARTMENT

Reg. No:

BIG DATA ANALYTICS LAB

This is to certify that this is the bonafide record work done in the laboratory by the candidate _____ studying MCA III Semester during the year 2023-2024.

No. of experiments conducted: **No. of experiments attended:**

Faculty In-Charge **HOD**

Submitted for the practical exam held on_____.

Internal Examiner **External Examiner**

INDEX

S. No	Date	Name of the Experiment	Page. No.	Initial's
1		Basic HDFS Commands		
2		Word Count Program Using Map Reduce Component		
3		Weather Data Analysis Using MapReduce		
4		Pig Data Processing Operators		
5		Pig Eval Functions		
6		Pig String Functions		
7		Pig Math Functions		
8		Weather Dataset Analysis using PigLatin		
9		Basic Hive Commands		
10		Hive Partitions		

RUBRICS FOR BIG DATA ANALYTICS LAB

	Excellent(3)	Good(2)	Fair(1)
Conduct Experiments (CO1)	Student successfully completes the experiment, records the data, analyses the experiment's main topics, and explains the experiment concisely and well.	Student successfully completes the experiment, records the data, and analyses the experiment's main topics	Student successfully completes the experiment, records the data, and unable to analyses.
Analysis and Synthesis (CO2)	Thorough analysis of the problem designed	Reasonable analysis of the given problem	Improper analysis of the given problem
Design (CO3)	Student understands what needs to be tested and designs an appropriate experiment, and explains the experiment concisely and well	Student understands what needs to be tested and designs an appropriate experiment.	Student understands what needs to be tested and does not design an appropriate experiment.
Complex Analysis & Conclusion (CO4)	Thorough comprehension through analysis/ synthesis	Reasonable comprehension through analysis/ synthesis	Improper comprehension through analysis/ synthesis
Use modern tools in engineering practice (CO5)	Student uses the tools to measure correctly, and understands the limitations of the hardware.	Student uses the tools to measure correctly.	Student uses the tools correctly, and unable to measure properly.
Report Writing (CO6)	Status report with clear and logical sequence of parameter using excellent language	Status report with logical sequence of parameter using understandable language	Status report not properly organized
Lab safety (CO7)	Student will demonstrate good understanding and follow lab safety	Student will demonstrate good understanding of lab safety	Students demonstrate a little knowledge of lab safety.
Ability to work in teams (CO8)	Performance on teams is excellent with clear evidence of equal distribution of tasks and effort	Performance on teams is good with equal distribution of tasks and effort	Performance on teams is acceptable with one or more members carrying a larger amount of the effort
Continuous learning (CO9)	Highly enthusiastic towards continuous learning	Interested in continuous learning	Inadequate interest in continuous learning

INDEX SHEET

S. No	Experiment Name	Knowledge Gained	Analysis, Design and use of Modern Tool/Technique	Ability of doing experiment and following of ethical principles	Result &Conclusion	VIVA VOCE Communication, Long Learning)	Total	Signature of the Faculty
		10	10	5	5	10	40	
1	Basic HDFS Commands							
2	Word Count Program Using Map Reduce Component							
3	Weather Data Analysis Using MapReduce							
4	Pig Data Processing Operators							
5	Pig Eval Functions							
6	Pig String Functions							
7	Pig Math Functions							
8	Weather Dataset Analysis using PigLatin							
9	Basic Hive Commands							
10	Hive Partitions							

ATTAINMENT LEVELS

S. No	Experiment Name	CO1	CO2	CO3	CO4	CO5	CO6	CO7	C08	C09
		Knowledg	Analysis	Design	Complex Analysis & Conclusior	Use of modern tools	Communica ability	Ethics	Individual /tear work	Life Lon Learning
1	Basic HDFS Commands									
2	Word Count Program Using Map Reduce Component									
3	Weather Data Analysis Using MapReduce									
4	Pig Data Processing Operators									
5	Pig Eval Functions									
6	Pig String Functions									
7	Pig Math Functions									
8	Weather Dataset Analysis using PigLatin									
9	Basic Hive Commands									
10	Hive Partitions									
Total Attainment(B1)										

1) ls: To display a list of the contents of a directory

[root@sandbox ~] ¦ hadoop fs -ls /

Found 14 items

drwxr-xr-x	- root	hdfs	0 2019-10-14 09:08 /MR
drwxrwxrwx	- yarn	hadoop	0 2016-03-14 14:19 /app-logs
drwxr-xr-x	- hdfs	hdfs	0 2016-03-14 14:25 /apps
drwxr-xr-x	- yarn	hadoop	0 2016-03-14 14:19 /ats
drwxr-xr-x	- hdfs	hdfs	0 2016-03-14 14:50 /demo
drwxr-xr-x	- hdfs	hdfs	0 2016-03-14 14:19 /hdp
drwxr-xr-x	- mapred	hdfs	0 2016-03-14 14:19 /mapred
drwxrwxrwx	- mapred	hadoop	0 2016-03-14 14:19 /mr-history
drwxr-xr-x	- root	hdfs	0 2019-10-14 10:12 /myfiles
drwxr-xr-x	- root	hdfs	0 2019-10-14 08:52 /new
drwxr-xr-x	- hdfs	hdfs	0 2016-03-14 14:42 /ranger
drwxrwxrwx	- spark	hadoop	0 2019-02-21 11:51 /spark-history
drwxrwxrwx	- hdfs	hdfs	0 2016-03-14 14:31 /tmp
drwxr-xr-x	- hdfs	hdfs	0 2019-10-14 08:48 /user

2) mkdir: To Create a Directory in HDFS

[root@sandbox ~]# hadoop fs -mkdir new

[root@sandbox ~]# hadoop fs -ls / Found

14 items

drwxr-xr-x	- root	hdfs	0 2019-10-14 09:08 /MR
drwxrwxrwx	- yarn	hadoop	0 2016-03-14 14:19 /app-logs
drwxr-xr-x	- hdfs	hdfs	0 2016-03-14 14:25 /apps
drwxr-xr-x	- yarn	hadoop	0 2016-03-14 14:19 /ats
drwxr-xr-x	- hdfs	hdfs	0 2016-03-14 14:50 /demo
drwxr-xr-x	- hdfs	hdfs	0 2016-03-14 14:19 /hdp

drwxr-xr-x - mapred hdfs 0 2016-03-14 14:19 /mapred

drwxrwxrwx - mapred hadoop 0 2016-03-14 14:19 /mr-history

drwxr-xr-x - root hdfs 0 2019-10-14 10:12 /myfiles

drwxr-xr-x - root hdfs 0 2019-10-14 08:52 /new

drwxr-xr-x - hdfs hdfs 0 2016-03-14 14:42 /ranger

drwxrwxrwx - spark hadoop 0 2019-02-21 11:51 /spark-history

drwxrwxrwx - hdfs hdfs 0 2016-03-14 14:31 /tmp

drwxr-xr-x - hdfs hdfs 0 2019-10-14 08:48 /user

3) put (or) copyFromLocal :copies the file or directory from the local file system to the HDFS

[root@sandbox ~]# cat > FirstFile

This is a Unix File created in Unix Local system which will be pushed to HDFS

^Z

[1]+ Stopped cat > FirstFile

[root@sandbox ~]# cat FirstFile

This is a Unix File created in Unix Local system which will be pushed to HDFS

[root@sandbox ~]# hadoop fs -put FirstFile new/

[root@sandbox ~]# hadoop fs -ls new/

Found 1 items

-rw-r--r-- 3 root hdfs 78 2019-10-31 10:03 new/FirstFile

[root@sandbox ~]# hadoop fs -cat new/FirstFile

This is a Unix File created in Unix Local system which will be pushed to HDFS

[root@sandbox local]# hadoop fs -copyFromLocal file1 new

[root@sandbox local]# hadoop fs -ls new

Found 2 items

-rw-r--r-- 3 root hdfs 78 2019-10-31 10:03 new/FirstFile

-rw-r--r-- 3 root hdfs 42 2019-10-31 10:21 new/file1

4) get (or) copyToLocal :copies the file or directory from the HDFS to Local File System

[root@sandbox ~]# hadoop fs -get new/FirstFile local/

[root@sandbox ~]# cd local

[root@sandbox local]# ls

FirstFile

[root@sandbox local]# cat FirstFile

This is a Unix File created in Unix Local system which will be pushed to HDFS

[root@sandbox ~]# hadoop fs -copyToLocal new/file1 newLocal/

[root@sandbox ~]# ls newLocal

file1

5) cp :copies the file or directory from one location to another in HDFS

[root@sandbox local]# hadoop fs -mkdir /latest

[root@sandbox local]# hadoop fs -cp new/FirstFile /latest

[root@sandbox local]# hadoop fs -ls /latest

Found 1 items

-rw-r--r-- 3 root hdfs 78 2019-10-31 10:16 /latest/FirstFile

[root@sandbox local]# hadoop fs -cat /latest/FirstFile

This is a Unix File created in Unix Local system which will be pushed to HDFS

6) mv :moves the file or directory from one location to another in HDFS

[root@sandbox local]# cat > dummy

This is a dummy file which is created in Unix

^Z

[2]+ Stopped cat > dummy

[root@sandbox local]# cat dummy

This is a dummy file which is created in Unix

[root@sandbox local]# hadoop fs -put dummy new/

[root@sandbox local]# hadoop fs -mv new/dummy /latest/

[root@sandbox local]# hadoop fs -ls latest

[root@sandbox local]# hadoop fs -ls /latest

Found 2 items

-rw-r--r-- 3 root hdfs 78 2019-10-31 10:16 /latest/FirstFile

-rw-r--r-- 3 root hdfs 46 2019-10-31 10:18 /latest/dummy

7) rm,rmdir :removes the file or directory from the HDFS

[root@sandbox ~]# hadoop fs -ls new

Found 2 items

-rw-r--r-- 3 root hdfs 78 2019-10-31 10:03 new/FirstFile

-rw-r--r-- 3 root hdfs 42 2019-10-31 10:21 new/file1

[root@sandbox ~]# hadoop fs -rm new/file1

19/10/31 10:33:42 INFO fs.TrashPolicyDefault: Namenode trash configuration: Deletion interval = 360 minutes, Emptier interval = 0 minutes.

Moved: 'hdfs://sandbox.hortonworks.com:8020/user/root/new/file1' to trash at: hdfs://sandbox.hortonworks.com:8020/user/root/.Trash/Current

[root@sandbox ~]# hadoop fs -ls new

Found 1 items

-rw-r--r-- 3 root hdfs 78 2019-10-31 10:03 new/FirstFile

[root@sandbox ~]# hadoop fs -rmdir new rmdir:

`new': Directory is not empty

[root@sandbox ~]# hadoop fs -rm-r new

-rm-r: Unknown command

[root@sandbox ~]# hadoop fs -rm -r new

19/10/31 10:35:49 INFO fs.TrashPolicyDefault: Namenode trash configuration: Deletion interval = 360 minutes, Emptier interval = 0 minutes.

