Lab Tutorial

GROUP 2
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Amazon Data Analysis using HIVE

Objectives

1. Download, unzip and upload data to HDFS
2. Create Hive tables to query Amazon data
3. Create Hive queries to analyze the data
4. Create Hive queries to analyze sentiment of data using dictionary
5. Download Data into your PC
6. Analyze Data using Power BI

Platform Spec

Oracle Big Data Compute Edition: 5 nodes
CPU Speed: 2.2 GHz
OCPUs: 10
Memory: 150 GB
Storage: 678 GB
HDFS Capacity: 147 GB

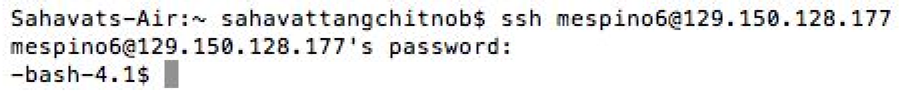
STEP 1: Remotely connect to Oracle Cloud

You must have an ip address to connect to Oracle Cloud

Your CalStateLA username should be a username/pwd for Oracle account

1. SSH to connect it, for example, the instructor mespino6:

ssh mespino6@129.150.128.177

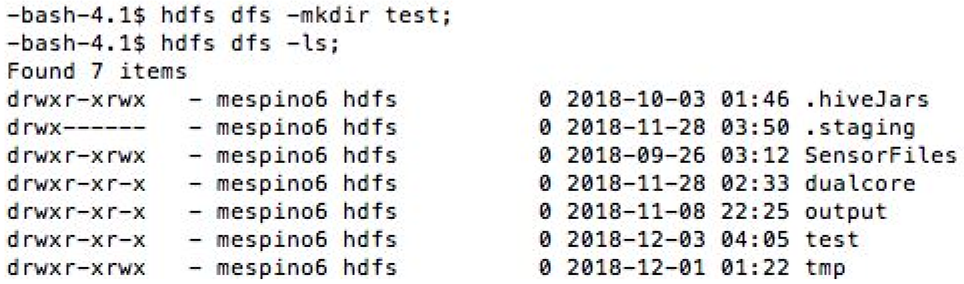


```
Sahavats-Air:~ sahavattangchitnob$ ssh mespino6@129.150.128.177
mespino6@129.150.128.177's password:
-bash-4.1$ █
```

And, you may run the following HDFS commands to test if hdfs works well at your Oracle account:

hdfs dfs -ls
hdfs dfs -mkdir test
hdfs dfs -ls

Example:



```
-bash-4.1$ hdfs dfs -mkdir test;
-bash-4.1$ hdfs dfs -ls;
Found 7 items
drwxr-xrwx   - mespino6 hdfs          0 2018-10-03 01:46 .hiveJars
drwx------   - mespino6 hdfs          0 2018-11-28 03:50 .staging
drwxr-xrwx   - mespino6 hdfs          0 2018-09-26 03:12 SensorFiles
drwxr-xr-x   - mespino6 hdfs          0 2018-11-28 02:33 dualcore
drwxr-xr-x   - mespino6 hdfs          0 2018-11-08 22:25 output
drwxr-xr-x   - mespino6 hdfs          0 2018-12-03 04:05 test
drwxr-xrwx   - mespino6 hdfs          0 2018-12-01 01:22 tmp
```

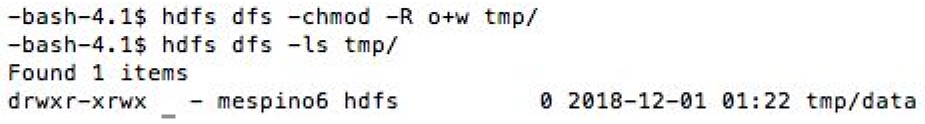
2. Now you have the following 3 commands. The first is to create a directory named “data”. The second is to create a directory named "tables" inside tmp/data/.The third is to list the the files and folders of /user/mespino6/tmp/data/tables

-bash-4.1$ hdfs dfs -mkdir tmp/data
-bash-4.1$ hdfs dfs -mkdir tmp/data/tables
-bash-4.1$ hdfs dfs -ls tmp/data/tables

3. Run the following HDFS command to make your beeline command works:

-bash-4.1$ hdfs dfs -chmod -R o+w tmp/

Example:



```
-bash-4.1$ hdfs dfs -chmod -R o+w tmp/
-bash-4.1$ hdfs dfs -ls tmp/
Found 1 items
drwxr-xrwx _ - mespino6 hdfs          0 2018-12-01 01:22 tmp/data
```

STEP 2: Downloading Data into your Oracle Big Data

After the Hive tables are created, you can download it to your lab (or personal PC/Laptop) as follows:

1. Open another terminal with git bash, minty, or putty, which is to connect the Oracle cloud to download the output file and unzip the contents to - at the HDFS path “/user/mespino6/tmp/data/tables ”:

```
wget -O amazon_reviews_us_Books_v1_02.tsv.gz https://s3.amazonaws.com/amazon-reviews-pds/tsv/amazon_reviews_us_Books_v1_02.tsv.gz
```

2. Unzip and put tsv.gz into hdfs

```
gunzip -c amazon_reviews_us_Books_v1_02.tsv.gz | hadoop fs -put - /user/mespino6/tmp/data/tables;
```

STEP 3: Creating Hive Tables and Queries to Analyze Data

1. Open beeline CLI (Command Line Shell Interface) that is equivalent to hive CLI environment as follows, which you have done in the previous lab. Beeline is for multiple users’ access to Hive Server 2 of a Hadoop cluster. You have to copy and paste “!connect …” command given by the instructor at the lab page of Canvas to beeline and press enter without any password when it asks for password.

```
-bash-4.1$ beeline
```

NOTE: the following connect url is an example and it should be given by the instructor at a lab page of the course web site:

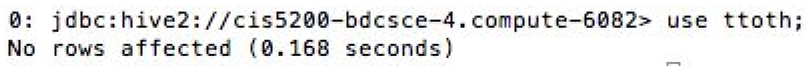
```
WARNING: Use "yarn jar" to launch YARN applications.
Beeline version 1.2.1000.2.4.2.0-258 by Apache Hive
beeline> !connect jdbc:hive2://cis5200-bdcsce-4.compute-608214094.oraclecloud.internal:2181,cis5200-bdcsce-2.compute-608214094.oraclecloud.internal:2181,cis5200-bdcsce-3.compute-608214094.oraclecloud.internal:2181/;serviceDiscoveryMode=zooKeeper;zooKeeperNamespace=hiveserver2?tez.queue.name=interactive bdcsce_admin
```

```
Connecting to
jdbc:hive2://cis5200-bdcsce-4.compute-608214094.oraclecloud.internal:2181,cis5200-bdcsce-2.compute-608214094.oraclecloud.internal:2181,cis5200-bdcsce-3.compute-608214094.oraclecloud.internal:2181/;serviceDiscoveryMode=zooKeeper;zooKeeperNamespace=hiveserver2?tez.queue.name=interactive
Enter password for
jdbc:hive2://cis5200-bdcsce-4.compute-608214094.oraclecloud.internal:2181,cis5200-bdcsce-2.compute-608214094.oraclecloud.internal:2181,cis5200-bdcsce-3.compute-608214094.oraclecloud.internal:2181/;serviceDiscoveryMode=zooKeeper;zooKeeperNamespace=hiveserver2?tez.queue.name=interactive:
Connected to: Apache Hive (version 1.2.1000.2.4.2.0-258)
Driver: Hive JDBC (version 1.2.1000.2.4.2.0-258)
Transaction isolation: TRANSACTION_REPEATABLE_READ

0: jdbc:hive2://cis5200-bdcsce-4.compute-6082>
```

NOTE: If you see “CLOSED” in the above beeline shell prompt, it is not connected to Hive Server2.

2. Now you have to create your database with your username to separate your tables with other users. For example, the user TtoTH should run the following:

```
Create database TtoTH;

use TtoTH;
```



```
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> use ttoth;
No rows affected (0.168 seconds)
```

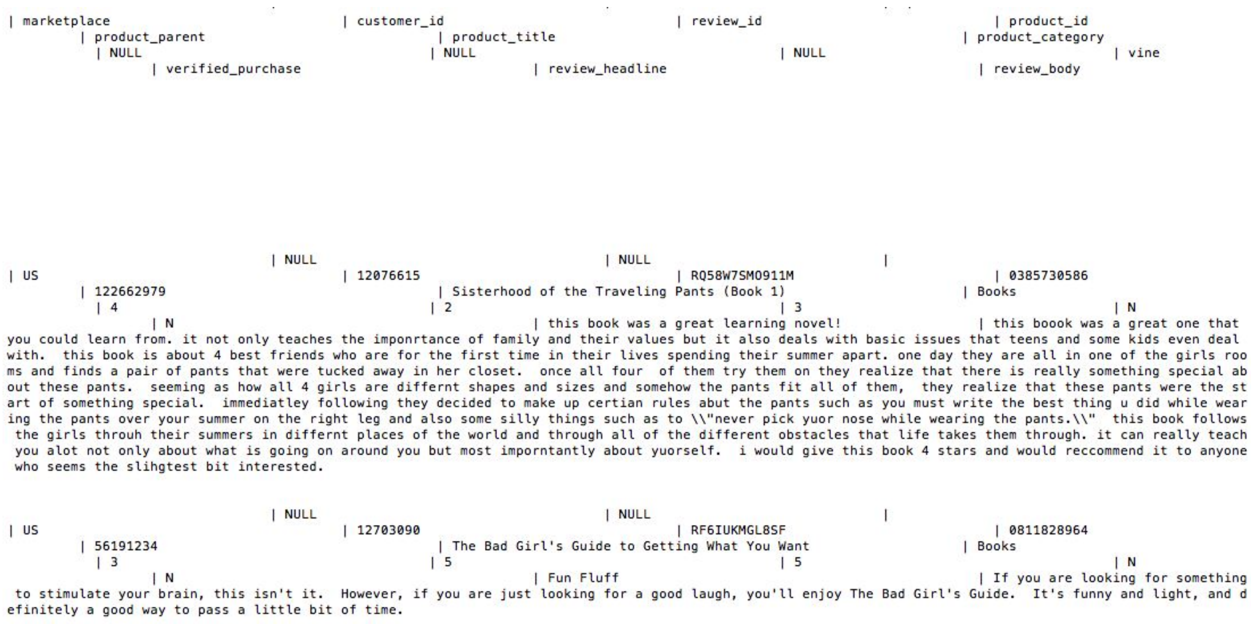
3. In the beeline shell CLI, you need to copy and paste the following HiveQL code to create an external table “amazon_reviews_traditional” and populate it with data you downloaded:

```
CREATE EXTERNAL TABLE amazon_reviews_traditional (
  marketplace string,
  customer_id string,
  review_id int,
  product_id int,
  product_parent string,
  product_title string,
  product_category string,
  star_rating int,
  helpful_votes int,
  total_votes int,
  vine string,
  verified_purchase string,
  review_headline string,
  review_body string,
  review_date bigint,
  year int)
```

```
ROW FORMAT DELIMITED FIELDS TERMINATED BY '\t' LOCATION
'/user/mespino6/tmp/data/tables';
```

