Proof of Concept (POC) on Stock Market Analysis

PoC
On
Stock Market Analysis

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Context:

The dataset includes a list of all the stocks contained therein and associated key financials such as price, market capitalization, earnings, price/earnings ratio, price to book

Input Format:

Comma Seperated values (.CSV) format of all the given datasets-

Data Publicly available at website:

https://datahub.io/core/s-and-p-500-companies-financials#readm

Field information

Field Name	Order	Type (Format)	Description
Symbol	1	string	
Name	2	string	
Sector	3	string	
Price	4	number	
Price/Earnings	5	number	
Dividend Yield	6	number	
Earnings/Share	7	number	
52 Week Low	8	number	
52 Week High	9	number	
Market Cap	10	number	

Price_to_Earning helps investors determine the market value of a stock as compared to the company's earnings. In short, the P/E shows what the market is willing to pay today for a stock based on its past or future earnings. A high P/E could mean that a stock's price is high relative to earnings and possibly overvalued. Conversely, a low P/E might indicate that the current stock price is low relative to earnings.

P/E ratios are used by investors and analysts to determine the relative value of a company's shares in an apples-to-apples comparison. It can also be used to compare a company against its own historical record or to compare aggregate markets against one another or over time.

Dividend yield is the ratio of a company's annual dividend compared to its share price

Earnings per share (EPS) is calculated as a company's profit divided by the outstanding shares of its common stock. The resulting number serves as an indicator of a company's profitability.

Market cap refers to the total value of all a company's shares of stock. It is calculated by multiplying the price of a stock by its total number of outstanding shares.

52_Week_Low : A 52-week low is the highest or lowest price at which a stock has traded in the previous year.

52_Week_High: A 52-week high is the highest or lowest price at which a stock has traded in the previous year**.**

Problem Statement:

1.Select sectors with high market cap.

2.Select sectors with low market cap.

3.Select industry and sectors with high P/E ratio.

4.Select industry and sector with low P/E ratios

5.Select five sectors with lowest stock price trader;

6.Select five sectors with highest stock price trader;

7.Select five sectors with market cap with lowest price

at which stock has traded;

8.Select five sectors with market cap with highest price

at which stock has traded

Big data analytics is a form of advanced analytics, which involves complex applications with elements such as predictive models, statistical algorithms and analysis powered by high-performance analytics systems.

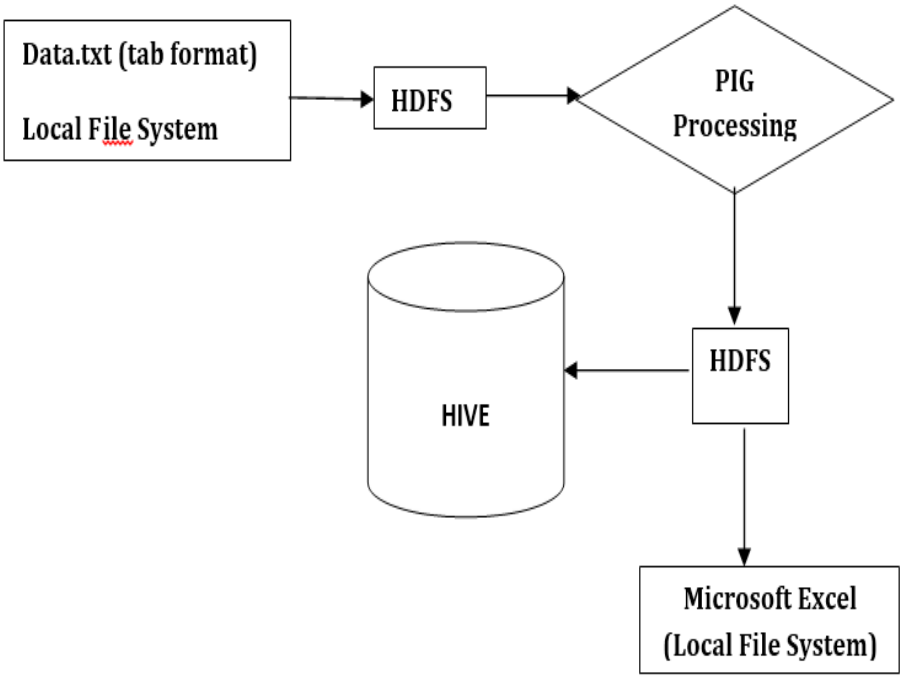
Importance of Bigdata:

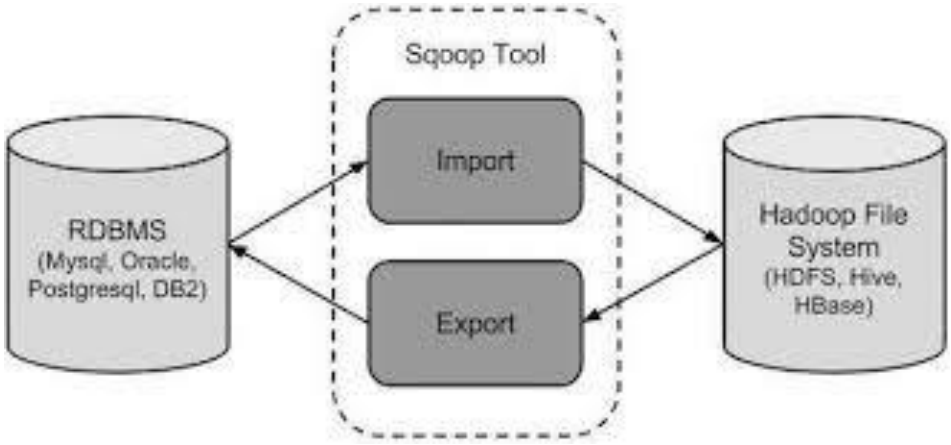
Big data analytics applications enable big data analysts, data scientists, predictive modelers, statisticians and other analytics professionals to analyze growing volumes of structured transaction data, plus other forms of data that are often left untapped by conventional business intelligence (BI) and analytics programs. That encompasses a mix of semi-structured and unstructured data -- for example, internet clickstream data, web server logs, social media content, text from customer emails and survey responses, mobile phone records, and machine data captured by sensors connected to the internet of things.