Moved: 'hdfs://sandbox.hortonworks.com:8020/user/root/new' to trash at: hdfs://sandbox.hortonworks.com:8020/user/root/.Trash/Current

8) touchz : To Create an empty file in HDFS

[root@sandbox ~]# hadoop fs -ls /rpk

Found 1 items

-rw-r--r-- 3 root hdfs 95 2021-01-18 09:42 /rpk/states.txt

[root@sandbox ~]# hadoop fs -touchz /rpk/empty.txt

[root@sandbox ~]# hadoop fs -ls /rpk

Found 2 items

-rw-r--r-- 3 root hdfs 0 2021-01-30 08:34 /rpk/empty.txt

-rw-r--r-- 3 root hdfs 95 2021-01-18 09:42 /rpk/states.txt

9) count : To Count the number of Directories, files and bytes under the path

[root@sandbox ~]# hadoop fs -count /rpk

1 2 95 /rpk

10) usage : Returns the Usage for an Individual command

[root@sandbox ~]# hadoop fs -usage rm

Usage: hadoop fs [generic options] -rm [-f] [-r|-R] [-skipTrash] [-safely] <src> ...

11) help: Displays help for given command or all commands if none is specified

[root@sandbox ~]# hadoop fs -help mkdir

-mkdir [-p] <path> ... :

Create a directory in specified location.

-p Do not fail if the directory already exists

12) du : command to check the file size

[root@sandbox ~]# hadoop fs -du -s /rpk/states.txt

95 /rpk/states.txt

13) appendToFile : Appends the contents of all given local files to the given destination file on HDFS

[root@sandbox ~]# cat > localfile

This is to illustrate appendToFile command

^Z

[1]+ Stopped cat > localfile

[root@sandbox ~]# hadoop fs -appendToFile localfile rpk/empty.txt

[root@sandbox ~]# hadoop fs -cat rpk/empty.txt

This is to illustrate appendToFile command

14) tail : shows the last 1KB of the given file

[root@sandbox ~]# hadoop fs -tail /rpk/states.txt

100,smith,AP

101,jones,TN

102,KIng,AP

103,ram,TN

104,sita,K

105,Lakshman,Kerala

106,aaa,Kerala

15) stat : Prints statistics about the file/directory

[root@sandbox ~]# hadoop fs -stat %b /rpk/states.txt

95

[root@sandbox ~]# hadoop fs -stat %g /rpk/states.txt hdfs

[root@sandbox ~]# hadoop fs -stat %n /rpk/states.txt states.txt

[root@sandbox ~]# hadoop fs -stat %o /rpk/states.txt

134217728

[root@sandbox ~]# hadoop fs -stat %r /rpk/states.txt

3

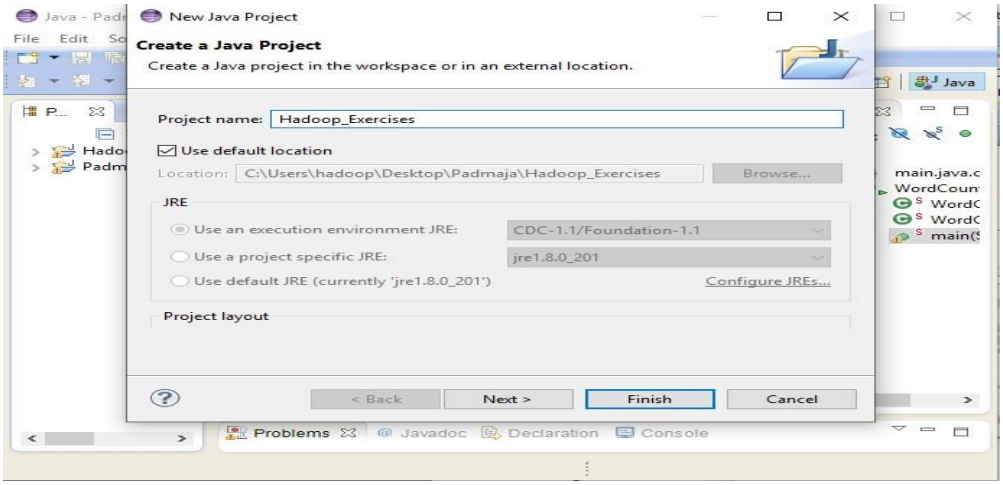
[root@sandbox ~]# hadoop fs -stat %u /rpk/states.txt root

[root@sandbox ~]# hadoop fs -stat %y /rpk/states.txt

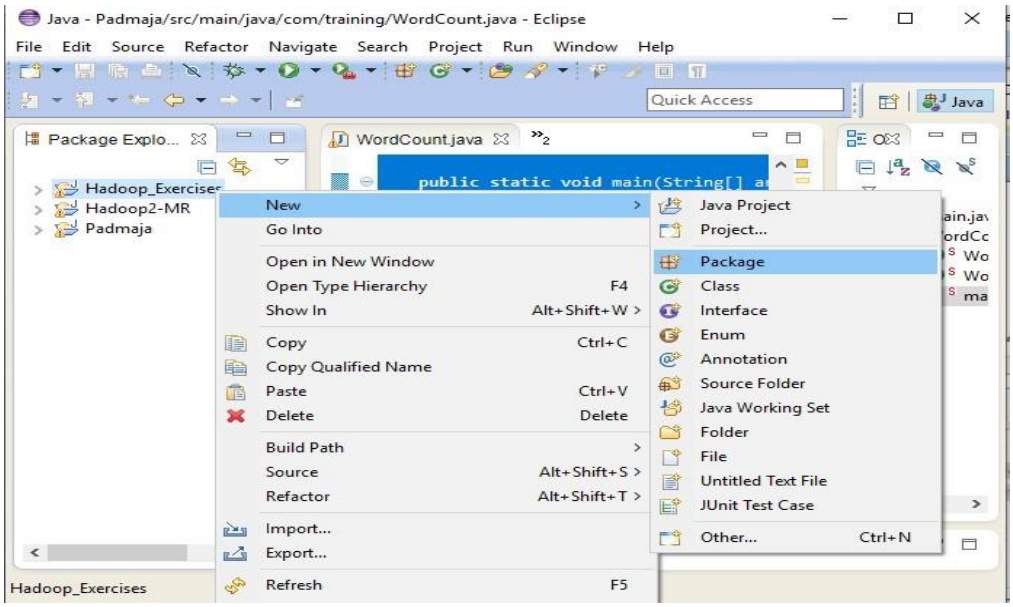
2021-01-18 09:42:33

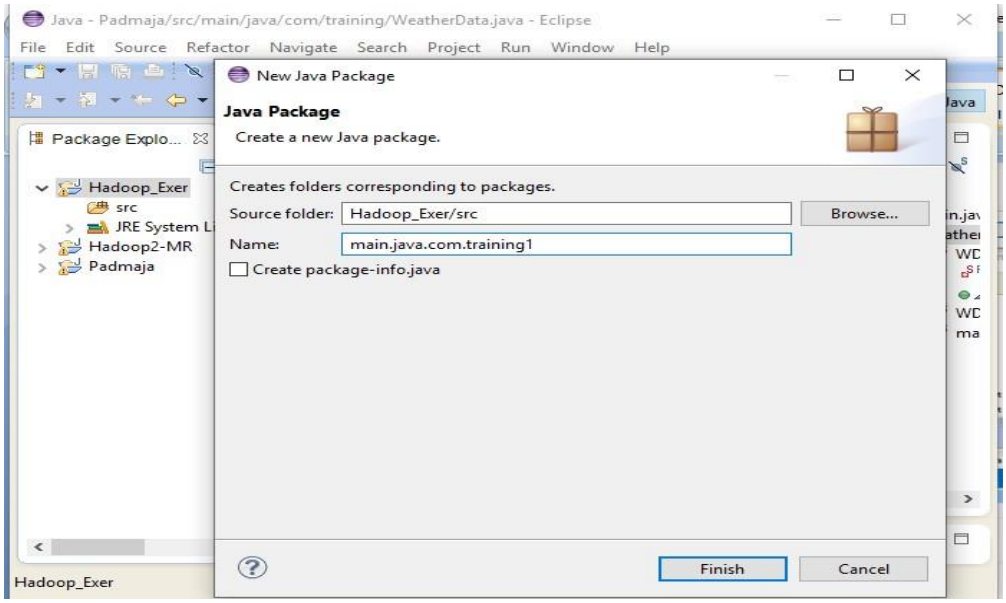
2) WordCount and Weather Data Analysis Program using MapReduce

Step 1: Right click on Package Explorer window, select new ->Java project to Create a Java Project called "**Hadoop_Exer**"

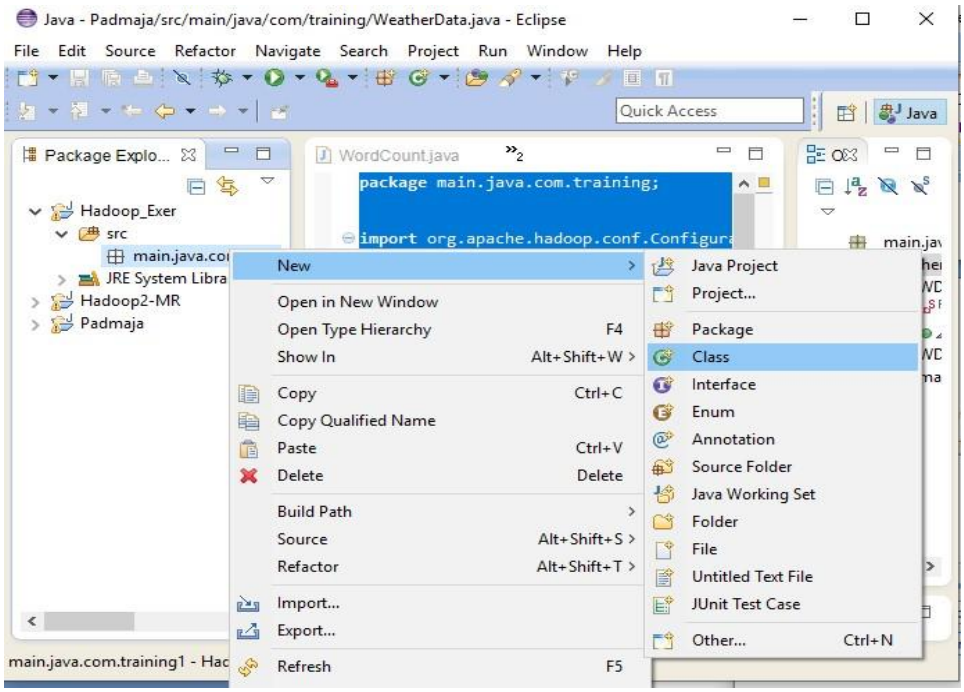


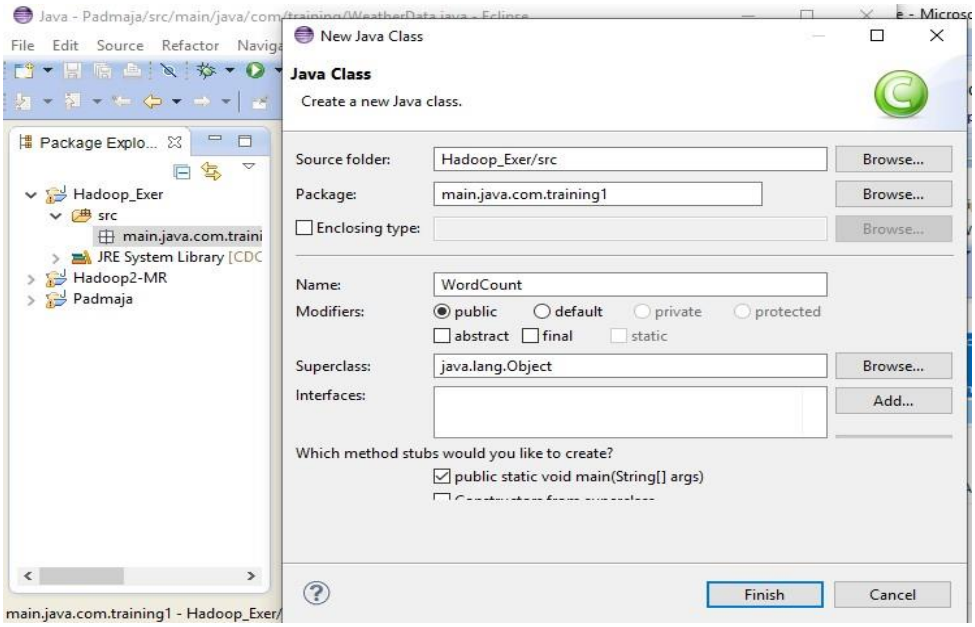
Step2 : Right click on Hadoop_Exer" Project , select new ->Package to Create a Package called **"main.java.com.training** " in the Java Project "Hadoop_Exer"