4. Now you can query the content of the amazon_reviews_traditional table:

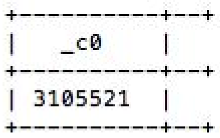
```
SELECT * FROM amazon_reviews_traditional limit 10;
```



```
| marketplace                             | customer_id                              | review_id                             | product_id
           | product_parent                           | product_title                                                    | product_category
           | NULL                                    | NULL                                       | NULL                                    | vine
                  | verified_purchase                             | review_headline                                        | review_body





                                 | NULL                                     | NULL                            |
| US                                      | 12076615                                 | RQ58W7SM0911M                         | 0385730586
         | 122662979                             | Sisterhood of the Traveling Pants (Book 1)                       | Books
           | 4                                     | 2                                          | 3                                       | N
                  | N                                             | this book was a great learning novel!                  | this boook was a great one that
you could learn from. it not only teaches the imponrtance of family and their values but it also deals with basic issues that teens and some kids even deal
with.  this book is about 4 best friends who are for the first time in their lives spending their summer apart. one day they are all in one of the girls roo
ms and finds a pair of pants that were tucked away in her closet.  once all four  of them try them on they realize that there is really something special ab
out these pants.  seeming as how all 4 girls are differnt shapes and sizes and somehow the pants fit all of them,  they realize that these pants were the st
art of something special.  immediatley following they decided to make up certian rules abut the pants such as you must write the best thing u did while wear
ing the pants over your summer on the right leg and also some silly things such as to \\"never pick yuor nose while wearing the pants.\\"  this book follows
 the girls throuh their summers in differnt places of the world and through all of the different obstacles that life takes them through. it can really teach
 you alot not only about what is going on around you but most imporntantly about yuorself.  i would give this book 4 stars and would reccommend it to anyone
 who seems the slihgtest bit interested.

                                 | NULL                                     | NULL                            |
| US                                      | 12703090                                 | RF6IUKMGL8SF                          | 0811828964
         | 56191234                              | The Bad Girl's Guide to Getting What You Want                    | Books
           | 3                                     | 5                                          | 5                                       | N
                  | N                                             | Fun Fluff                                              | If you are looking for something
 to stimulate your brain, this isn't it.  However, if you are just looking for a good laugh, you'll enjoy The Bad Girl's Guide.  It's funny and light, and d
efinitely a good way to pass a little bit of time.
```

5. Count the records in the ratings table to ensure that all 3105521 records are available:

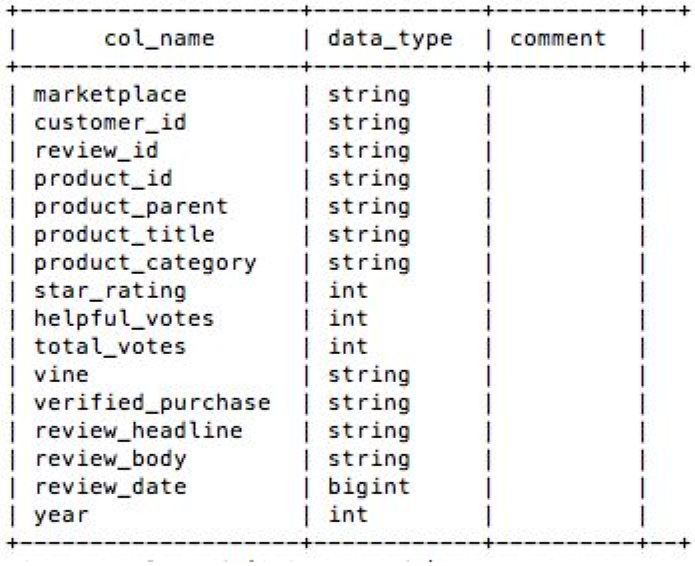
```
SELECT COUNT(*) FROM amazon_reviews_traditional;
```



```
+----------+--+
|   _c0    |
+----------+--+
| 3105521  |
+----------+--+
```

You can see the structure of the table as well:

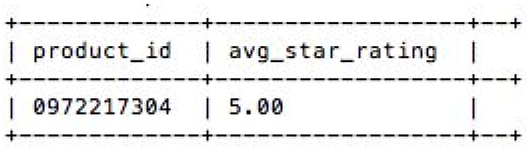
DESCRIBE amazon_reviews_traditional;



```
+--------------------+------------+----------+--+
|      col_name      | data_type  | comment  |
+--------------------+------------+----------+--+
| marketplace        | string     |          |
| customer_id        | string     |          |
| review_id          | string     |          |
| product_id         | string     |          |
| product_parent     | string     |          |
| product_title      | string     |          |
| product_category   | string     |          |
| star_rating        | int        |          |
| helpful_votes      | int        |          |
| total_votes        | int        |          |
| vine               | string     |          |
| verified_purchase  | string     |          |
| review_headline    | string     |          |
| review_body        | string     |          |
| review_date        | bigint     |          |
| year               | int        |          |
+--------------------+------------+----------+--+
```

5. We want to find the product that customers like most, but must guard against being misled by products that have few ratings assigned. Run the following query to find the product with the highest average using DESC among all those with at least 50 ratings, which should show the following result:

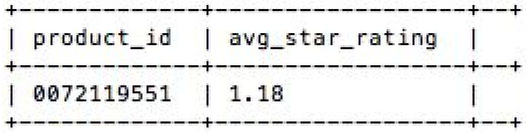
```
SELECT product_id, FORMAT_NUMBER(avg_star_rating,2) AS avg_star_rating
        FROM (SELECT product_id, AVG(star_rating) AS avg_star_rating,
                COUNT(*) AS num
                FROM amazon_reviews_traditional
                GROUP by product_id) amazon_reviews_traditional
        WHERE num >=50
        ORDER BY avg_star_rating DESC
        LIMIT 1;
```



```
+-------------+------------------+--+
| product_id  | avg_star_rating  |
+-------------+------------------+--+
| 0972217304  | 5.00             |
+-------------+------------------+--+
```

Rewrite, and then execute, the query above to find the product with the lowest average using ASC among products with at least 50 ratings (num >= 50). You should see that the result is product ID 007119551 with an average rating of 1.18, which should show the following result:

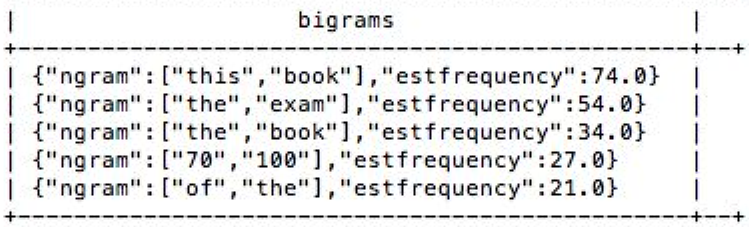
```
SELECT product_id, FORMAT_NUMBER(avg_star_rating,2) AS avg_star_rating
        FROM (SELECT product_id, AVG(star_rating) AS avg_star_rating,
                COUNT(*) AS num
                FROM amazon_reviews_traditional
                GROUP by product_id) amazon_reviews_traditional
        WHERE num >=50
        ORDER BY avg_star_rating ASC
        LIMIT 1;
```



```
+-------------+------------------+--+
| product_id  | avg_star_rating  |
+-------------+------------------+--+
| 0072119551  | 1.18             |
+-------------+------------------+--+
```

7. The following query normalizes all comments on that product to lowercase, breaks them into individual words using the SENTENCES function, and passes those to the NGRAMS function to find the five most common bigrams (two-word combinations). Run the query in Hive:

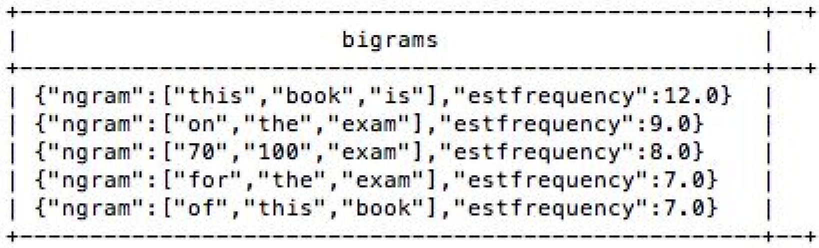
```
SELECT EXPLODE(NGRAMS(SENTENCES(LOWER(review_body)), 2, 5)) AS
bigrams FROM amazon_reviews_traditional WHERE product_id = 0072119551;
```



```
+-----------------------------------------------+--+
|                    bigrams                    |
+-----------------------------------------------+--+
| {"ngram":["this","book"],"estfrequency":74.0}  |
| {"ngram":["the","exam"],"estfrequency":54.0}   |
| {"ngram":["the","book"],"estfrequency":34.0}   |
| {"ngram":["70","100"],"estfrequency":27.0}     |
| {"ngram":["of","the"],"estfrequency":21.0}     |
+-----------------------------------------------+--+
```

8. Most of these words are too common to provide much insight. Modify the previous query to find the five most common trigrams (three-word combinations), and then run that query in Hive, which shows the following result:

SELECT EXPLODE(NGRAMS(SENTENCES(LOWER(review_body)), 3, 5)) AS bigrams FROM amazon_reviews_traditional WHERE product_id = 0072119551;