Technologies used by Bigdata:

Many of the organizations that collect, process and analyze big data turn to NoSQL databases, as well as Hadoop and its companion tools, including:

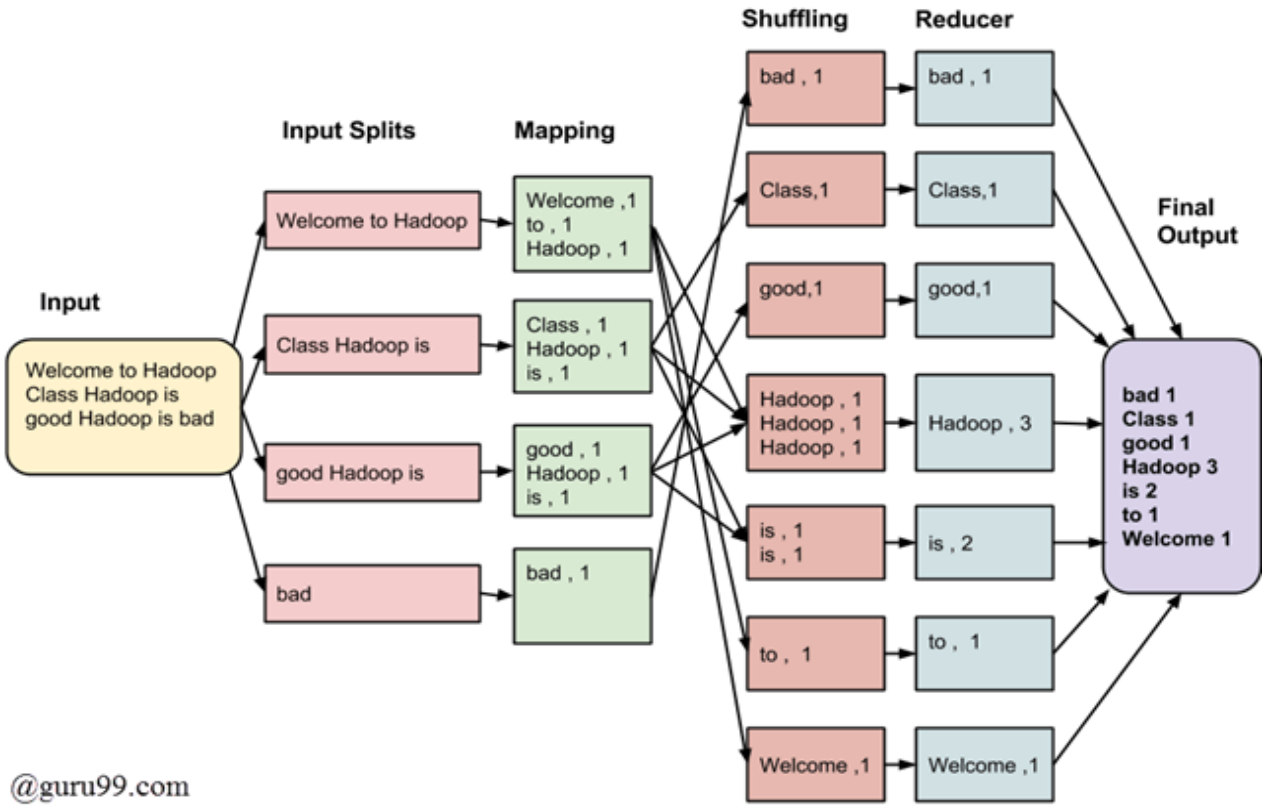
- YARN: a cluster management technology and one of the key features in second-generation Hadoop.
- MapReduce: a software framework that allows developers to write programs that process massive amounts of unstructured data in parallel across a distributed cluster of processors or stand-alone computers
- Spark: an open source, parallel processing framework that enables users to run large-scale data analytics applications across clustered systems.
- HBase: a column-oriented key/value data store built to run on top of the Hadoop Distributed File System (HDFS).
- Hive: an open source data warehouse system for querying and analyzing large data sets stored in Hadoop files.
- Kafka: a distributed publish/subscribe messaging system designed to replace traditional message brokers.
- Pig: an open source technology that offers a high-level mechanism for the parallel programming of MapReduce jobs executed on Hadoop clusters.


Data.txt (tab format)
Local File System
HDFS
PIG
Processing
HIVE
HDFS
Microsoft Excel
(Local File System)


Sqoop Tool
Import
Export
RDBMS
(Mysql, Oracle,
Postgresql, DB2)
Hadoop File
System
(HDFS, Hive,
HBase)

Hadoop Distributed File System

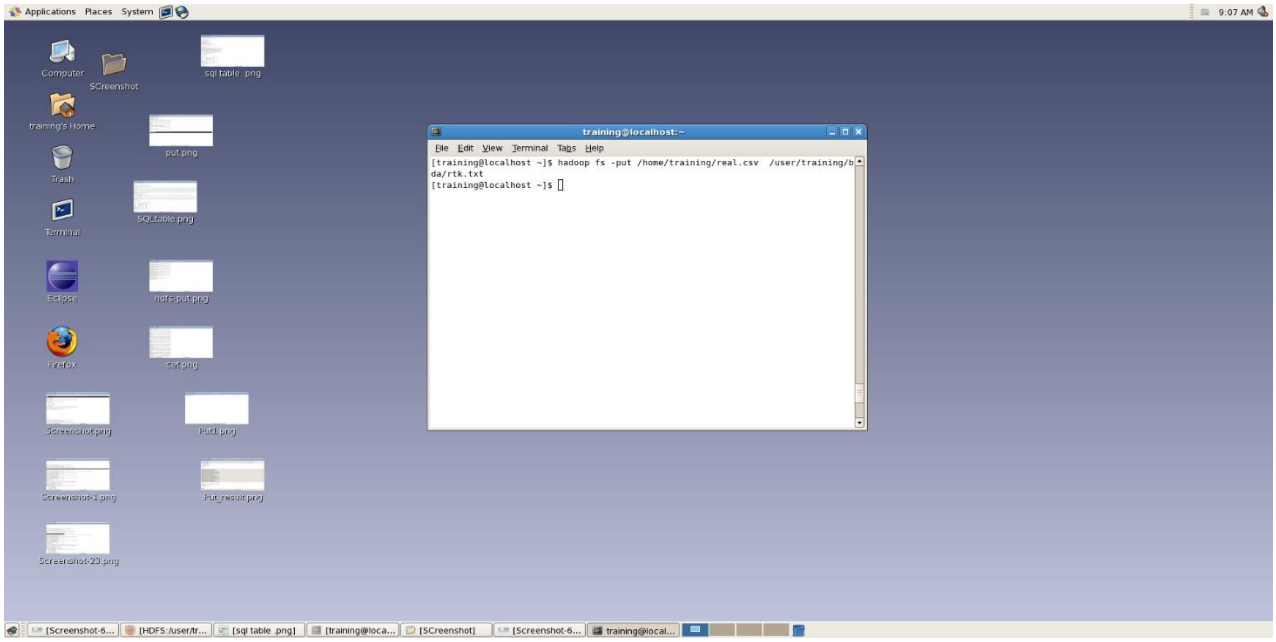
MapReduce is a programming model suitable for processing of huge data. Hadoop is capable of running MapReduce programs written in various languages: Java, Ruby, Python, and C++. MapReduce programs are parallel in nature, thus are very useful for performing large-scale data analysis using multiple machines in the cluster.