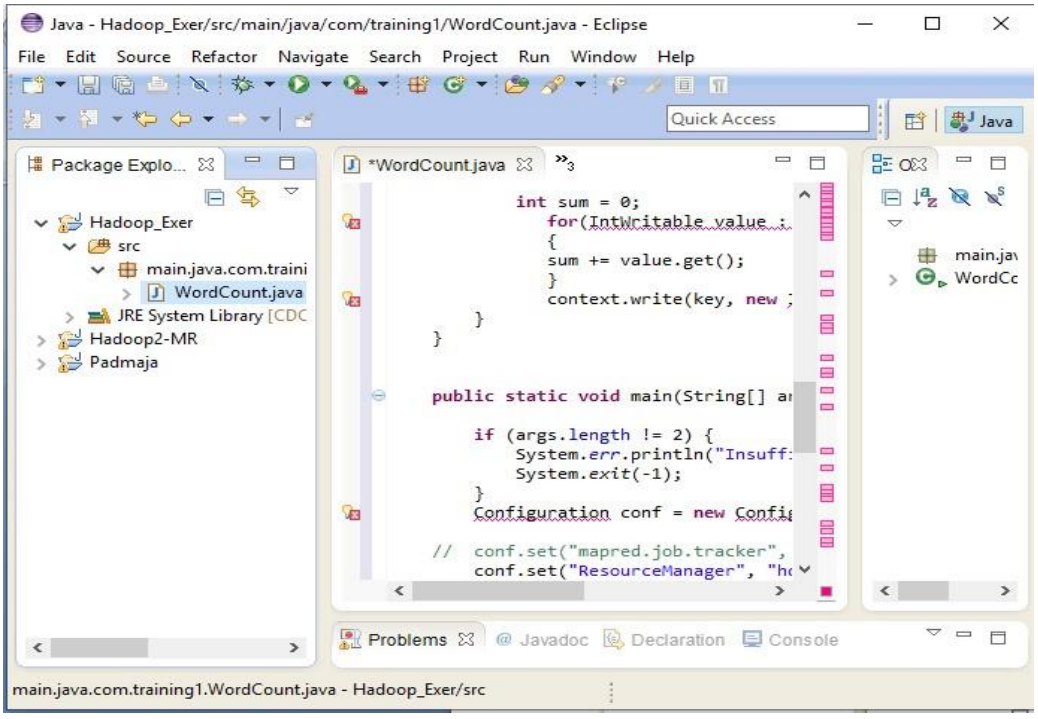




Step 3: Right click on "main.java.com.training1 " package , select new ->class to Create a Class called "WordCount" in package "main.java.com.training1" package







Step 4 : Right click on Hadoop_Exer" Project, select Build path ->Configure Build path,select Libraries tab, remove all Jar files and add External Jar files to execute the program

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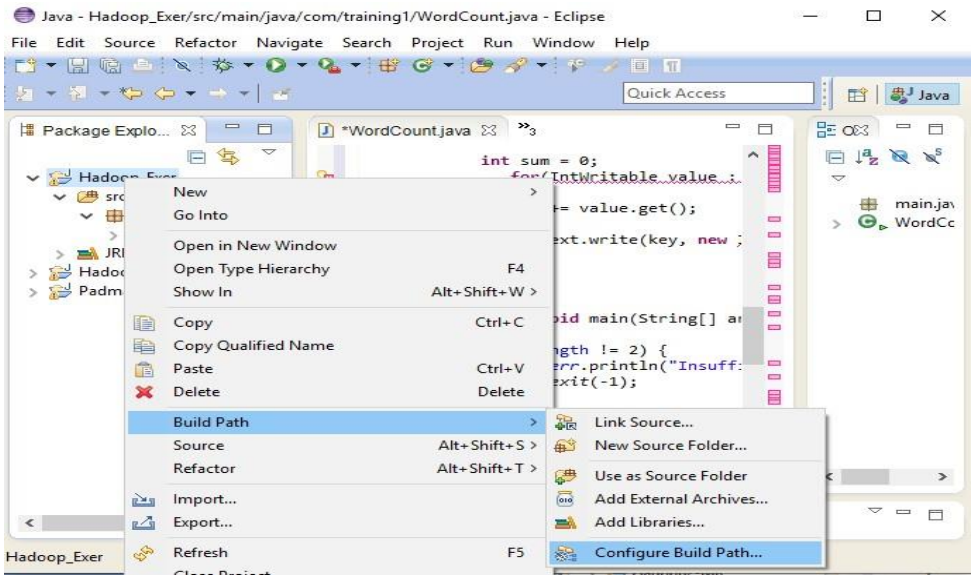
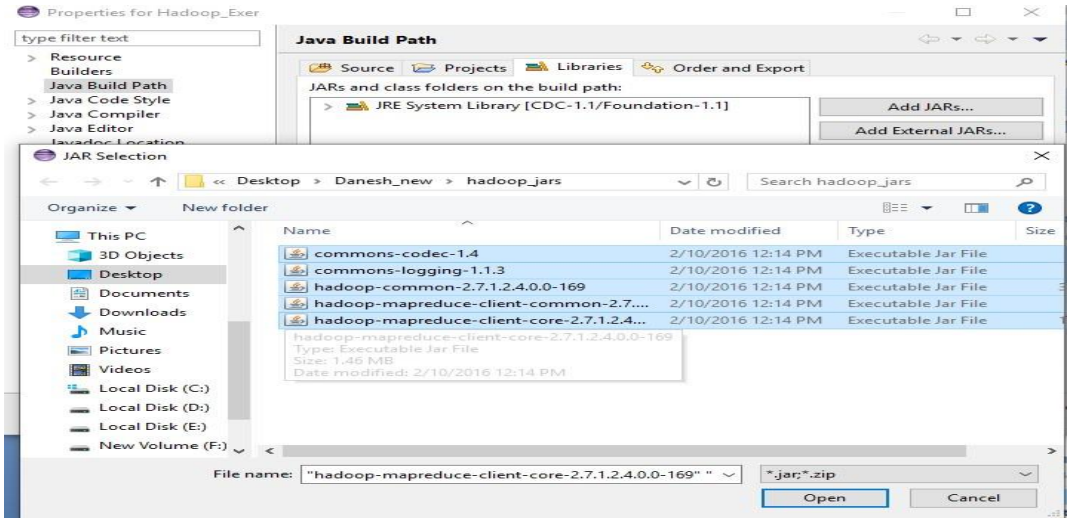
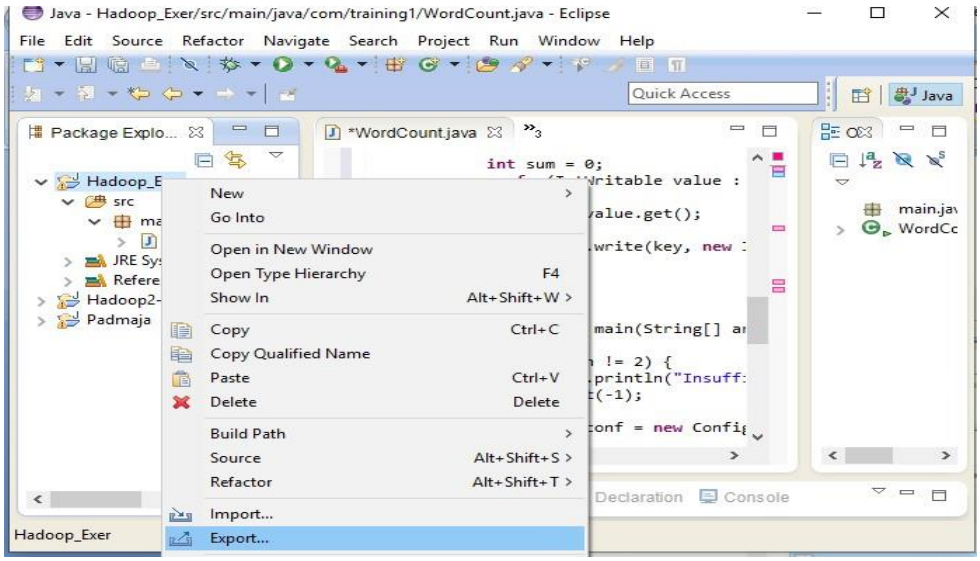
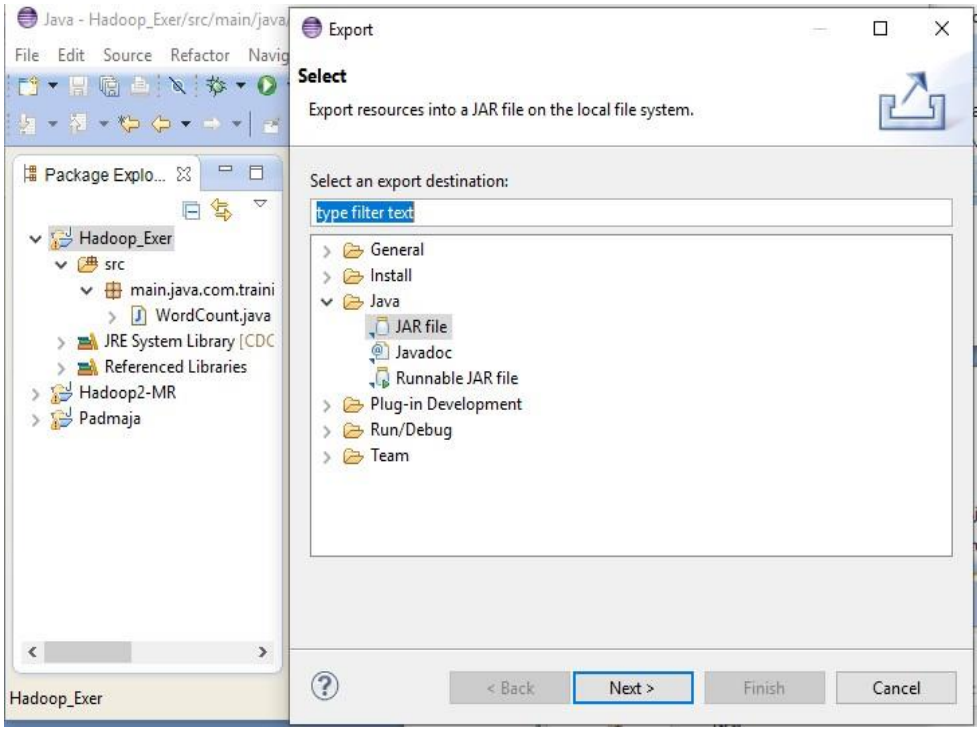
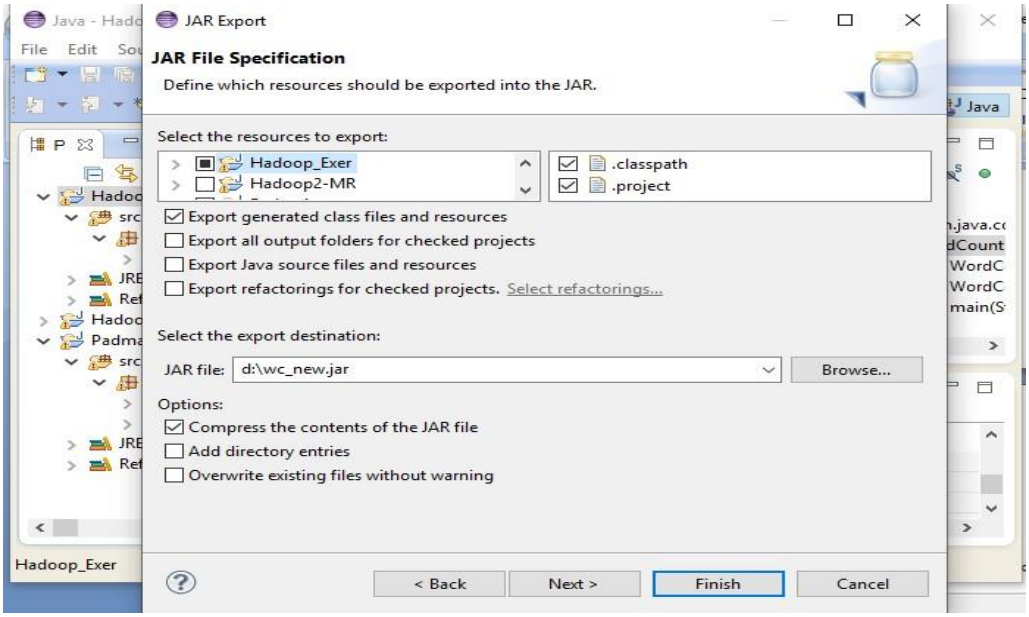