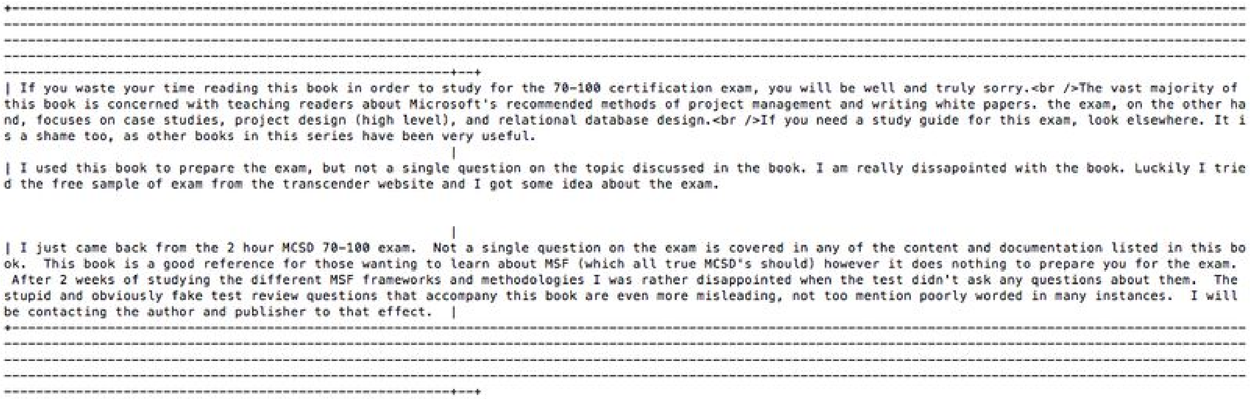


```
+-----------------------------------------------------+--+
|                       bigrams                       |
+-----------------------------------------------------+--+
| {"ngram":["this","book","is"],"estfrequency":12.0}  |
| {"ngram":["on","the","exam"],"estfrequency":9.0}    |
| {"ngram":["70","100","exam"],"estfrequency":8.0}    |
| {"ngram":["for","the","exam"],"estfrequency":7.0}   |
| {"ngram":["of","this","book"],"estfrequency":7.0}   |
+-----------------------------------------------------+--+
```

9. Among the patterns you see in the result is the phrase “the exam.” This might be related to the complaints that the book does not help students study for an exam. Now that you’ve identified a specific phrase, look at a few comments that contain it by running this query:

SELECT review_body FROM amazon_reviews_traditional WHERE product_id = 0072119551 AND review_body LIKE '%the exam%' LIMIT 3;

You should see three comments that talk about the 70-100 certification exam and how the book does not adequately prepare the customer for the exam:

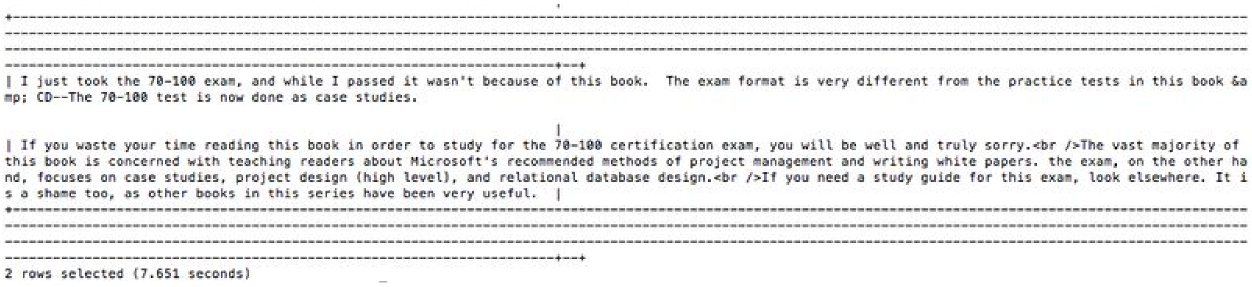


```
+----------------------------------------------------------------------------------------------------------------------------------
----------------------------------------------------------------------------------------------------------------------------------
----------------------------------------------------------------------------------------------------------------------------------
----------------------------------------------------------------------------------------------------------------------------------
-------------------------------------------------------+--+
| If you waste your time reading this book in order to study for the 70-100 certification exam, you will be well and truly sorry.<br />The vast majority of
this book is concerned with teaching readers about Microsoft's recommended methods of project management and writing white papers. the exam, on the other ha
nd, focuses on case studies, project design (high level), and relational database design.<br />If you need a study guide for this exam, look elsewhere. It i
s a shame too, as other books in this series have been very useful.
                                                       |
| I used this book to prepare the exam, but not a single question on the topic discussed in the book. I am really dissapointed with the book. Luckily I trie
d the free sample of exam from the transcender website and I got some idea about the exam.


                                                       |
| I just came back from the 2 hour MCSD 70-100 exam.  Not a single question on the exam is covered in any of the content and documentation listed in this bo
ok.  This book is a good reference for those wanting to learn about MSF (which all true MCSD's should) however it does nothing to prepare you for the exam.
 After 2 weeks of studying the different MSF frameworks and methodologies I was rather disappointed when the test didn't ask any questions about them.  The
stupid and obviously fake test review questions that accompany this book are even more misleading, not too mention poorly worded in many instances.  I will
be contacting the author and publisher to that effect.  |
+----------------------------------------------------------------------------------------------------------------------------------
----------------------------------------------------------------------------------------------------------------------------------
----------------------------------------------------------------------------------------------------------------------------------
----------------------------------------------------------------------------------------------------------------------------------
-------------------------------------------------------+--+
```

10. We can infer that customers are complaining about how the book does not have relevant content for those taking the exam in question, but the comment alone doesn’t provide enough detail. One of the words (“70”) in that comment was also found in the list of trigrams from the earlier query. Run the following query that will find all distinct

comments containing the word “70” that are associated with product ID 0072119551, which shows the result below:

SELECT review_body FROM amazon_reviews_traditional WHERE product_id = 0072119551 AND review_body LIKE '%70%' LIMIT 2;



```
+--------------------------------------------------------------------------------------------------------------------------------
--------------------------------------------------------------------------------------------------------------------------------
--------------------------------------------------------------------------------------------------------------------------------
-----------------------------------------------------------------------+--+
| I just took the 70-100 exam, and while I passed it wasn't because of this book.  The exam format is very different from the practice tests in this book &a
mp; CD--The 70-100 test is now done as case studies.

                                                                       |
| If you waste your time reading this book in order to study for the 70-100 certification exam, you will be well and truly sorry.<br />The vast majority of
this book is concerned with teaching readers about Microsoft's recommended methods of project management and writing white papers. the exam, on the other ha
nd, focuses on case studies, project design (high level), and relational database design.<br />If you need a study guide for this exam, look elsewhere. It i
s a shame too, as other books in this series have been very useful.  |
+--------------------------------------------------------------------------------------------------------------------------------
--------------------------------------------------------------------------------------------------------------------------------
--------------------------------------------------------------------------------------------------------------------------------
-----------------------------------------------------------------------+--+
2 rows selected (7.651 seconds)
```

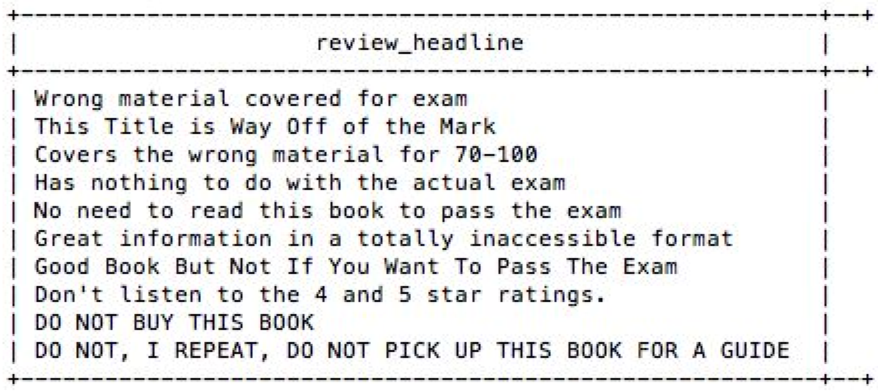
The previous step should have displayed two comments:

1. I just took the 70-100 exam, and while I passed it wasn't because of this book. The exam format is very different from the practice tests in this book & CD--The 70-100 test is now done as case studies.

2. If you waste your time reading this book in order to study for the 70-100 certification exam, you will be well and truly sorry.The vast majority of this book is concerned with teaching readers about Microsoft's recommended methods of project management and writing white papers. the exam, on the other hand, focuses on case studies, project design (high level), and relational database design. If you need a study guide for this exam, look elsewhere. It is a shame too, as other books in this series have been very useful.

11. The second comment states that the book's content is irrelevant to the 70-100 exam, unlike similar books in its series. Write and run a query that will display 10 review headlines for product ID 0072119551 in the amazon_traditional_reviews table.

SELECT review_headline FROM amazon_reviews_traditional WHERE product_id=0072119551 LIMIT 10;



```
+------------------------------------------------------------+--+
|                     review_headline                         |
+------------------------------------------------------------+--+
| Wrong material covered for exam                              |
| This Title is Way Off of the Mark                            |
| Covers the wrong material for 70-100                         |
| Has nothing to do with the actual exam                       |
| No need to read this book to pass the exam                   |
| Great information in a totally inaccessible format           |
| Good Book But Not If You Want To Pass The Exam               |
| Don't listen to the 4 and 5 star ratings.                    |
| DO NOT BUY THIS BOOK                                         |
| DO NOT, I REPEAT, DO NOT PICK UP THIS BOOK FOR A GUIDE       |
+------------------------------------------------------------+--+
```

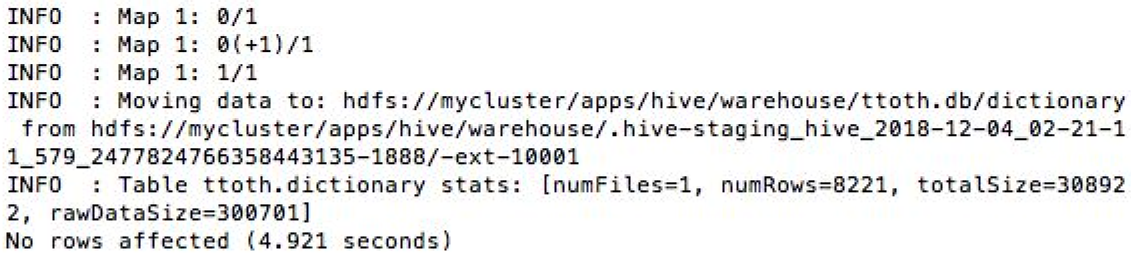
The query results show that the book's content is good, but the title is misleading. Customers who want a study guide for the exam are purchasing this book based on the title, but the content is not geared towards the exam.