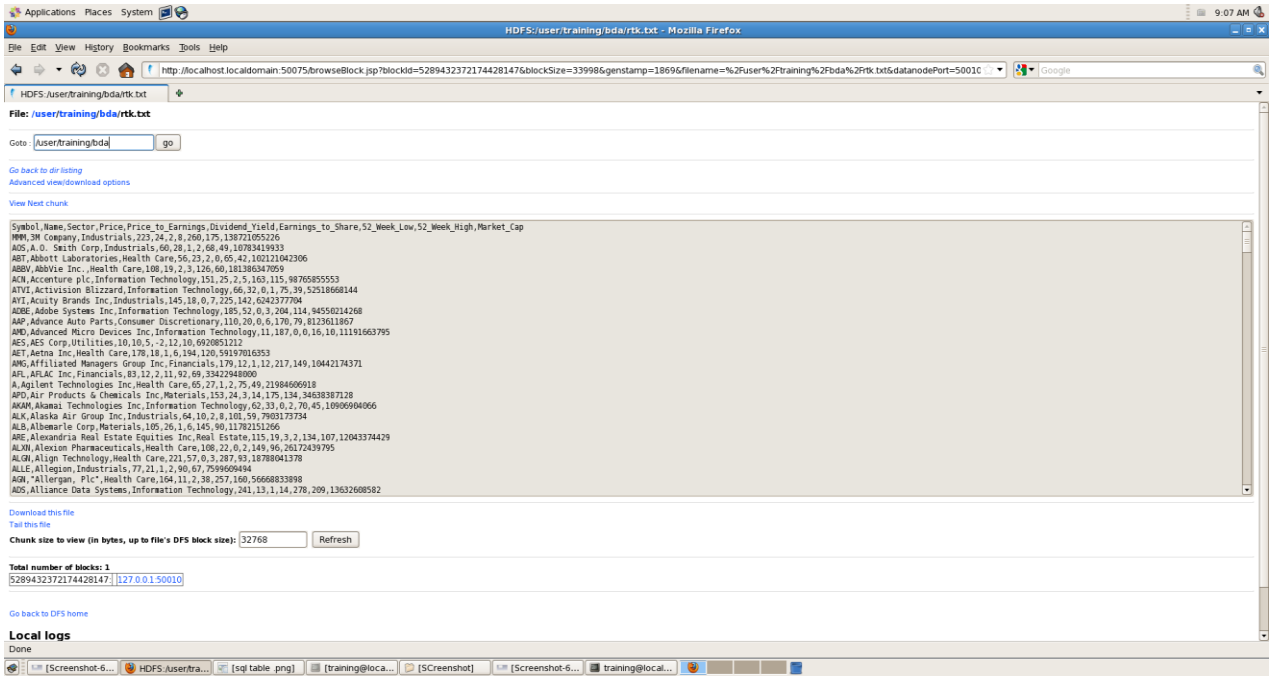


Step 1: Moving data into Hadoop Distributed File System (HDFS)

For any queries in Hive we need to load the data in HDFS. For queries in hive we will load the data in HDFS and for queries in Pig we will use the data from local file system.

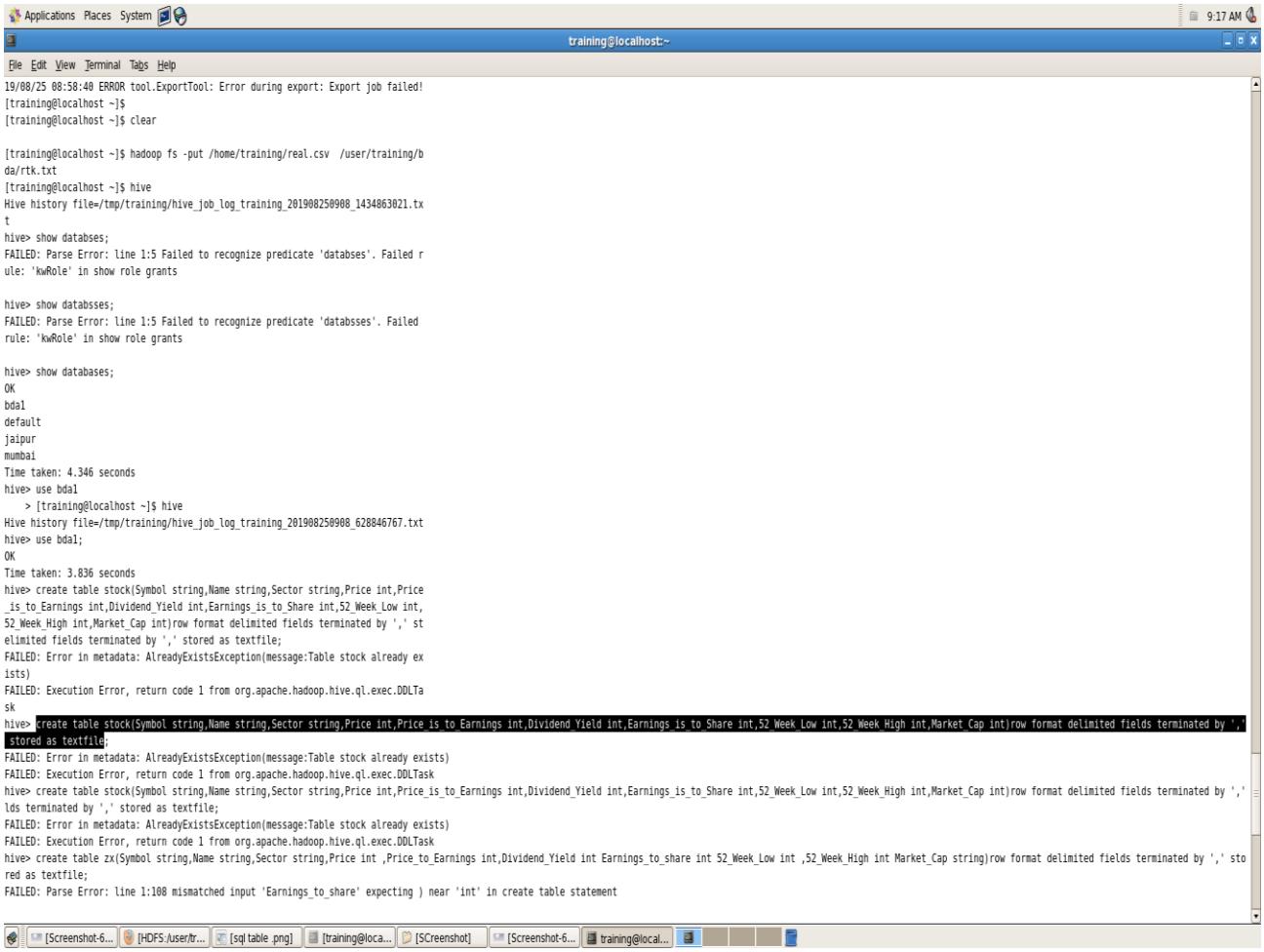
The snapshot also contains some hadoop fs –put/get/cat commands and mkdir to create directory in hadoop file system.