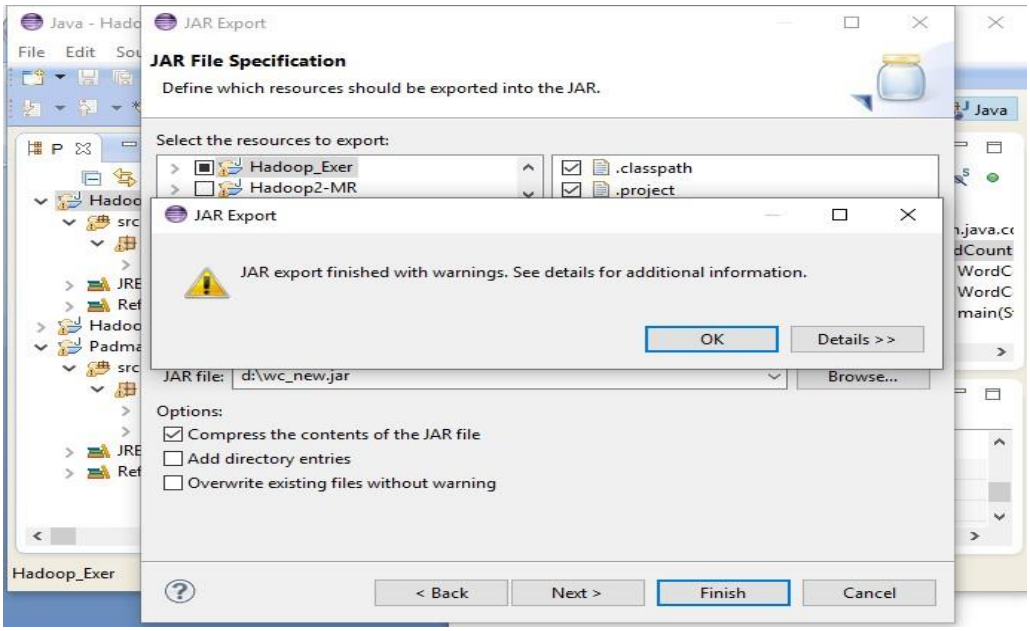


Step 5: select Export ->Java➐jar , type the jar file with destination

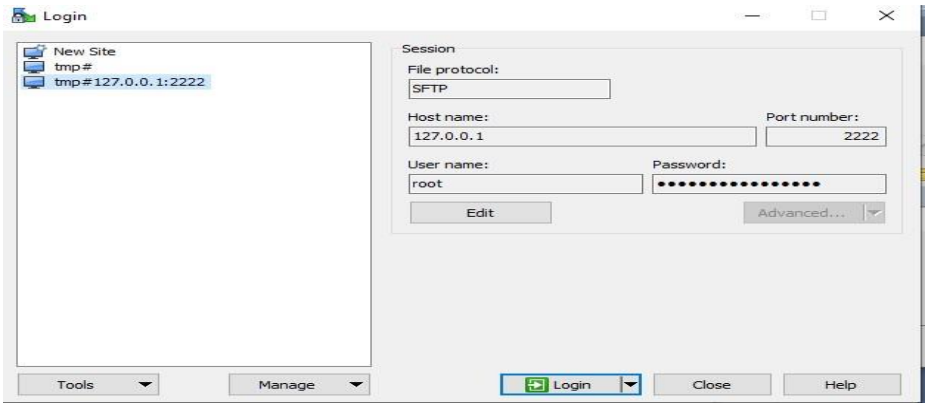


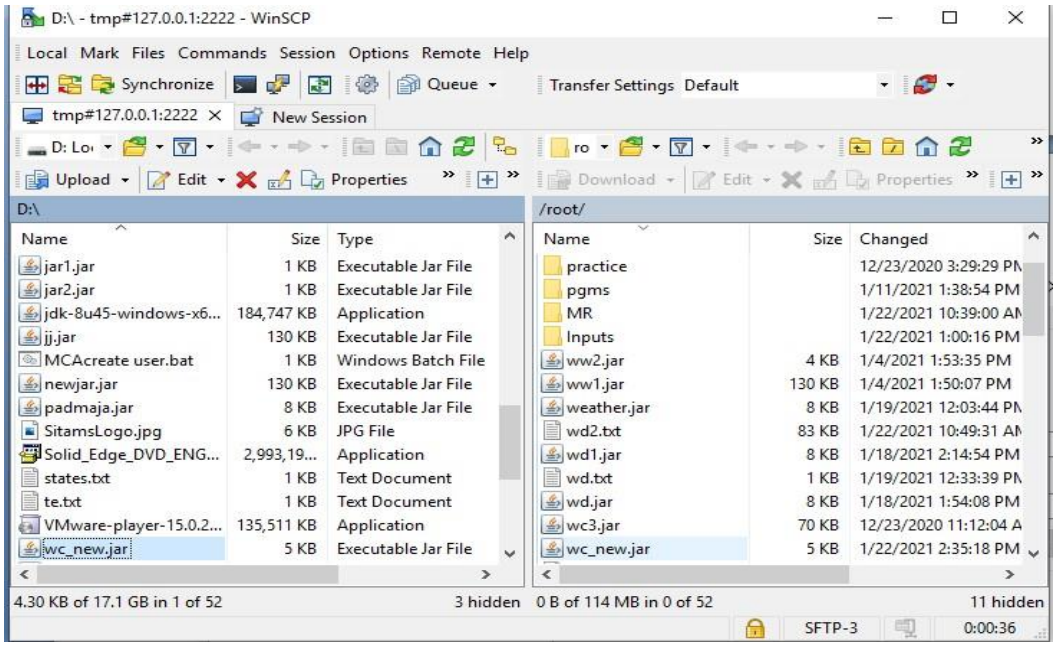


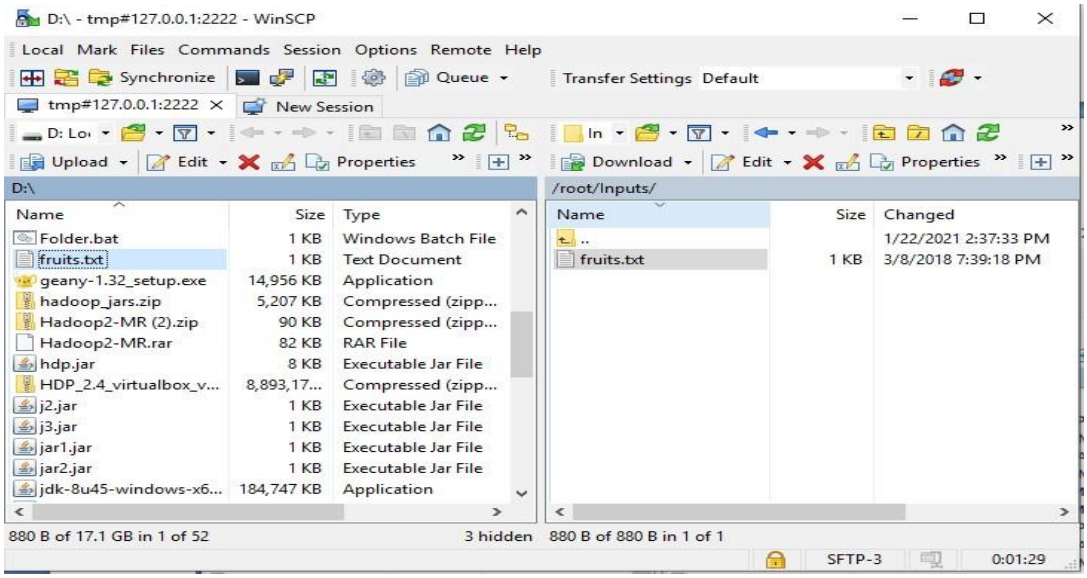

JAR Export
JAR File Specification
Define which resources should be exported into the JAR.
Select the resources to export:
Hadoop_Exer
Hadoop2-MR
.classpath
.project
Export generated class files and resources
Export all output folders for checked projects
Export Java source files and resources
Export refactorings for checked projects. Select refactorings...
Select the export destination:
JAR file: d:\wc_new.jar
Browse...
Options:
Compress the contents of the JAR file
Add directory entries
Overwrite existing files without warning
< Back
Next >
Finish
Cancel


JAR Export
JAR File Specification
Define which resources should be exported into the JAR.
Select the resources to export:
Hadoop_Exer
Hadoop2-MR
.classpath
.project
JAR Export
JAR export finished with warnings. See details for additional information.
OK
Details >>
JAR file: d:\wc_new.jar
Browse...
Options:
Compress the contents of the JAR file
Add directory entries
Overwrite existing files without warning
< Back
Next >
Finish
Cancel