Based on the review_body and review_headline columns, it appears that doing text processing has helped this author uncover a title error.

STEP 4: Create Hive Queries to Analyze the Sentiment of Data Using Dictionary and Download Data into your PC

1. Copy the dictionary table, which has **polarity** to show each word's meaning implied as positive or negative, from the main database into the TtoTh Database:

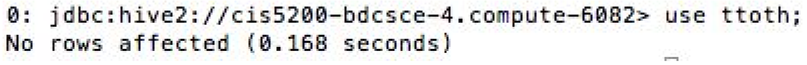
CREATE TABLE TtoTH.dictionary AS select * from dictionary



```
INFO  : Map 1: 0/1
INFO  : Map 1: 0(+1)/1
INFO  : Map 1: 1/1
INFO  : Moving data to: hdfs://mycluster/apps/hive/warehouse/ttoth.db/dictionary
 from hdfs://mycluster/apps/hive/warehouse/.hive-staging_hive_2018-12-04_02-21-1
1_579_2477824766358443135-1888/-ext-10001
INFO  : Table ttoth.dictionary stats: [numFiles=1, numRows=8221, totalSize=30892
2, rawDataSize=300701]
No rows affected (4.921 seconds)
```

We need to use the TtoTH database to query data:

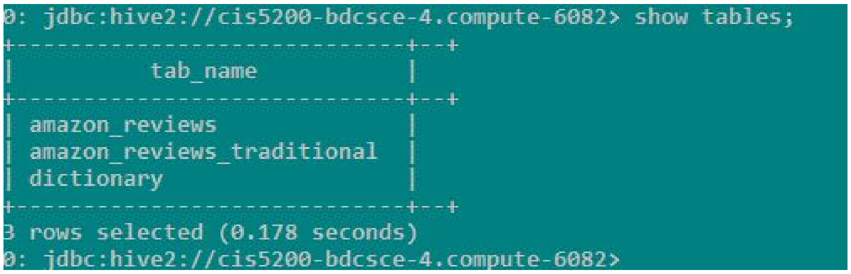
Use TtoTH;



```
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> use ttoth;
No rows affected (0.168 seconds)
```

Make sure that the dictionary table has been created using command:

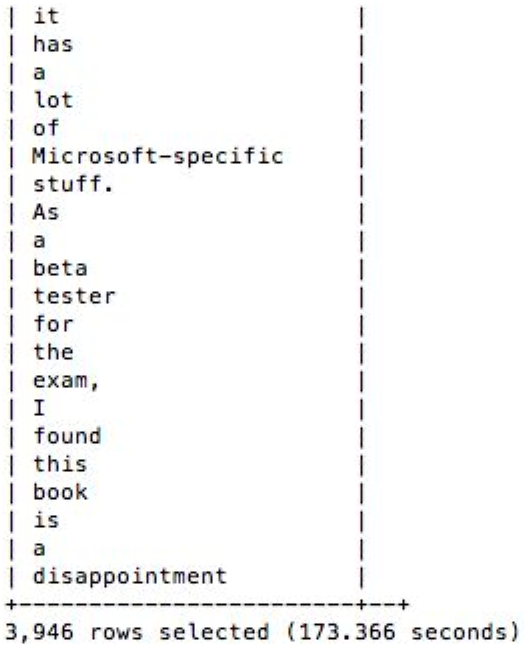
SHOW tables;



```
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> show tables;
+-----------------------------+--+
|          tab_name           |
+-----------------------------+--+
| amazon_reviews              |
| amazon_reviews_traditional  |
| dictionary                  |
+-----------------------------+--+
3 rows selected (0.178 seconds)
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082>
```

2. Using EXPLODE, list all words in review body for product_id=0072119551, MCSD Analyzing Requirements: Exam 70-100 (MCSD Study Guides), which should produce 3,946 results:

```
SELECT EXPLODE(SPLIT(review_body, ' ')) AS word
        FROM amazon_reviews_traditional
        WHERE product_id = 0072119551;
```

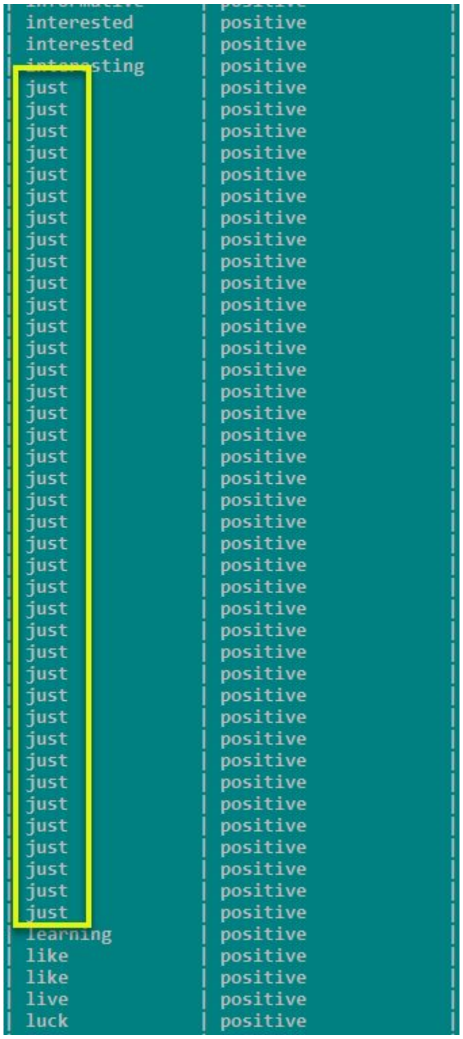


```
| it                        |
| has                       |
| a                         |
| lot                       |
| of                        |
| Microsoft-specific        |
| stuff.                    |
| As                        |
| a                         |
| beta                      |
| tester                    |
| for                       |
| the                       |
| exam,                     |
| I                         |
| found                     |
| this                      |
| book                      |
| is                        |
| a                         |
| disappointment            |
+-------------------------+--+
3,946 rows selected (173.366 seconds)
```

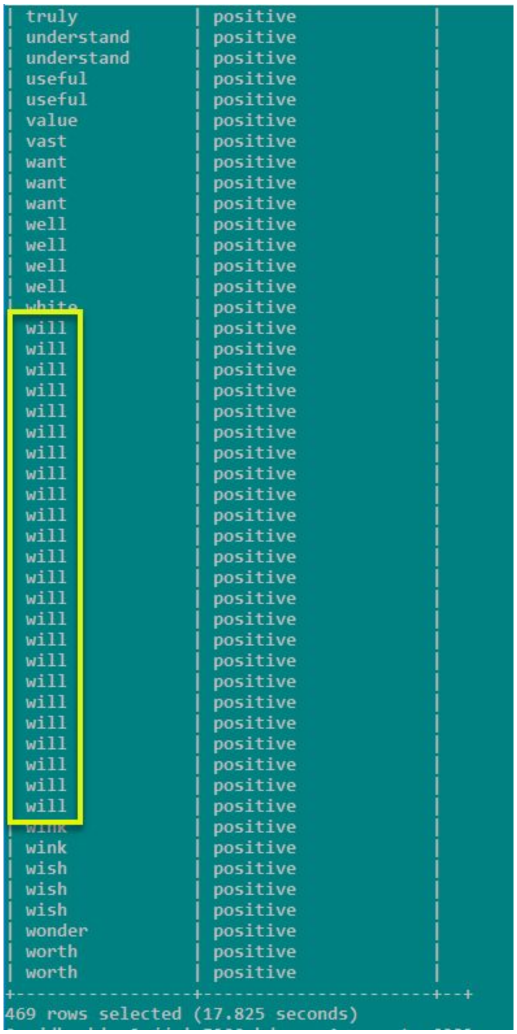
3. Display words which are accounted for in the Dictionary table and order by polarity,

which should display 469 Results:

```
SELECT words, dictionary.polarity
        FROM (SELECT explode(split(review_body, ' '))
        AS words FROM amazon_reviews_traditional
        WHERE product_id = 0072119551)
a join Dictionary on words=word
ORDER by dictionary.polarity, words;
```



```
| informative        | positive                |
| interested         | positive                |
| interested         | positive                |
| interesting        | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| just               | positive                |
| learning           | positive                |
| like               | positive                |
| like               | positive                |
| live               | positive                |
| luck               | positive                |
```



```
| truly             | positive              |
| understand        | positive              |
| understand        | positive              |
| useful            | positive              |
| useful            | positive              |
| value             | positive              |
| vast              | positive              |
| want              | positive              |
| want              | positive              |
| want              | positive              |
| well              | positive              |
| well              | positive              |
| well              | positive              |
| well              | positive              |
| white             | positive              |
| will              | positive              |
| will              | positive              |
| will              | positive              |
| will              | positive              |
| will              | positive              |
| will              | positive              |
| will              | positive              |
| will              | positive              |
| will              | positive              |
| will              | positive              |
| will              | positive              |
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| will              | positive              |
| will              | positive              |
| will              | positive              |
| will              | positive              |
| will              | positive              |
| will              | positive              |
| will              | positive              |
| will              | positive              |
| wink              | positive              |
| wink              | positive              |
| wish              | positive              |
| wish              | positive              |
| wish              | positive              |
| wonder            | positive              |
| worth             | positive              |
| worth             | positive              |
+-----------------+----------------------+--+
469 rows selected (17.825 seconds)
```
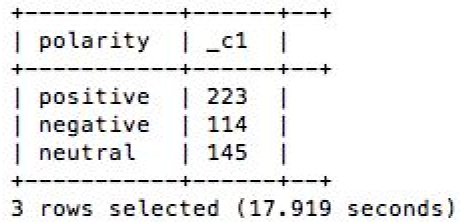