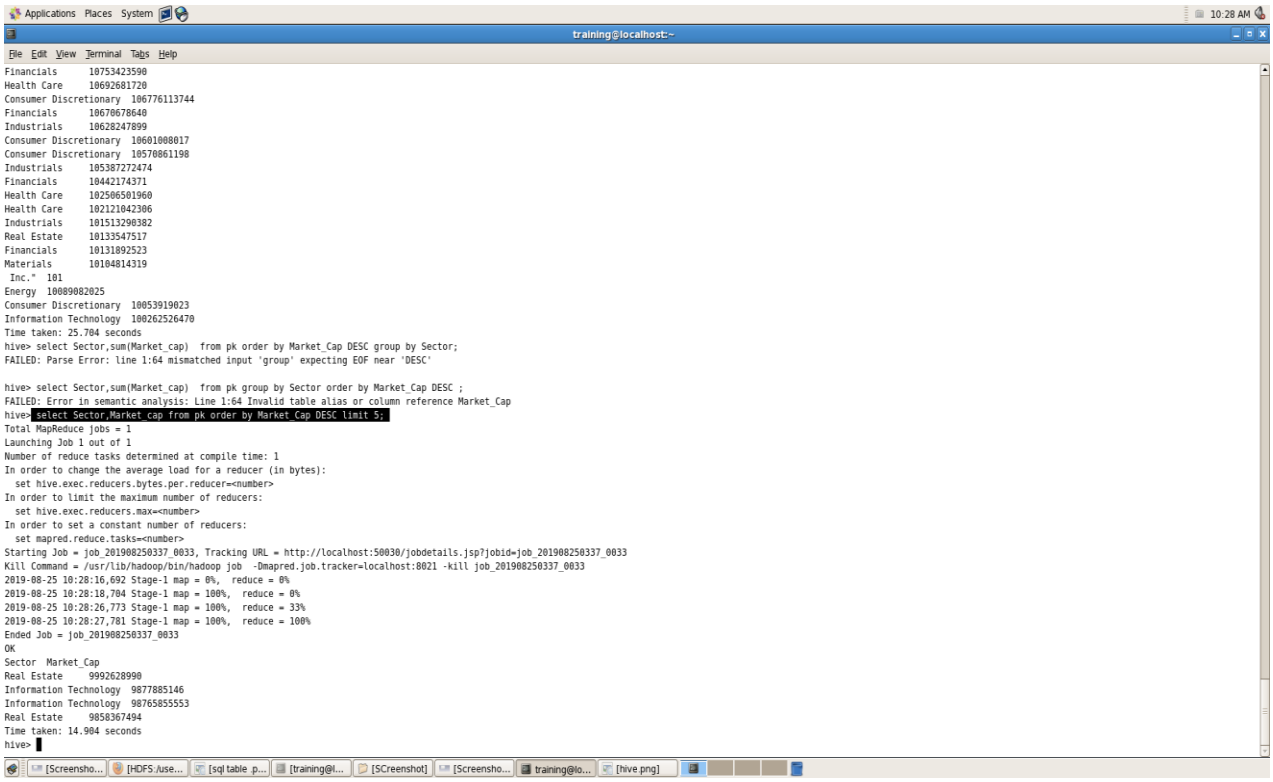
Step 2: Load Data into Hive

1. Open the terminal.
2. Write the Hive Command as hive
3. Now you need to create a table and load data into it from local file system.