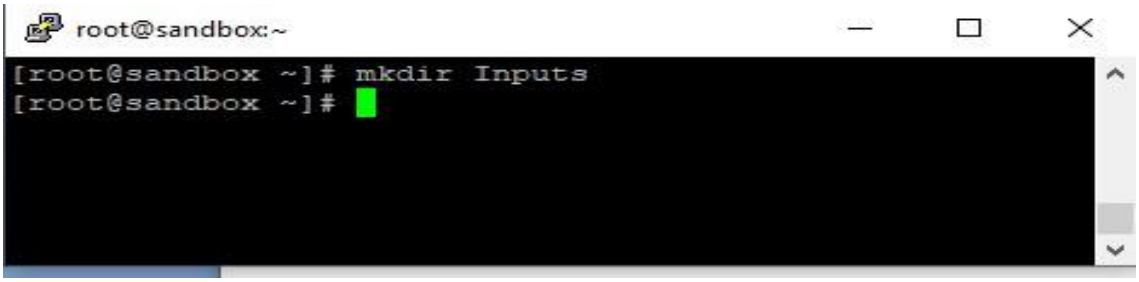
Step 6: Open winscp , to transfer fruits.txt and wc_new.jar from windows to Unix. Drag the wc_new.jar from d:/ to unix's root directory



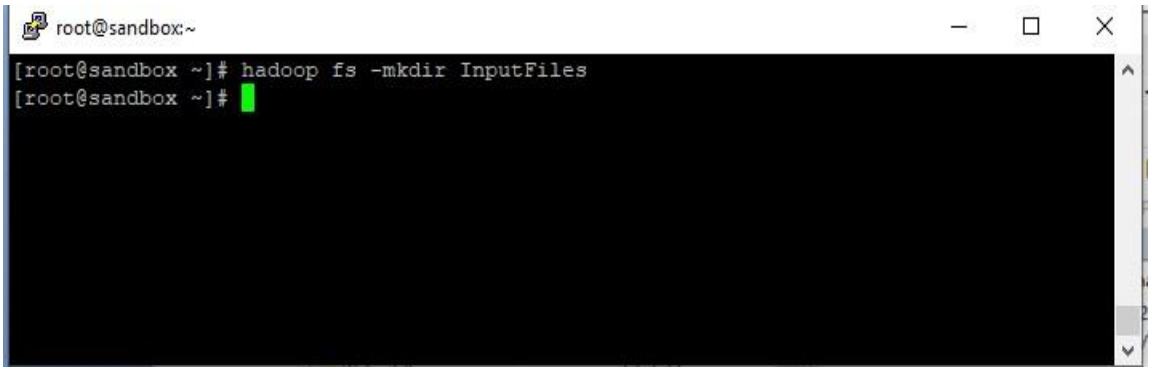




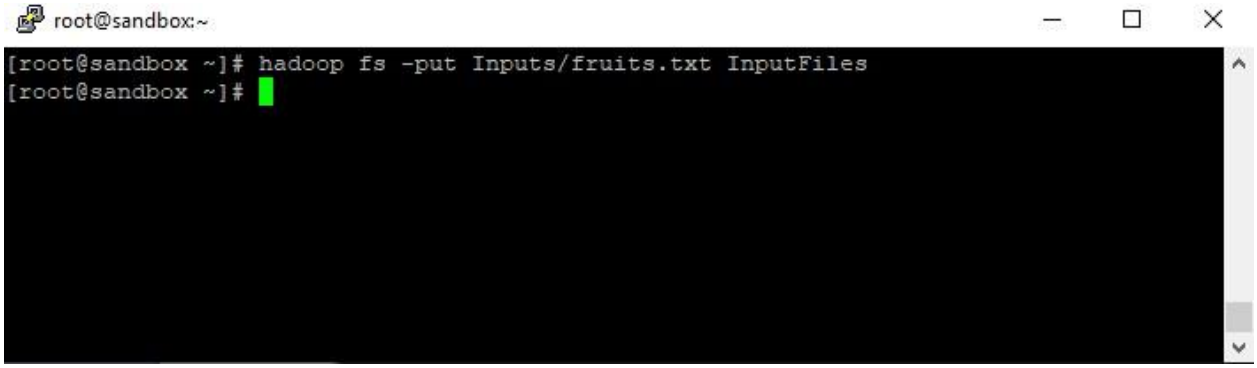
Step 7: create a directory called “Inputs” in unix and transfer the input file “fruits.txt” from root to Inputs directory

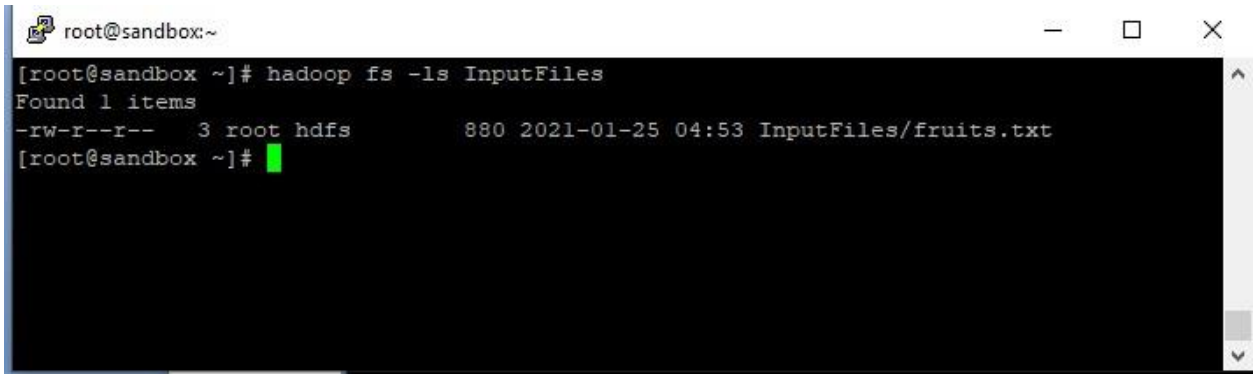


Step8 : Create a directory called “inputFiles” in hadoop

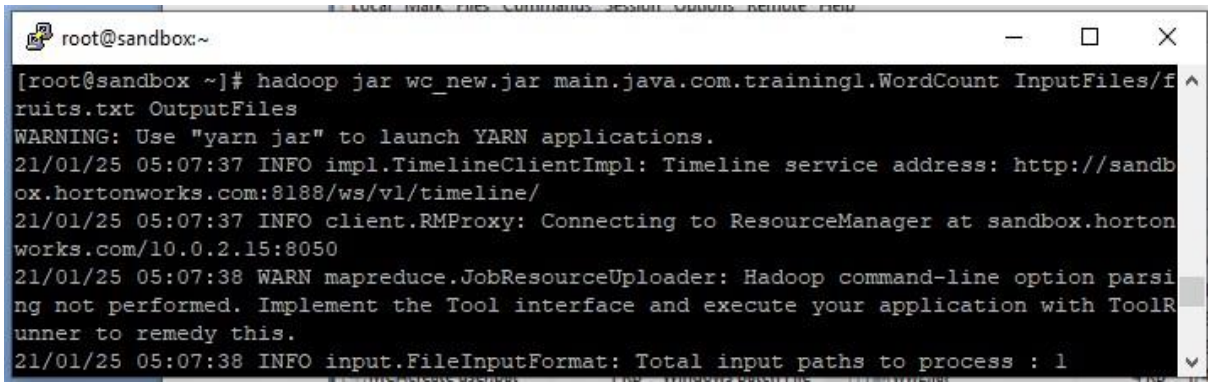


Step 9: transfer fruits.txt which is in Inputs directory to hadoop's directory "InputFiles"

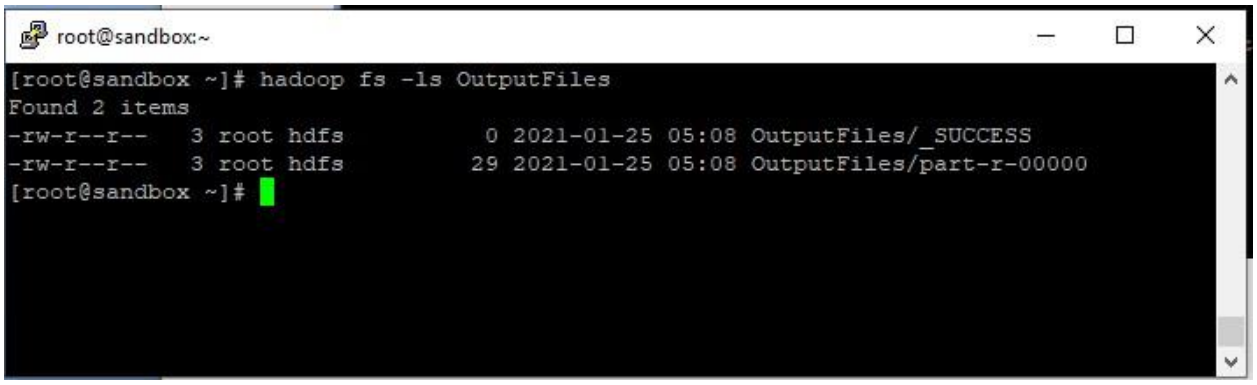




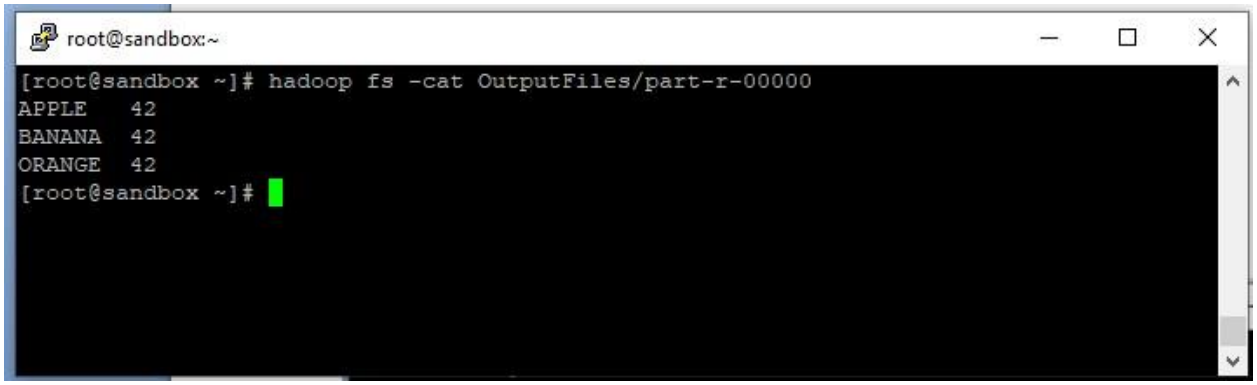
Step 9: type the below command to execute the code