4. Show totals by polarity to determine if the reviews are mainly positive or negative:

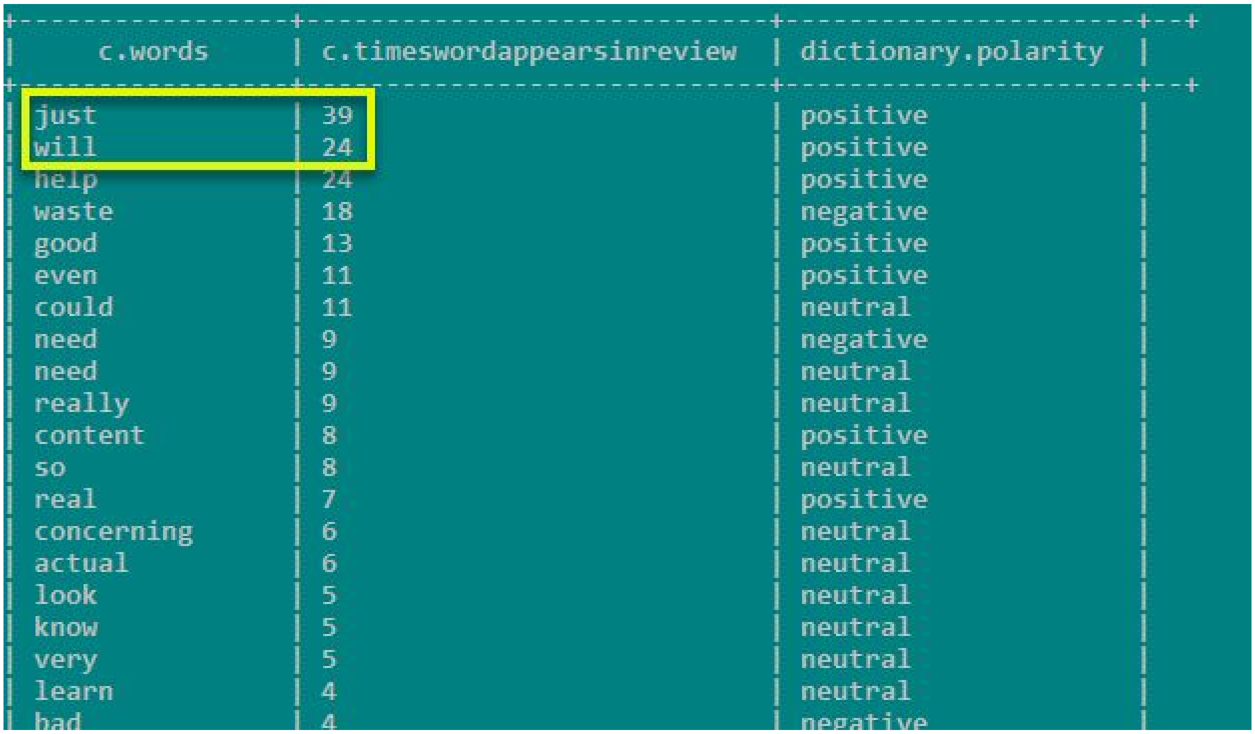
```
SELECT polarity, sum(TimesWordAppearsInReview)
        FROM(SELECT DISTINCT words,
        TimesWordAppearsInReview,
        polarity
        FROM (SELECT words, COUNT(words) as TimesWordAppearsInReview
        FROM(SELECT words
        FROM(SELECT explode(split(review_body, ' ')) AS words
FROM amazon_reviews_traditional
        WHERE product_id = 0072119551) a join Dictionary on words=word
        ORDER BY words) b
        GROUP BY words) c
        JOIN Dictionary on words=word
        ORDER BY words, polarity) d
        GROUP by polarity;
```



```
+-----------+------+--+
| polarity  | _c1  |
+-----------+------+--+
| positive  | 223  |
| negative  | 114  |
| neutral   | 145  |
+-----------+------+--+
3 rows selected (17.919 seconds)
```

5. Even though this book has the lowest average rating, it’s "positive" polarity is such a high number. This may be an error, so run the following hive command to determine what positive words may be skewing the results:

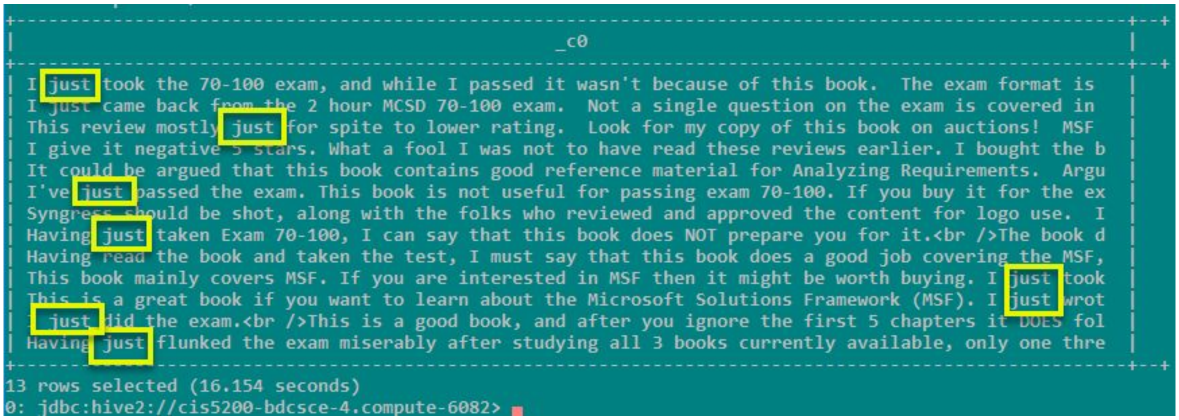
```
SELECT DISTINCT c.words, c.TimesWordAppearsInReview, Dictionary.polarity
        FROM (SELECT words, COUNT(words) as TimesWordAppearsInReview
        FROM(SELECT words FROM(SELECT explode(split(review_body, ' ')) as words
FROM amazon_reviews_traditional
        WHERE product_id = 0072119551) a JOIN Dictionary on words=word
        ORDER BY words) b
        GROUP by words) c JOIN Dictionary on words=word
        ORDER by TimesWordAppearsInReview DESC;
```



```
+-----------------+--------------------------------+-------------------------+--+
|     c.words     | c.timeswordappearsinreview     | dictionary.polarity     |
+-----------------+--------------------------------+-------------------------+--+
| just            | 39                             | positive                |
| will            | 24                             | positive                |
| help            | 24                             | positive                |
| waste           | 18                             | negative                |
| good            | 13                             | positive                |
| even            | 11                             | positive                |
| could           | 11                             | neutral                 |
| need            | 9                              | negative                |
| need            | 9                              | neutral                 |
| really          | 9                              | neutral                 |
| content         | 8                              | positive                |
| so              | 8                              | neutral                 |
| real            | 7                              | positive                |
| concerning      | 6                              | neutral                 |
| actual          | 6                              | neutral                 |
| look            | 5                              | neutral                 |
| know            | 5                              | neutral                 |
| very            | 5                              | neutral                 |
| learn           | 4                              | neutral                 |
| bad             | 4                              | negative                |
```

6. The words “just” and “will” appear 39 and 24 times respectively. These may or may not be positive in most contexts. We can look at a few comments that contain these words to see if the comment is positive or negative overall:

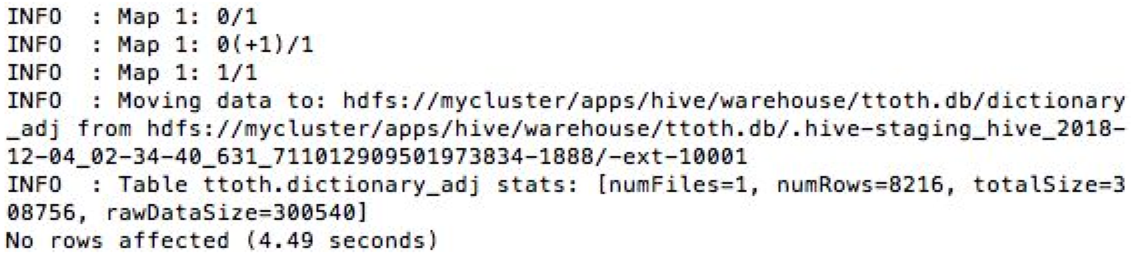
```
SELECT substr(review_body,0,100)
FROM amazon_reviews_traditional
        WHERE review_body like '%just%' and product_id = 0072119551;
```



```
+------------------------------------------------------------------------------------------------------+--+
|                                                _c0                                                   |
+------------------------------------------------------------------------------------------------------+--+
| I just took the 70-100 exam, and while I passed it wasn't because of this book.  The exam format is  |
| I just came back from the 2 hour MCSD 70-100 exam.  Not a single question on the exam is covered in  |
| This review mostly just for spite to lower rating.  Look for my copy of this book on auctions!  MSF  |
| I give it negative 5 stars. What a fool I was not to have read these reviews earlier. I bought the b |
| It could be argued that this book contains good reference material for Analyzing Requirements.  Argu |
| I've just passed the exam. This book is not useful for passing exam 70-100. If you buy it for the ex |
| Syngress should be shot, along with the folks who reviewed and approved the content for logo use.  I |
| Having just taken Exam 70-100, I can say that this book does NOT prepare you for it.<br />The book d |
| Having read the book and taken the test, I must say that this book does a good job covering the MSF, |
| This book mainly covers MSF. If you are interested in MSF then it might be worth buying. I just took |
| This is a great book if you want to learn about the Microsoft Solutions Framework (MSF). I just wrot |
| I just did the exam.<br />This is a good book, and after you ignore the first 5 chapters it DOES fol |
| Having just flunked the exam miserably after studying all 3 books currently available, only one thre |
+------------------------------------------------------------------------------------------------------+--+
13 rows selected (16.154 seconds)
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082>
```