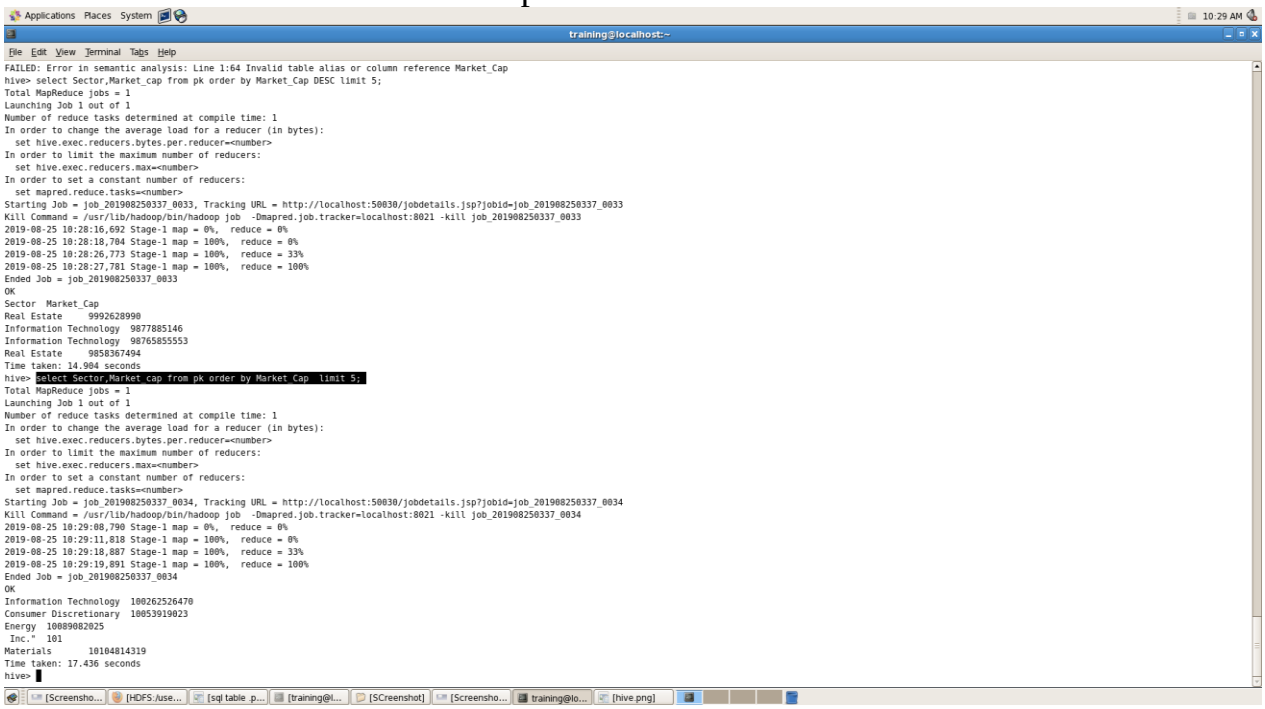


Solving Problem Statement:

1. Select sectors with high market cap.



2. Select sectors with low market cap.



```
Applications  Places  System                                                                    10:29 AM
training@localhost:~
File  Edit  View  Terminal  Tabs  Help
FAILED: Error in semantic analysis: Line 1:64 Invalid table alias or column reference Market_Cap
hive> select Sector,Market_cap from pk order by Market_Cap DESC limit 5;
Total MapReduce jobs = 1
Launching Job 1 out of 1
Number of reduce tasks determined at compile time: 1
In order to change the average load for a reducer (in bytes):
  set hive.exec.reducers.bytes.per.reducer=<number>
In order to limit the maximum number of reducers:
  set hive.exec.reducers.max=<number>
In order to set a constant number of reducers:
  set mapred.reduce.tasks=<number>
Starting Job = job_201908250337_0033, Tracking URL = http://localhost:50030/jobdetails.jsp?jobid=job_201908250337_0033
Kill Command = /usr/lib/hadoop/bin/hadoop job  -Dmapred.job.tracker=localhost:8021 -kill job_201908250337_0033
2019-08-25 10:28:16,692 Stage-1 map = 0%,  reduce = 0%
2019-08-25 10:28:18,704 Stage-1 map = 100%,  reduce = 0%
2019-08-25 10:28:26,773 Stage-1 map = 100%,  reduce = 33%
2019-08-25 10:28:27,781 Stage-1 map = 100%,  reduce = 100%
Ended Job = job_201908250337_0033