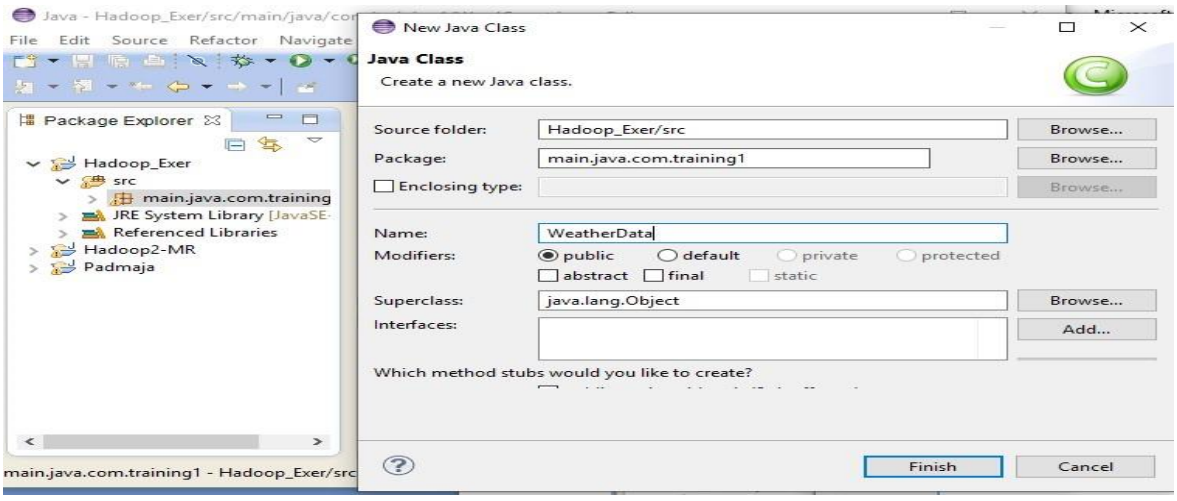
Step 10: check the output folder called “OutputFiles



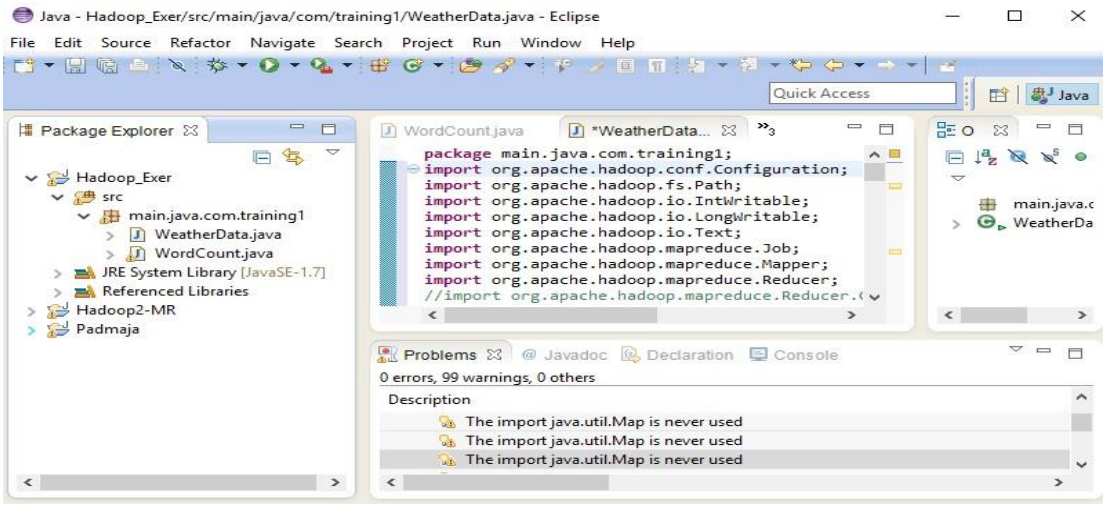
Step 11: Display the output



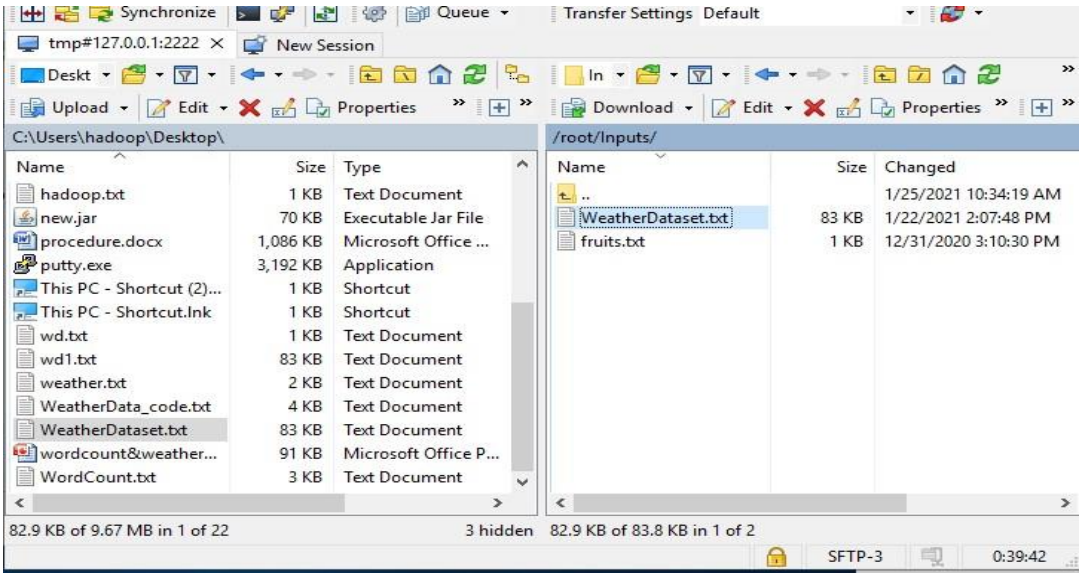
Step 12: create another java file called “WeatherData “ in the same package as



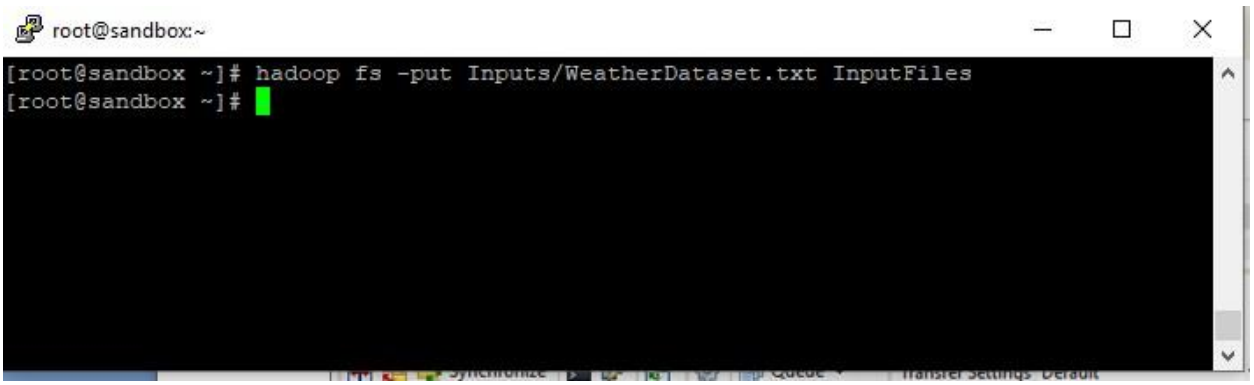
Step 13: type the weather data analysis code



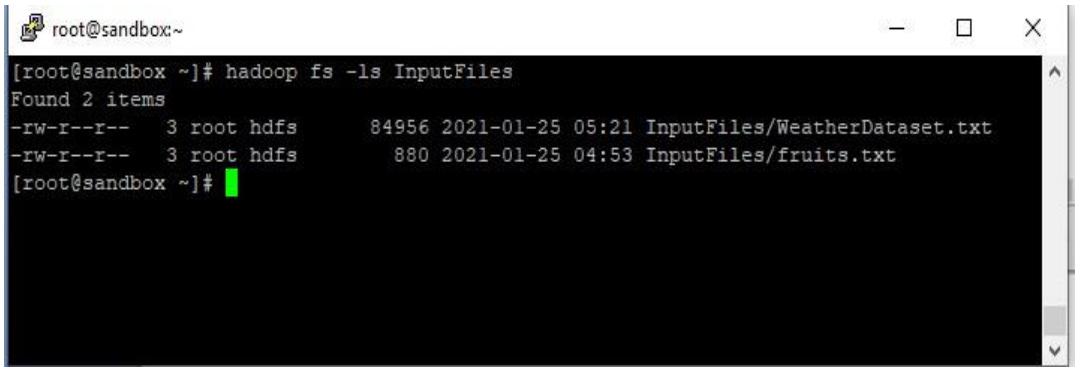
Step 14: transfer the dataset from windows to unix folder "Inputs"



Step 15 : transfer Unix file "WeatherDataset.txt" from unix to Hadoop

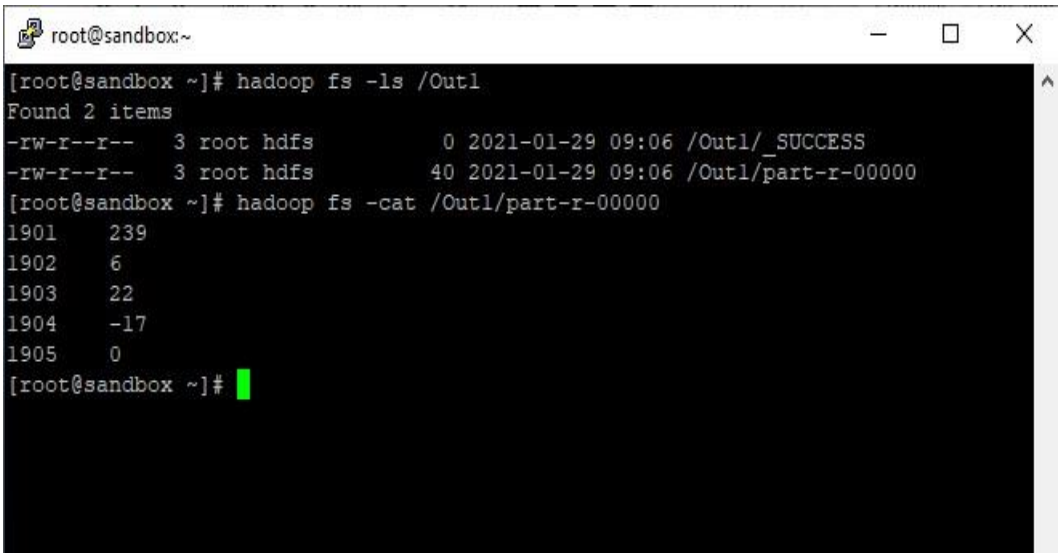


Step 16 : Check the dataset existence in hadoop folder “InputFiles”



Step 17 : execute the Weatherata program

Step 18 : Display the Results



3) TO ILLUSTRATE THE PIG DATA PROCESSING OPERATORS LOAD and STORE Data

LOAD Operator

2) Creating a file called **sample**

[root@sandbox ~]# cat > sample

100 Ram MCA

101 Sita MCA

102 Lakshman MBA

103 Bharat MBA

104 Smith MCA

105 Jones MBA

3) Create a directory called **Operators** and move **sample to operators**

[root@sandbox ~]# **mkdir operators**

[root@sandbox **~]# mv sample operators**

[root@sandbox **~]# ls operators** sample

4) Create a directory called **hadoop_dir** in hadoop

[root@sandbox ~]# **hadoop fs -mkdir hadoop_dir** 5)