7. We can see from the comments that they are not positive overall. The words “just” and “will” are skewing our results. We need to clean up the data by omitting these words by using the following HIVE command:

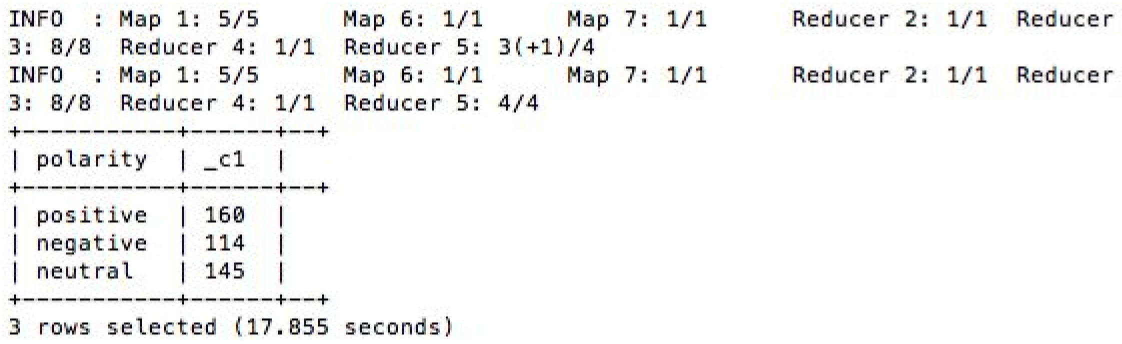
```
CREATE TABLE TtoTH.dictionary_adj AS select * from dictionary where word not in
('just','will');
```



```
INFO  : Map 1: 0/1
INFO  : Map 1: 0(+1)/1
INFO  : Map 1: 1/1
INFO  : Moving data to: hdfs://mycluster/apps/hive/warehouse/ttoth.db/dictionary
_adj from hdfs://mycluster/apps/hive/warehouse/ttoth.db/.hive-staging_hive_2018-
12-04_02-34-40_631_711012909501973834-1888/-ext-10001
INFO  : Table ttoth.dictionary_adj stats: [numFiles=1, numRows=8216, totalSize=3
08756, rawDataSize=300540]
No rows affected (4.49 seconds)
```

8. Show totals by polarity using the new dictionary without words “just” and “will”

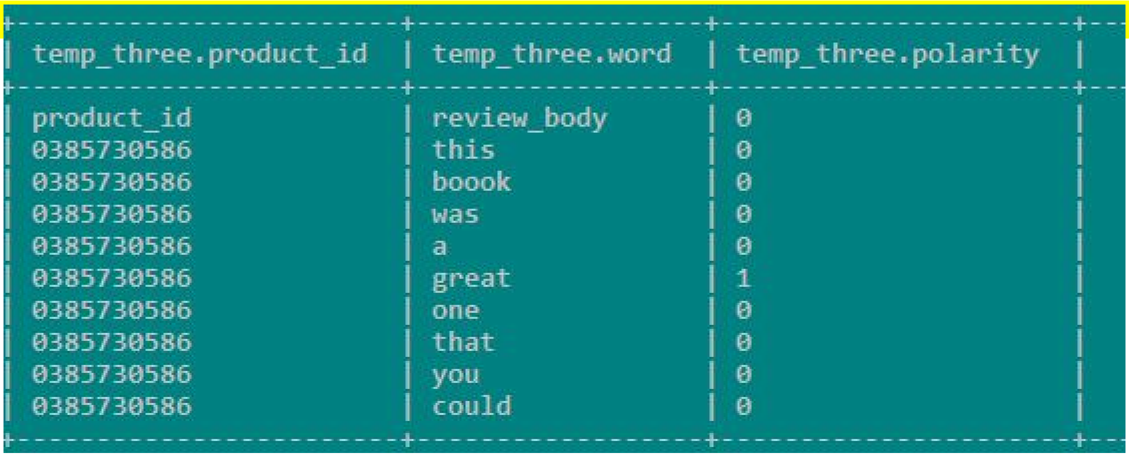
```
SELECT polarity, SUM(TimesWordAppearsInReview)
        FROM (SELECT DISTINCT words, TimesWordAppearsInReview, polarity
FROM (SELECT words, COUNT(words) as TimesWordAppearsInReview
FROM (SELECT words
        FROM (SELECT explode(split(review_body, ' ')) AS words
FROM amazon_reviews_traditional
        WHERE product_id = 0072119551) a
        JOIN dictionary_adj on words=word
        ORDER BY words) b
        GROUP BY words) c
        JOIN dictionary_adj on words=word
        ORDER BY words, polarity) d
        GROUP BY polarity;
```



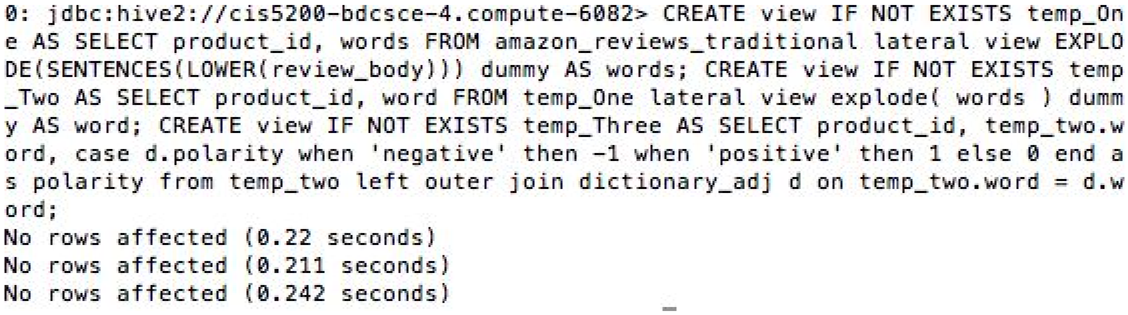
```
INFO  : Map 1: 5/5      Map 6: 1/1      Map 7: 1/1      Reducer 2: 1/1  Reducer
3: 8/8  Reducer 4: 1/1  Reducer 5: 3(+1)/4
INFO  : Map 1: 5/5      Map 6: 1/1      Map 7: 1/1      Reducer 2: 1/1  Reducer
3: 8/8  Reducer 4: 1/1  Reducer 5: 4/4
+-----------+------+--+
| polarity  | _c1  |
+-----------+------+--+
| positive  | 160  |
| negative  | 114  |
| neutral   | 145  |
+-----------+------+--+
3 rows selected (17.855 seconds)
```

9. Now that we've cleaned our data we can get around to computing the sentiment. Use the following 3 Hive commands to create 3 views that will allow us to do that:

```
CREATE view IF NOT EXISTS temp_One AS
        SELECT product_id, words
FROM amazon_reviews_traditional
        lateral view EXPLODE(SENTENCES(LOWER(review_body))) dummy AS words;

CREATE view IF NOT EXISTS temp_Two AS
        SELECT product_id, word
FROM temp_One
        lateral view explode( words ) dummy AS word;

CREATE view IF NOT EXISTS temp_Three AS
        SELECT product_id,
        temp_two.word,
        case d.polarity
        when 'negative' then -1
        when 'positive' then 1
        else 0 end as polarity
        from temp_two left outer join dictionary_adj d on temp_two.word = d.word;
```



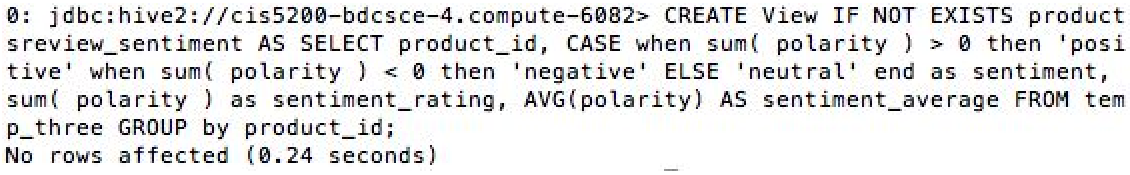
```
+-------------------------+------------------+-----------------------+---
| temp_three.product_id   | temp_three.word  | temp_three.polarity   |
+-------------------------+------------------+-----------------------+---
| product_id              | review_body      | 0                     |
| 0385730586              | this             | 0                     |
| 0385730586              | boook            | 0                     |
| 0385730586              | was              | 0                     |
| 0385730586              | a                | 0                     |
| 0385730586              | great            | 1                     |
| 0385730586              | one              | 0                     |
| 0385730586              | that             | 0                     |
| 0385730586              | you              | 0                     |
| 0385730586              | could            | 0                     |
+-------------------------+------------------+-----------------------+---
```



```
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> CREATE view IF NOT EXISTS temp_On
e AS SELECT product_id, words FROM amazon_reviews_traditional lateral view EXPLO
DE(SENTENCES(LOWER(review_body))) dummy AS words; CREATE view IF NOT EXISTS temp
_Two AS SELECT product_id, word FROM temp_One lateral view explode( words ) dumm
y AS word; CREATE view IF NOT EXISTS temp_Three AS SELECT product_id, temp_two.w
ord, case d.polarity when 'negative' then -1 when 'positive' then 1 else 0 end a
s polarity from temp_two left outer join dictionary_adj d on temp_two.word = d.w
ord;
No rows affected (0.22 seconds)
No rows affected (0.211 seconds)
No rows affected (0.242 seconds)
```

We can determine overall sentiment of each product id using average sentiment:

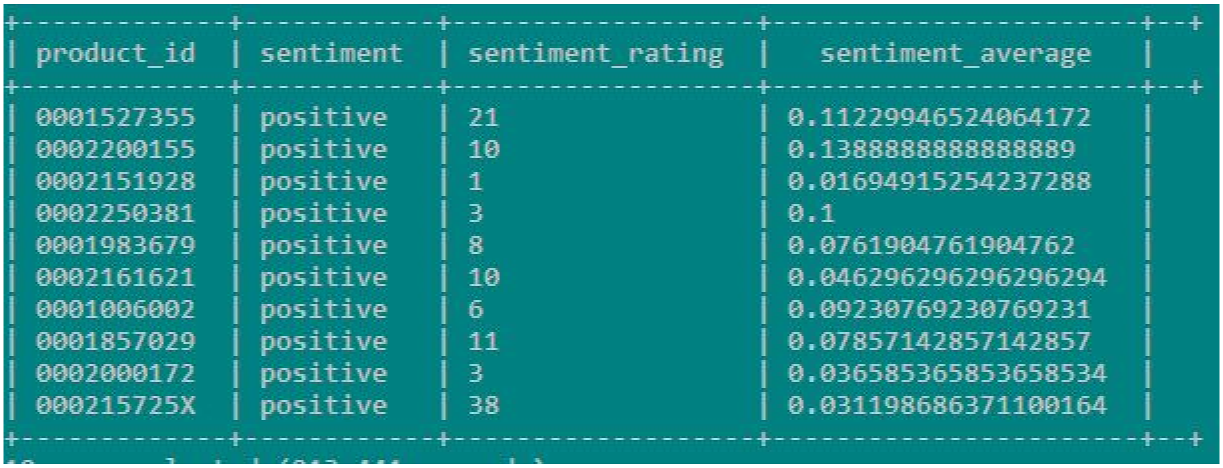
```
CREATE View IF NOT EXISTS productsreview_sentiment AS
        SELECT product_id,
        CASE
        when sum( polarity ) > 0 then 'positive'
        when sum( polarity ) < 0 then 'negative'
        ELSE 'neutral' end as sentiment, sum( polarity ) as sentiment_rating,
AVG(polarity)
        AS sentiment_average
FROM temp_three
GROUP by product_id;
```



```
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> CREATE View IF NOT EXISTS product
sreview_sentiment AS SELECT product_id, CASE when sum( polarity ) > 0 then 'posi
tive' when sum( polarity ) < 0 then 'negative' ELSE 'neutral' end as sentiment,
sum( polarity ) as sentiment_rating, AVG(polarity) AS sentiment_average FROM tem
p_three GROUP by product_id;
No rows affected (0.24 seconds)
```

10. You have to query data from productreview_sentiment to see if it has the correct data and values:

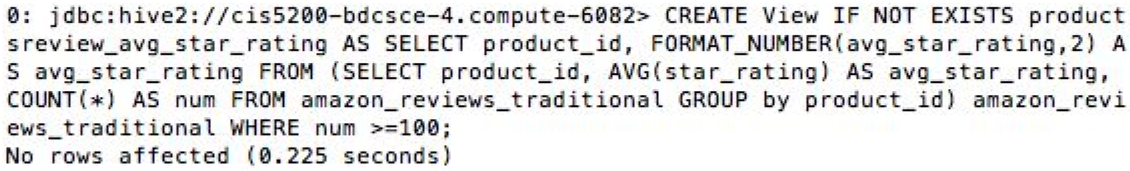
SELECT * from productsreview_sentiment LIMIT 10;



```
+-------------+------------+-------------------+-------------------------+--+
| product_id  | sentiment  | sentiment_rating  |    sentiment_average    |
+-------------+------------+-------------------+-------------------------+--+
| 0001527355  | positive   | 21                | 0.11229946524064172     |
| 0002200155  | positive   | 10                | 0.1388888888888889      |
| 0002151928  | positive   | 1                 | 0.01694915254237288     |
| 0002250381  | positive   | 3                 | 0.1                     |
| 0001983679  | positive   | 8                 | 0.0761904761904762      |
| 0002161621  | positive   | 10                | 0.046296296296296294    |
| 0001006002  | positive   | 6                 | 0.09230769230769231     |
| 0001857029  | positive   | 11                | 0.07857142857142857     |
| 0002000172  | positive   | 3                 | 0.036585365853658534    |
| 000215725X  | positive   | 38                | 0.031198686371100164    |
+-------------+------------+-------------------+-------------------------+--+
```

11. Create Star Rating view:

CREATE View IF NOT EXISTS productsreview_avg_star_rating AS
SELECT product_id, FORMAT_NUMBER(avg_star_rating,2) AS avg_star_rating
FROM (SELECT product_id, AVG(star_rating) AS avg_star_rating,
COUNT(*) AS num
FROM amazon_reviews_traditional
GROUP by product_id) amazon_reviews_traditional
WHERE num >=100;

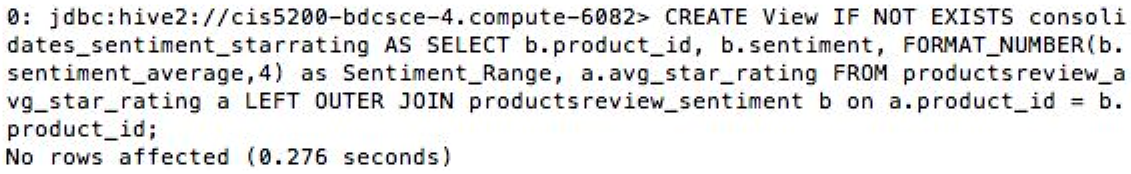


```
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> CREATE View IF NOT EXISTS product
sreview_avg_star_rating AS SELECT product_id, FORMAT_NUMBER(avg_star_rating,2) A
S avg_star_rating FROM (SELECT product_id, AVG(star_rating) AS avg_star_rating,
COUNT(*) AS num FROM amazon_reviews_traditional GROUP by product_id) amazon_revi
ews_traditional WHERE num >=100;
No rows affected (0.225 seconds)
```

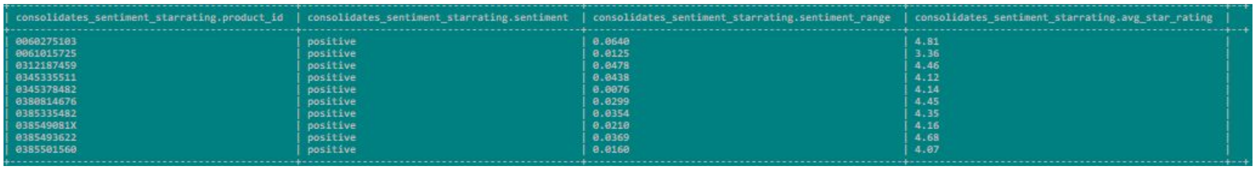
12. Consolidate the Star Ratings and Sentiment Information:

CREATE View IF NOT EXISTS
consolidates_sentiment_starrating AS
SELECT b.product_id, b.sentiment,
FORMAT_NUMBER(b.sentiment_average,4) as Sentiment_Range,
a.avg_star_rating

FROM productsreview_avg_star_rating a LEFT OUTER JOIN productsreview_sentiment b on a.product_id = b.product_id;



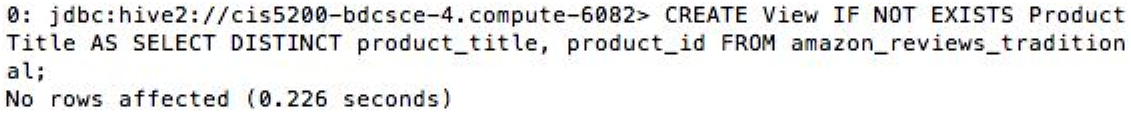
```
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> CREATE View IF NOT EXISTS consoli
dates_sentiment_starrating AS SELECT b.product_id, b.sentiment, FORMAT_NUMBER(b.
sentiment_average,4) as Sentiment_Range, a.avg_star_rating FROM productsreview_a
vg_star_rating a LEFT OUTER JOIN productsreview_sentiment b on a.product_id = b.
product_id;
No rows affected (0.276 seconds)
```



```
+----------------------------------------------+--------------------------------------------+-----------------------------------------------+------------------------------------------------+--+
| consolidates_sentiment_starrating.product_id | consolidates_sentiment_starrating.sentiment | consolidates_sentiment_starrating.sentiment_range | consolidates_sentiment_starrating.avg_star_rating |  |
+----------------------------------------------+--------------------------------------------+-----------------------------------------------+------------------------------------------------+--+
| 0060275103                                   | positive                                   | 0.0640                                        | 4.81                                           |  |
| 0061015725                                   | positive                                   | 0.0125                                        | 3.36                                           |  |
| 0312187459                                   | positive                                   | 0.0478                                        | 4.46                                           |  |
| 0345335511                                   | positive                                   | 0.0438                                        | 4.12                                           |  |
| 0345378482                                   | positive                                   | 0.0076                                        | 4.14                                           |  |
| 0380814676                                   | positive                                   | 0.0299                                        | 4.45                                           |  |
| 0385335482                                   | positive                                   | 0.0354                                        | 4.35                                           |  |
| 038549081X                                   | positive                                   | 0.0210                                        | 4.16                                           |  |
| 0385493622                                   | positive                                   | 0.0369                                        | 4.68                                           |  |
| 0385501560                                   | positive                                   | 0.0160                                        | 4.07                                           |  |
+----------------------------------------------+--------------------------------------------+-----------------------------------------------+------------------------------------------------+--+
```