OK
Sector  Market_Cap
Real Estate     9992628990
Information Technology  9877885146
Information Technology  98765855553
Real Estate     9858367494
Time taken: 14.904 seconds
hive> select Sector,Market_cap from pk order by Market_Cap  limit 5;
Total MapReduce jobs = 1
Launching Job 1 out of 1
Number of reduce tasks determined at compile time: 1
In order to change the average load for a reducer (in bytes):
  set hive.exec.reducers.bytes.per.reducer=<number>
In order to limit the maximum number of reducers:
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  set mapred.reduce.tasks=<number>
Starting Job = job_201908250337_0034, Tracking URL = http://localhost:50030/jobdetails.jsp?jobid=job_201908250337_0034
Kill Command = /usr/lib/hadoop/bin/hadoop job  -Dmapred.job.tracker=localhost:8021 -kill job_201908250337_0034
2019-08-25 10:29:08,790 Stage-1 map = 0%,  reduce = 0%
2019-08-25 10:29:11,818 Stage-1 map = 100%,  reduce = 0%
2019-08-25 10:29:18,887 Stage-1 map = 100%,  reduce = 33%
2019-08-25 10:29:19,891 Stage-1 map = 100%,  reduce = 100%
Ended Job = job_201908250337_0034
OK
Information Technology  100262526470
Consumer Discretionary  10053919023
Energy  10089082025
 Inc."  101
Materials       10104814319
Time taken: 17.436 seconds
hive>
```
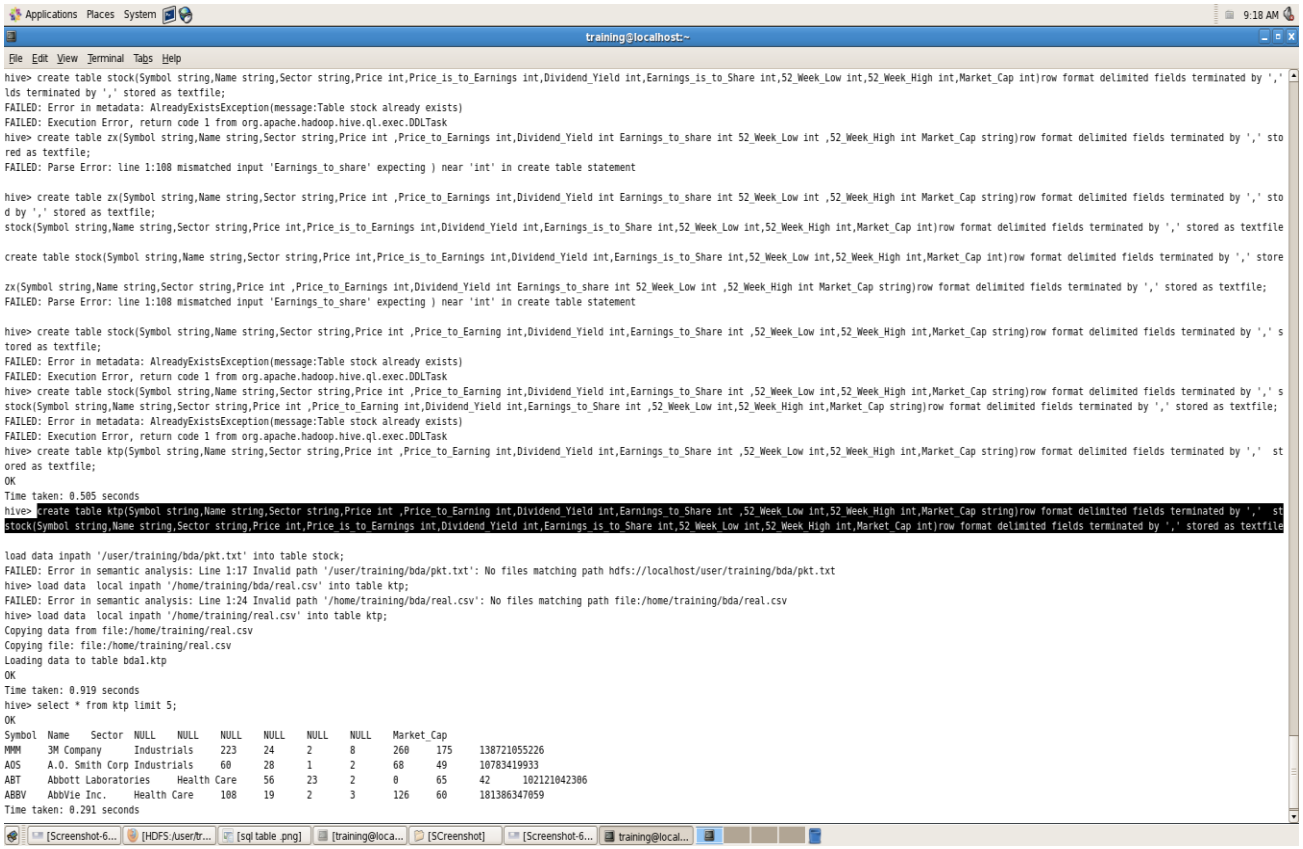
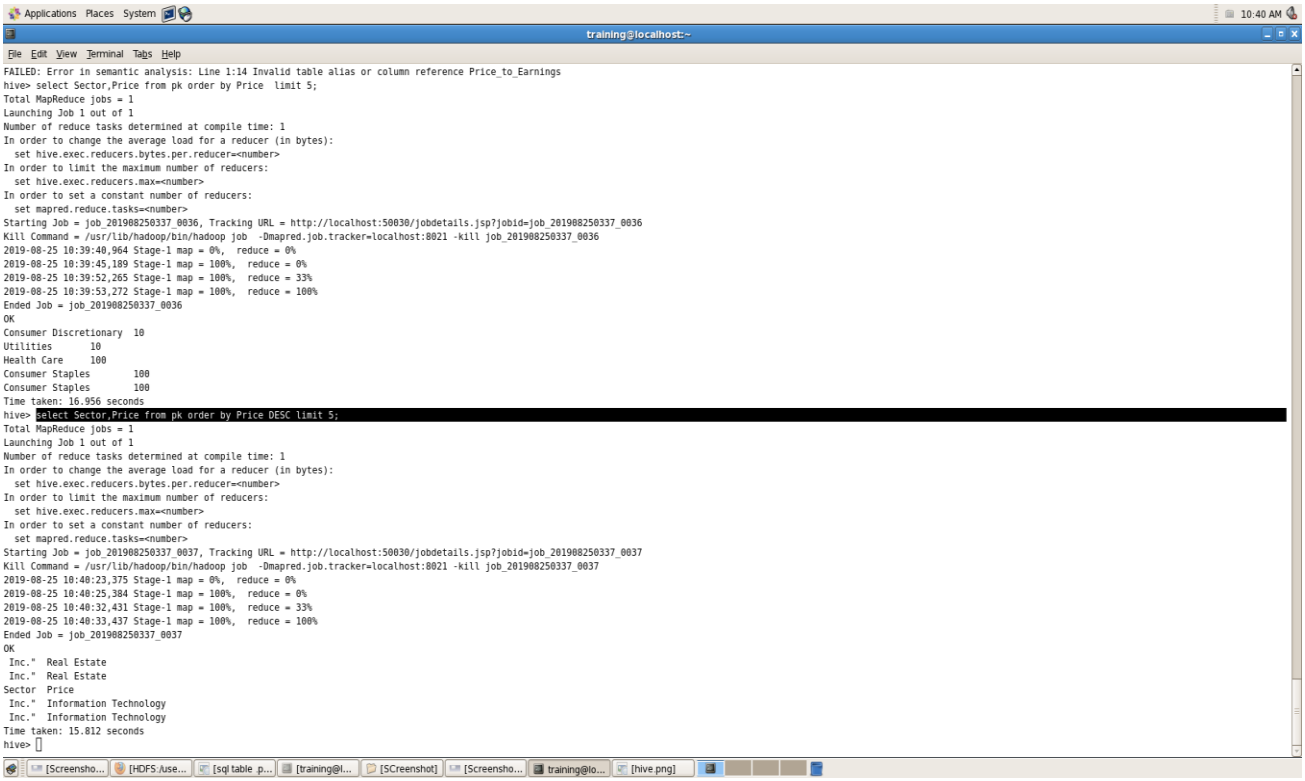