5) Transfer unix file called sample to hadoop directory

[root@sandbox ~]# **hadoop fs -put operators/sample hadoop_dir** 6)

6) Goto **Pig**

[root@sandbox ~]# **pig grunt>**

7) Load s**ample** file which is in hadoop directory to Pig

Relation **grunt> A = Load 'hadoop_dir/sample' using PigStorage('\t') as**

(sno:int,sname:charArray,branch:charArray);

8) Display the contents of Relation A **grunt> dump A;**

(100,Ram,MCA)

(101,Sita,MCA)

(102,LakshmanMBA,)

(103,Bharat,MBA)

(104,Smith,MCA)

(105,Jones,MBA)

STORE OPERATOR

1) Display the contents of States.txt

[root@sandbox ~]# cat states.txt

100,smith,AP

101,jones,TN

102,KIng,AP

103,ram,TN

104,sita,K

105,Lakshman,Kerala

106,aaa,Kerala

2) Create a Directory in Hadoop as rp1

[root@sandbox ~]# hadoop fs -mkdir rp1

3) Transfer the Unix File to Hadoop's Directory rp1

[root@sandbox ~]# hadoop fs -put states.txt rp1

4) Display the contents of Hadoop directory rp1's contents

[root@sandbox ~]# hadoop fs -ls rp1

Found 1 items

-rw-r--r-- 3 root hdfs 95 2021-01-28 05:16 rp1/states.txt

5) Load the file into the Pig Relation A and display the Relation content **grunt> A = Load 'rp1/states.txt' using PigStorage(',') as (sno:int,sname:chararray,states:chararray); grunt> dump A;** (100,smith,AP)

(101,jones,TN)

(102,KIng,AP)

(103,ram,TN)

(104,sita,K)

(105,Lakshman,Kerala)

(106,aaa,Kerala)

5) Get only the AP employees and display the results **grunt> B =**

filter A by states == 'AP'; grunt> dump B; (100,smith,AP)

(102,KIng,AP)

6) Store the Pig relation contents into Hadoop directory rp2 **grunt>**

store B into 'rp2';

7) Check the Contents in Hadoop Directory

[root@sandbox ~]# hadoop fs -ls rp2

Found 2 items

-rw-r--r-- 3 root hdfs 0 2021-01-28 05:20 rp2/_SUCCESS

-rw-r--r-- 3 root hdfs 25 2021-01-28 05:20 rp2/part-m-0000

8) Display the file contents

[root@sandbox ~]# hadoop fs -cat rp2/part-m-00000

100 smith AP

102 KIng AP

2) FILTERING DATA

FILTER OPERATOR

1) To display only MCA Students using FILTER operator

grunt> B = FILTER A BY branch == 'MCA'; grunt>

dump B;

(100,Ram,MCA)

(101,Sita,MCA)

(104,Smith,MCA)

2) To display only MBA Students using FILTER operator

grunt> C = FILTER A BY branch == 'MBA'; grunt>

dump C;

(102,Lakshman,MBA)

(103,Bharat,MBA)

(105,Jones,MBA)

3) GROUPING AND JOINING DATA

JOIN Operator

GROUP Operator

COGROUP Operator

CROSS Operator

JOIN OPERATOR

1) **Create a file called <u>join1</u>**

[root@sandbox ~]# cat > join1

joe 2

hank 4

ali 0

eve 3

hank 2

2) **Create another file called <u>join2</u>** [root@sandbox ~]# cat > join2

2 tie

4 coat

1 scarf

3 hat

3) **Create a directory called <u>h1</u> in hadoop**

[root@sandbox ~]# hadoop fs –mkdir h1

3) **Push both join1 and join2 to the h1 directory**

[root@sandbox ~]# hadoop fs -put join1 h1

[root@sandbox ~]# hadoop fs -put join2 h1

4) **Load join2 file as Pig Relation grunt>A = LOAD 'h1/join2' USING PigStorage ('\t') AS (id:int,name:charArray); grunt>DUMP A;**

(2,tie)

(4,coat)

(1,scarf)

(3,hat)

5) **Load join1 file as Pig Relation grunt>B = LOAD 'h1/join1' USING PigStorage ('\t') AS (name:charArray,id:int); grunt>DUMP B;**

(joe,2)

(hank,4)

(ali,0)

(eve,3)

(hank,2)

6) **Join the relations A and B grunt>C = JOIN A BY $0, B BY $1; grunt>DUMP C;**

(2,tie,hank,2)

(2,tie,joe,2)

(3,hat,eve,3)

(4,coat,hank,4)

COGROUP OPERATOR:

grunt>D = COGROUP A BY $0, B BY $1;

grunt>DUMP D;

(0,{},{(ali,0)})

(1,{(1,scarf)},{})

(2,{(2,tie)},{(hank,2),(joe,2)})

(3,{(3,hat)},{(eve,3)})

(4,{(4,coat)},{(hank,4)})

GROUP OPERATOR

1) **Load student1 file from hadoop into Pig Relation "Records"**

Records = LOAD '/pigfunctions/student1' using PigStorage('\t') as (name:charArray, subject:charArray marks:int);

Dump Records;

2) **To Group students Subjectwise**

sub = GROUP Records by subject;

Dump sub;

Dump Records; // Displays the original records

(james, wp,78)

(smith, dsat,65)

(james, dsat,73)

(jones, unix,89)

(smith, unix,50)

(jones, unix,85)

Dump sub; // Displays subject wise marks

(wp,{(james, wp,78)})

(dsat,{(james, dsat,73),(smith, dsat,65)})

(unix,{(jones, unix,85),(smith, unix,50),(jones, unix,89)})

CROSS OPERATOR

1) **Create a file called cross2**

[root@sandbox ~]# cat>cross2

1 2

3 4

2) **Create another file called cross1**

[root@sandbox ~]# cat>cross1

a b c

e f g

3) **Push both cross1 and cross2 into hadoop's directory h1**

[root@sandbox ~]# hadoop fs -put cross h1

[root@sandbox ~]# hadoop fs -put cross1 h1

4) **Load both cross1 and cross2 from hadoop's directory to Pig** grunt> G = LOAD 'h1/cross' USING PigStorage ('\t') AS (fname:int,lname:int);

DUMP G;

(1,2)

(3,4)

grunt> H = LOAD 'h1/cross1' USING PigStorage ('\t') AS (fname:chararray,lname:chararray);

DUMP H;

(a,b)

(e,f)

5) **Apply Cross Operator** grunt> I = CROSS G,H;

DUMP I;

(3,4,e,f)

(3,4,a,b)

(1,2,e,f)

(1,2,a,b)

4) SORTING DATA

ORDER Operator

1) **Create a File called "order"**

[root@sandbox ~]# cat>order

104 ram mca

105 sita mca

102 lakshman mba

103 bharatha mba

2) **Push the file into hadoop's directory h1**

[root@sandbox ~]# hadoop fs -put order h1

3) **Load the Hadoop file into Pig** grunt> J = LOAD 'h1/order' USING PigStorage ('\t') AS (id:int,name:chararray,branch:chararray); DUMP J;

(104,ram,mca)

(105,sita,mca)

(102,lakshman,mba)

(103,bharatha,mba)

4) **Sort by id using ORDER operator** grunt> K = ORDER J BY $0;

DUMP K;

(102,lakshman,mba)

(103,bharatha,mba)

(104,ram,mca)

(105,sita,mca)

5) COMBINING AND SPLITTING DATA

UNION Operator for Combining the Pig Relations

SPLIT Operator for Spliting the Pig Relations **UNION OPERATOR**

1) **Create a file called "union"**

[root@sandbox ~]# cat>union

2 3

1 2

2 4

2) **Create another file called "union1"**

[root@sandbox ~]# cat>union1

z x 8 w

y 1

3) **Push both union and union1 into hadoop's directory "h1"**

[root@sandbox ~]# hadoop fs -put union h1

[root@sandbox ~]# hadoop fs -put union1 h1

4) **Load both union and union1 Hadoop's files into Pig** grunt> L = LOAD 'h1/union' USING PigStorage ('\t') AS (id:int,id1:int); DUMP L;

(2,3)

(1,2)

(2,4) grunt> M = LOAD 'h1/union1' USING PigStorage ('\t') AS

(fname:chararray,lname:chararray,id:int);

DUMP M;

(z,x,8)

(w,y,1)

5) **Apply UNION Operator** grunt> N = UNION L,M;

DUMP N;

(z,x,8)

(w,y,1)

(2,3)

(1,2)

(2,4)

SPLIT OPERATOR:

1) **Create a file called split**

[root@sandbox ~]# cat>split

100 smith 24 hyd

101 ivan 20 chennai

102 bayross 23 delhi

103 tornwhite 25 bay

104 leon 26 chennai

2) **Push the file to Hadoop's Directory "h1"**

[root@sandbox ~]# hadoop fs -put split h1

3) **Load the file from Hadoop to Pig** grunt> O = LOAD 'h1/split'

USING PigStorage ('\t') AS

(id:int,name:chararray,age:int,location:chararray);

DUMP O;

(100,smith,24,hyd)

(101,ivan,20,chennai)

(102,bayross,23,delhi)

(103,tornwhite,25,bay)

(104,leon,26,chennai)

4) **Apply Split Operator** grunt> SPLIT O INTO Q IF age<=23,R if age>23; DUMP Q;

(101,ivan,20,chennai)

(102,bayross,23,delhi)

DUMP R;

(100,smith,24,hyd)

(103,tornwhite,25,bay)

(104,leon,26,chennai)

LIMIT OPERATOR

1) To Display Top 2 records of Relation A grunt> A = Load 'hadoop_dir/sample' using PigStorage('\t') as (sno:int,sname:chararray,branch:chararray);

grunt> D = LIMIT A 2; grunt> dump D;

(100,Ram,MCA)

(101,Sita,MCA)

4) Pig Code to find
1) Total Marks obtained by each student
2) Average Obtained by each student and
3) Number of subjects taken by each student using Pig EVAL FUNTIONS

$ vi eval1.pig

```
Records = LOAD '/pigfunctions/student1' using PigStorage('\t')
as(name:charArray,subject:charArray,marks:int);

Dump Records;

Name = GROUP Records by name; Dump

Name;

tot = forEach Name generate group,SUM(Records.marks);

Dump tot; per = forEach Name generate

group,AVG(Records.marks); Dump per; count = forEach Name

generate group,COUNT(Records.marks);

Dump count;
```

OUTPUT

Dump Records; ***// Displays the original records***

(james, wp,78)

(smith, dsat,65)

(james, dsat,73)

(jones, unix,89)

(smith, unix,50)

(jones, unix,85)

Dump Name; ***// Displays student wise records***

(james,{(james, dsat,73),(james, wp,78)})

(jones,{(jones, unix,85),(jones, unix,89)})

(smith,{(smith, unix,50),(smith, dsat,65)})

Dump tot ; (To display Total Marks obtained by each student)

(james,151)

(jones,174)

(smith,115)

Dump per ; (percentage of each student)

(james,75.5)

(jones,87.0)

(smith,57.5)

Dump count ; (Number of Subjects taken by each student)

(james,2)

(jones,2)

(smith,2)