3.Select industry and sectors with high P/E ratio

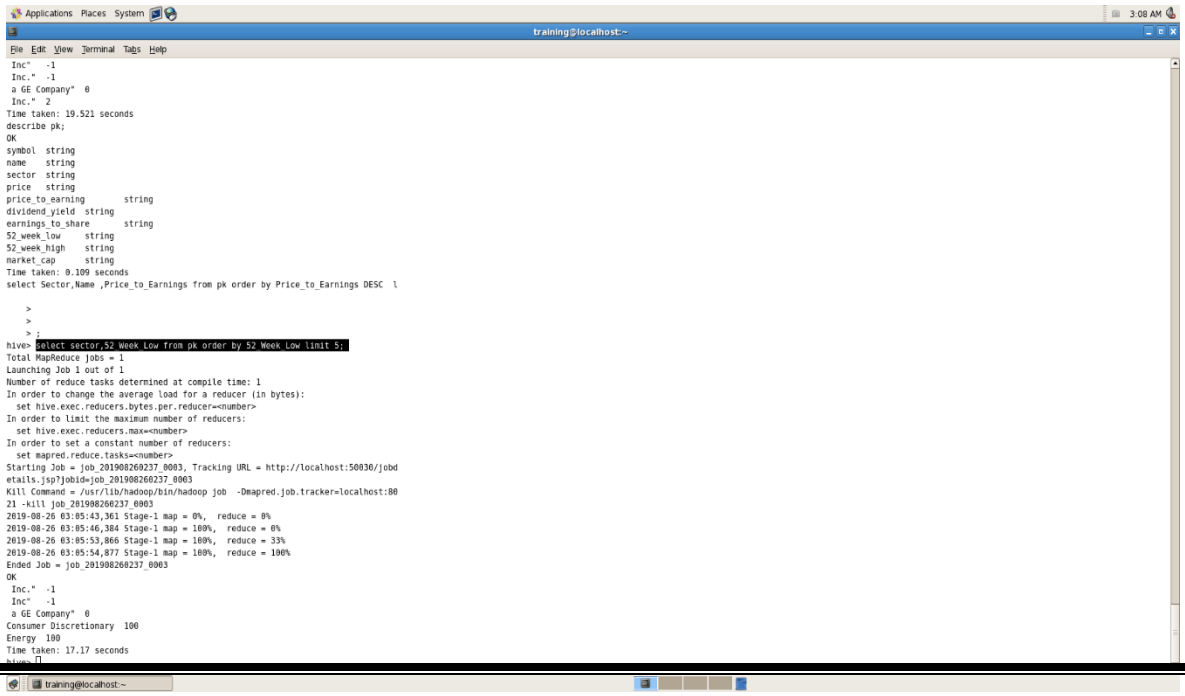


```
Applications  Places  System                                                                    9:18 AM
training@localhost:~
File  Edit  View  Terminal  Tabs  Help
hive> create table stock(Symbol string,Name string,Sector string,Price int,Price_is_to_Earnings int,Dividend_Yield int,Earnings_is_to_Share int,52_Week_Low int,52_Week_High int,Market_Cap int)row format delimited fields terminated by ','
lds terminated by ',' stored as textfile;
FAILED: Error in metadata: AlreadyExistsException(message:Table stock already exists)
FAILED: Execution Error, return code 1 from org.apache.hadoop.hive.ql.exec.DDLTask
hive> create table zx(Symbol string,Name string,Sector string,Price int ,Price_to_Earnings int,Dividend_Yield int Earnings_to_share int 52_Week_Low int ,52_Week_High int Market_Cap string)row format delimited fields terminated by ',' sto
red as textfile;
FAILED: Parse Error: line 1:108 mismatched input 'Earnings_to_share' expecting ) near 'int' in create table statement

hive> create table zx(Symbol string,Name string,Sector string,Price int ,Price_to_Earnings int,Dividend_Yield int Earnings_to_share int 52_Week_Low int ,52_Week_High int Market_Cap string)row format delimited fields terminated by ',' sto
d by ',' stored as textfile;
stock(Symbol string,Name string,Sector string,Price int,Price_is_to_Earnings int,Dividend_Yield int,Earnings_is_to_Share int,52_Week_Low int,52_Week_High int,Market_Cap int)row format delimited fields terminated by ',' stored as textfile

create table stock(Symbol string,Name string,Sector string,Price int,Price_is_to_Earnings int,Dividend_Yield int,Earnings_is_to_Share int,52_Week_Low int,52_Week_High int,Market_Cap int)row format delimited fields terminated by ',' store

zx(Symbol string,Name string,Sector string,Price int ,Price_to_Earnings int,Dividend_Yield int Earnings_to_share int 52_Week_Low int ,52_Week_High int Market_Cap string)row format delimited fields terminated by ',' stored as textfile;
FAILED: Parse Error: line 1:108 mismatched input 'Earnings_to_share' expecting ) near 'int' in create table statement

hive> create table stock(Symbol string,Name string,Sector string,Price int ,Price_to_Earning int,Dividend_Yield int,Earnings_to_Share int ,52_Week_Low int,52_Week_High int,Market_Cap string)row format delimited fields terminated by ',' s
tored as textfile;
FAILED: Error in metadata: AlreadyExistsException(message:Table stock already exists)
FAILED: Execution Error, return code 1 from org.apache.hadoop.hive.ql.exec.DDLTask
hive> create table stock(Symbol string,Name string,Sector string,Price int ,Price_to_Earning int,Dividend_Yield int,Earnings_to_Share int ,52_Week_Low int,52_Week_High int,Market_Cap string)row format delimited fields terminated by ',' s
stock(Symbol string,Name string,Sector string,Price int ,Price_to_Earning int,Dividend_Yield int,Earnings_to_Share int ,52_Week_Low int,52_Week_High int,Market_Cap string)row format delimited fields terminated by ',' stored as textfile;
FAILED: Error in metadata: AlreadyExistsException(message:Table stock already exists)
FAILED: Execution Error, return code 1 from org.apache.hadoop.hive.ql.exec.DDLTask
hive> create table ktp(Symbol string,Name string,Sector string,Price int ,Price_to_Earning int,Dividend_Yield int,Earnings_to_Share int ,52_Week_Low int,52_Week_High int,Market_Cap string)row format delimited fields terminated by ','  st
ored as textfile;
OK
Time taken: 0.505 seconds
hive> create table ktp(Symbol string,Name string,Sector string,Price int ,Price_to_Earning int,Dividend_Yield int,Earnings_to_Share int ,52_Week_Low int,52_Week_High int,Market_Cap string)row format delimited fields terminated by ','  st
stock(Symbol string,Name string,Sector string,Price int,Price_is_to_Earnings int,Dividend_Yield int,Earnings_is_to_Share int,52_Week_Low int,52_Week_High int,Market_Cap int)row format delimited fields terminated by ',' stored as textfile

load data inpath '/user/training/bda/pkt.txt' into table stock;
FAILED: Error in semantic analysis: Line 1:17 Invalid path '/user/training/bda/pkt.txt': No files matching path hdfs://localhost/user/training/bda/pkt.txt
hive> load data  local inpath '/home/training/bda/real.csv' into table ktp;
FAILED: Error in semantic analysis: Line 1:24 Invalid path '/home/training/bda/real.csv': No files matching path file:/home/training/bda/real.csv
hive> load data  local inpath '/home/training/real.csv' into table ktp;
Copying data from file:/home/training/real.csv
Copying file: file:/home/training/real.csv
Loading data to table bda1.ktp
OK
Time taken: 0.919 seconds
hive> select * from ktp limit 5;
OK
Symbol  Name    Sector  NULL    NULL    NULL    NULL    NULL    NULL    Market_Cap
MMM     3M Company      Industrials     223     24      2       8       260     175     138721055226
AOS     A.O. Smith Corp Industrials     60      28      1       2       68      49      10783419933
ABT     Abbott Laboratories     Health Care     56      23      2       0       65      42      102121042306
ABBV    AbbVie Inc.     Health Care     108     19      2       3       126     60      181386347059
Time taken: 0.291 seconds
```

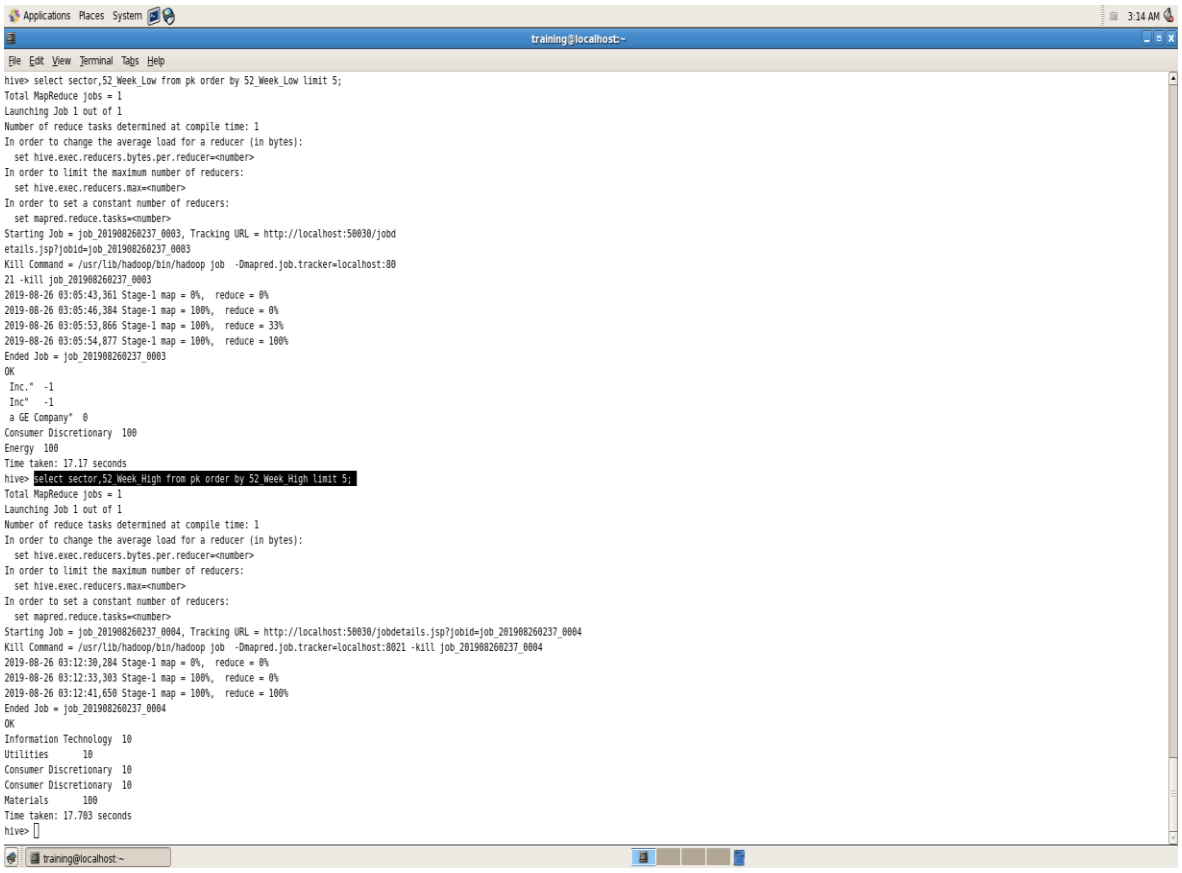
4. Select industry and sectors with low P/E ratio



5 .Select 5 sectors with lowest stock price trader;

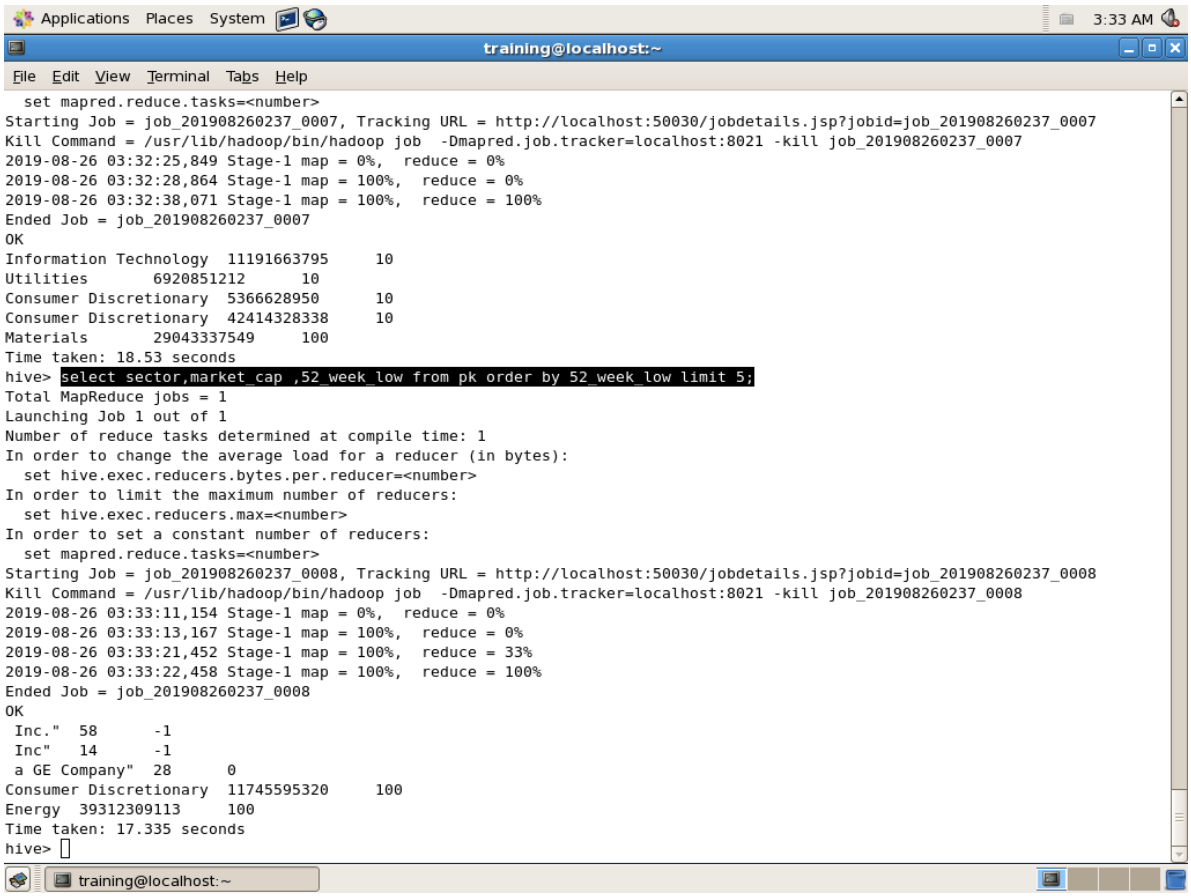


6 Select 5 Sectors with highest stock price trader;



7.Select five sector with market cap with lowest

price at which stock has traded;



8.Select five sector with market cap with highest price at which stock has traded;