5) Pig Code to find

1) Maximum Marks secured in Each subject and

2) Minimum Marks secured in Each Subject

USING Pig EVAL FUNTIONS

$ vi eval2.pig

```
Records = LOAD '/pigfunctions/student1' using PigStorage('\t')
as(name:charArray,subject:charArray,marks:int); Dump
Records; sub = GROUP Records by subject; Dump sub; max =
forEach sub generate group,MAX(Records.marks); Dump max;
min = forEach sub generate group,MIN(Records.marks);
Dump min;
```

OUTPUT

Dump Records; // Displays the original records

(james, wp,78)

(smith, dsat,65)

(james, dsat,73)

(jones, unix,89)

(smith, unix,50)

(jones, unix,85)

Dump sub; // Displays subject wise marks

(wp,{(james, wp,78)})

(dsat,{(james, dsat,73),(smith, dsat,65)})

(unix,{(jones, unix,85),(smith, unix,50),(jones, unix,89)})

Dump min; // Displays subject wise Minimum mark

(wp,78)

(dsat,65)

(unix,50)

Dump max; // Displays Subject wise Maximum markss

(wp,78)

(dsat,73)

(unix,89)

5) To Illustrate the Pig String Functions _

```
A =  LOAD '/pigfunctions/student1' using PigStorage('\t') as(name:charArray,subject:charArray,marks:int);

   Dump A;

B = forEach A generate name,LOWER(name);

Dump B;

C = forEach A generate name,UPPER(name);

Dump C;

D =forEach A generate name,SUBSTRING(name,1,3);

Dump D;

E = forEach  A generate name,INDEXOF(name,'s');

Dump E;

F  = forEach A generate name,ENDSWITH(name,'s'),STARTSWITH(name,'j'); Dump F;
```

OUTPUT

Dump A; // Displays Original Records

(james, wp,78)

(smith, dsat,65)

(james, dsat,73)

(jones, unix,89)

(smith, unix,50)

(jones, unix,85)

Dump B;// Displays names in Lower Case

(james,james)

(smith,smith)

(james,james)

(jones,jones)

(smith,smith)

(jones,jones)

Dump C; // Displays Names in UpperCase

(james,JAMES)

(smith,SMITH)

(james,JAMES)

(jones,JONES)

(smith,SMITH)

(jones,JONES)

Dump D; Displays substring of name String

(james,am)

(smith,mi)

(jones,on)

Dump E; // Displays Index Of the letter 's' (smith,0)

(james,4)

(king,-1)

(jones,4)

(rama,-1)

(sita,0)

Dump F; Displays the names that ends with 's' and the names that starts with 'j'

(smith,false,false)

(james,true,true)

(king,false,false)

(jones,true,true)

(rama,false,false)

(sita,false,false)

6) To Illustrate the Pig Math Functions

```
X = LOAD '/pigex/student4' using PigStorage ('\t') as (name:charArray,GPA:float);

Dump X;

Y = forEach X generate GPA,ROUND(GPA);

Dump Y;

Z = forEach X generate GPA,FLOOR(GPA);

Dump Z;

U = forEach X generate GPA,CEIL(GPA);

Dump U;
```

OUTPUT

Dump X; // Displays Original data

(smith,7.8)

(james,8.7)

(king,6.9)

(jones,8.5)

(rama,7.7)

(sita,8.9)

Dump Y;// Displays the ROUND values of GPA

(7.8,8)

(8.7,9)

(6.9,7)

(8.5,9)

(7.7,8)

(8.9,9)

Dump Z; Displays the FLOOR values of GPA

(7.8,8.0)

(8.7,9.0)

(6.9,7.0)

(8.5,9.0)

(7.7,8.0)

(8.9,9.0)

Dump U; Displays the CEIL values of GPA

(7.8,7.0)

(8.7,8.0)

(6.9,6.0)

(8.5,8.0)

(7.7,7.0)

(8.9,8.0)

7) Pig Code to Analyse Weather dataset

$ vi Weather.pig

```
A = Load 'rp/WeatherDataset.txt' as (line:chararray);
B = foreach A generate SUBSTRING(line,15,19),SUBSTRING(line,88,92),SUBSTRING(line,92,93); store B
    into 'rp/revised5';
E = load 'rp/revised5/part-m-00000' using PigStorage('\t') as (year:int,temp:int,quality:int);
filtered_records = FILTER E by temp!=9999 AND quality IN (0,1,4,5,9); grouped_records =
GROUP filtered_records by year; max_temp = FOREACH grouped_records GENERATE
group,MAX(filtered_records.temp); dump max_temp;
```

$ pig –x mapreduce Weather.pig

OUTPUT

(1901,250)

(1902,72)

(1903,56)

(1904,44)

(1905,44)

8) To Illustrate Hive Tables

1) Create a file in Unix as “emp”

```
[root@sandbox ~]# cat emp
100,smith,Manager,50000
101,jones,Asst.Manager,40000
102,KIng,Clerk, 15000
103,ram,SE,25000
104,sita,SE,25000
105,Lakshman,Analyst,30000
```

2) Push the Unix file “emp” to hdfs directory “rpk”

```
[root@sandbox ~]# hadoop fs -put emp /rpk/ 3)
```

Check the contents of the file at HDFS

```
[root@sandbox ~]# hadoop fs -ls /rpk
Found 2 items
-rw-r--r--   3 root hdfs        138 2021-02-01 08:53 /rpk/emp
-rw-r--r--   3 root hdfs          0 2021-01-30 08:34 /rpk/empty.txt
[root@sandbox ~]# hadoop fs -cat /rpk/emp
100,smith,Manager,50000
101,jones,Asst.Manager,40000
102,KIng,Clerk, 15000
103,ram,SE,25000
104,sita,SE,25000
105,Lakshman,Analyst,30000
```

4) Create a Table in Hive hive> create table employees(eno int,ename string,desg string,sal double);

```
OK
Time taken: 1.434 seconds
```

5) Check the schema of the Hive Table hive> describe Employees; OK

```
eno                 int ename
string                  desg
```

string sal
double
Time taken: 0.506 seconds, Fetched: 4 row(s)

6) Load the 'emp' file data into Employee Table hive>
load data inpath 'rpk/emp' into table employee;
Loading data to table default.employee
Table default.employee stats: [numFiles=1, totalSize=138]
OK
Time taken: 2.114 seconds

7) Retrieve the Records of Hive table "employee" table
hive> select * from employee;
OK
100 smith Manager 50000.0
101 jones Asst.Manager 40000.0
102 KIng Clerk 15000.0
103 ram SE 25000.0
104 sita SE 25000.0
105 Lakshman Analyst 30000.0
Time taken: 0.596 seconds, Fetched: 7 row(s)

8) Get employees who are working as SE hive> select *
from employee where desg == 'SE';
OK
103 ram SE 25000.0
104 sita SE 25000.0
Time taken: 1.639 seconds, Fetched: 2 row(s)

9) Display Employees who earn salary greater than
30000 hive> select * from employee where sal
>30000;
OK
100 smith Manager 50000.0
101 jones Asst.Manager 40000.0
Time taken: 0.669 seconds, Fetched: 2 row(s)

10) Change the name of the Hive Table hive> alter table employee rename to EMP;

```
OK
Time taken: 1.301 seconds hive>
DESCRIBE EMP;
OK
eno                     int
ename                   string
desg                    string
sal                     double
dept                    string
Time taken: 0.555 seconds, Fetched: 5 row(s)
```

11) Change the Column name of Employee Table hive> alter table employee change ename EmployeeName string;

```
OK
Time taken: 0.642 seconds hive>
describe employee;
OK
eno                     int
employeename            string
desg                    string
sal                     double
dept                    string
Time taken: 0.576 seconds, Fetched: 5 row(s)
```

12) Add new Column to the Employee Table hive> alter table employee add columns (dept string);

```
OK
Time taken: 0.502 seconds hive>
describe employee;
OK
eno             int ename
string                  desg
string                  sal
```

double dept

string

Time taken: 0.468 seconds, Fetched: 5 row(s)

13) Drop the hive table “employee” hive> drop table

employee;

OK

Time taken: 0.723 seconds hive>

describe employee;

FAILED: SemanticException [Error 10001]: Table not found employee

9) To Create Partitions in Hive

1) Create a Table called “AllStates” in hive

```
hive> create table AllStates(eno int, ename string, state string) row format delimited fields terminated by ',';
OK
Time taken: 1.298 seconds
```

2) Check the input file exists in HDFS

```
[root@sandbox ~]# hadoop fs -ls /rpk
Found 2 items
-rw-r--r--   3 root hdfs          0 2021-01-30 08:34 /rpk/empty.txt
-rw-r--r--   3 root hdfs         95 2021-01-18 09:42 /rpk/states.txt
```

3) Check the contents of input file “Sates.txt”

```
[root@sandbox ~]# hadoop fs -cat /rpk/states.txt
100,smith,AP
101,jones,TN
102,KIng,AP
103,ram,TN
104,sita,K
105,Lakshman,Kerala
106,aaa,Kerala
```

3) Load the Input file from HDFS to hive

```
hive> load data inpath '/rpk/states.txt' into table AllStates;
Loading data to table default.allstates
Table default.allstates stats: [numFiles=1, totalSize=95]
OK
Time taken: 2.613 seconds
```

4) Check the contents of Input File in Hive

```
hive> select * from AllStates;
OK
100     smith   AP
101     jones   TN
102     KIng    AP
103     ram     TN
104     sita    K
```

105 Lakshman Kerala

106 aaa Kerala

Time taken: 0.726 seconds, Fetched: 7 row(s)

5) Create a Partitions Table hive> create table state_part(eno int,ename string) partitioned by (state string);

OK

Time taken: 1.686 seconds

6) Insert data into Partition Tables hive> insert overwrite table state_part partition(state) select eno,ename,state from AllStates;

Query ID = root_20210201083126_fbc2931c-12ea-4f6b-b561-fede08805943

Total jobs = 1

Launching Job 1 out of 1

Tez session was closed. Reopening...

Session re-established.

Status: Running (Executing on YARN cluster with App id application_1612167624046_0002)

```
--------------------------------------------------------------------------------
        VERTICES      STATUS  TOTAL  COMPLETED  RUNNING  PENDING  FAILED  KILLED
--------------------------------------------------------------------------------
Map 1 ..........   SUCCEEDED      1          1        0        0       0       0
--------------------------------------------------------------------------------
VERTICES: 01/01  [==========================>>] 100%  ELAPSED TIME: 5.91 s
--------------------------------------------------------------------------------
```

Loading data to table default.state_part partition (state=null)

Time taken for load dynamic partitions : 1769

Loading partition {state=TN}

Loading partition {state=Kerala}

Loading partition {state=AP}

Loading partition {state=K}

Time taken for adding to write entity : 2

Partition default.state_part{state=AP} stats: [numFiles=1, numRows=2, totalSize=19, rawDataSize=17]

Partition default.state_part{state=K} stats: [numFiles=1, numRows=1, totalSize=9, rawDataSize=8]

Partition default.state_part{state=Kerala} stats: [numFiles=1, numRows=2, totalSize=21, rawDataSize=19]

Partition default.state_part{state=TN} stats: [numFiles=1, numRows=2, totalSize=18, rawDataSize=16]

7) To View the Partitions hive>

```
show partitions state_part;

OK

state=AP

state=K

state=Kerala

state=TN

Time taken: 0.798 seconds, Fetched: 4 row(s)
```