13. Create Product Name and Product Table View

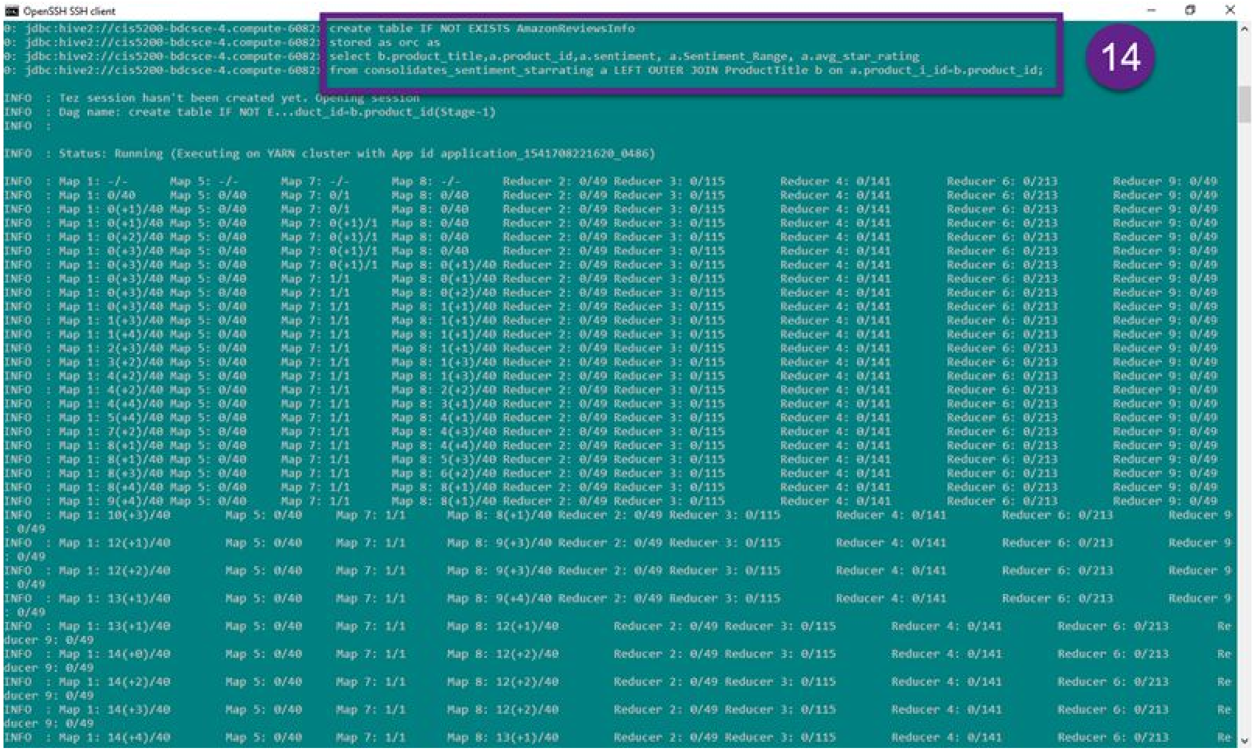
CREATE View IF NOT EXISTS ProductTitle AS
	SELECT DISTINCT product_title, product_id
FROM amazon_reviews_traditional;



```
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> CREATE View IF NOT EXISTS Product
Title AS SELECT DISTINCT product_title, product_id FROM amazon_reviews_tradition
al;
No rows affected (0.226 seconds)
```

14. Create Table with all of our sentiment information:

CREATE table IF NOT EXISTS AmazonReviewsInfo
	STORED AS orc AS
	SELECT b.product_title,a.product_id,a.sentiment, a.Sentiment_Range, a.avg_star_rating
	FROM consolidates_sentiment_starrating a LEFT OUTER JOIN ProductTitle b on a.product_id=b.product_id;

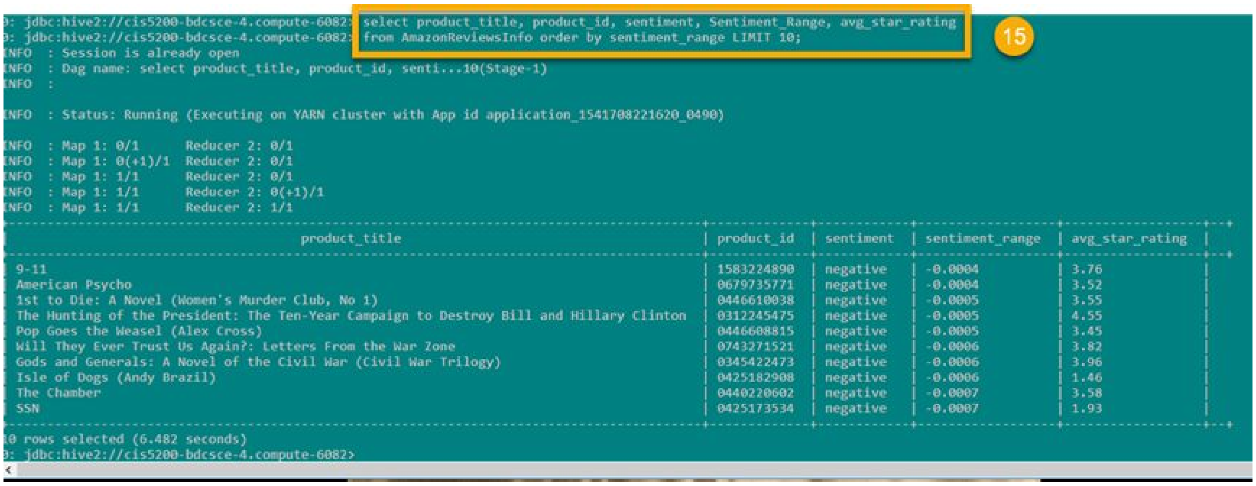


OpenSSH SSH client

```
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> create table IF NOT EXISTS AmazonReviewsInfo
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> stored as orc as
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> select b.product_title,a.product_id,a.sentiment, a.Sentiment_Range, a.avg_star_rating
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> from consolidates_sentiment_starrating a LEFT OUTER JOIN ProductTitle b on a.product_i_id=b.product_id;

INFO  : Tez session hasn't been created yet. Opening session
INFO  : Dag name: create table IF NOT E...duct_id=b.product_id(Stage-1)
INFO  :

INFO  : Status: Running (Executing on YARN cluster with App id application_1541708221620_0486)

INFO  : Map 1: -/-      Map 5: -/-      Map 7: -/-      Map 8: -/-      Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 0/40     Map 5: 0/40     Map 7: 0/1      Map 8: 0/40     Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 0(+1)/40 Map 5: 0/40     Map 7: 0/1      Map 8: 0/40     Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 0(+1)/40 Map 5: 0/40     Map 7: 0(+1)/1  Map 8: 0/40     Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 0(+2)/40 Map 5: 0/40     Map 7: 0(+1)/1  Map 8: 0/40     Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 0(+3)/40 Map 5: 0/40     Map 7: 0(+1)/1  Map 8: 0/40     Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 0(+3)/40 Map 5: 0/40     Map 7: 0(+1)/1  Map 8: 0(+1)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 0(+3)/40 Map 5: 0/40     Map 7: 1/1      Map 8: 0(+1)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 0(+3)/40 Map 5: 0/40     Map 7: 1/1      Map 8: 0(+2)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 0(+3)/40 Map 5: 0/40     Map 7: 1/1      Map 8: 1(+1)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 1(+3)/40 Map 5: 0/40     Map 7: 1/1      Map 8: 1(+1)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 1(+4)/40 Map 5: 0/40     Map 7: 1/1      Map 8: 1(+1)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 2(+3)/40 Map 5: 0/40     Map 7: 1/1      Map 8: 1(+1)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 3(+2)/40 Map 5: 0/40     Map 7: 1/1      Map 8: 1(+3)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 4(+2)/40 Map 5: 0/40     Map 7: 1/1      Map 8: 1(+3)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 4(+2)/40 Map 5: 0/40     Map 7: 1/1      Map 8: 2(+2)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 4(+4)/40 Map 5: 0/40     Map 7: 1/1      Map 8: 3(+1)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 5(+4)/40 Map 5: 0/40     Map 7: 1/1      Map 8: 4(+1)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 7(+2)/40 Map 5: 0/40     Map 7: 1/1      Map 8: 4(+3)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 8(+1)/40 Map 5: 0/40     Map 7: 1/1      Map 8: 4(+4)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 8(+1)/40 Map 5: 0/40     Map 7: 1/1      Map 8: 5(+3)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 8(+3)/40 Map 5: 0/40     Map 7: 1/1      Map 8: 6(+2)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 8(+4)/40 Map 5: 0/40     Map 7: 1/1      Map 8: 8(+1)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 9(+4)/40 Map 5: 0/40     Map 7: 1/1      Map 8: 8(+1)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9: 0/49
INFO  : Map 1: 10(+3)/40        Map 5: 0/40     Map 7: 1/1      Map 8: 8(+1)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9
: 0/49
INFO  : Map 1: 12(+1)/40        Map 5: 0/40     Map 7: 1/1      Map 8: 9(+3)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9
: 0/49
INFO  : Map 1: 12(+2)/40        Map 5: 0/40     Map 7: 1/1      Map 8: 9(+3)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9
: 0/49
INFO  : Map 1: 13(+1)/40        Map 5: 0/40     Map 7: 1/1      Map 8: 9(+4)/40 Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Reducer 9
: 0/49
INFO  : Map 1: 13(+1)/40        Map 5: 0/40     Map 7: 1/1      Map 8: 12(+1)/40        Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Re
ducer 9: 0/49
INFO  : Map 1: 14(+0)/40        Map 5: 0/40     Map 7: 1/1      Map 8: 12(+2)/40        Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Re
ducer 9: 0/49
INFO  : Map 1: 14(+2)/40        Map 5: 0/40     Map 7: 1/1      Map 8: 12(+2)/40        Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Re
ducer 9: 0/49
INFO  : Map 1: 14(+3)/40        Map 5: 0/40     Map 7: 1/1      Map 8: 12(+2)/40        Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Re
ducer 9: 0/49
INFO  : Map 1: 14(+4)/40        Map 5: 0/40     Map 7: 1/1      Map 8: 13(+1)/40        Reducer 2: 0/49 Reducer 3: 0/115        Reducer 4: 0/141        Reducer 6: 0/213        Re
```

15. You have to query data from the table to see if it has the correct data and values:

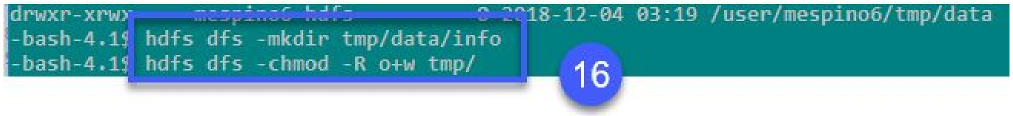
```
SELECT product_id, sentiment, Sentiment_Range, avg_star_rating
        FROM AmazonReviewsInfo order by sentiment_range;
```



```
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> select product_title, product_id, sentiment, Sentiment_Range, avg_star_rating
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> from AmazonReviewsInfo order by sentiment_range LIMIT 10;
INFO  : Session is already open
INFO  : Dag name: select product_title, product_id, senti...10(Stage-1)
INFO  :

INFO  : Status: Running (Executing on YARN cluster with App id application_1541708221620_0490)

INFO  : Map 1: 0/1      Reducer 2: 0/1
INFO  : Map 1: 0(+1)/1  Reducer 2: 0/1
INFO  : Map 1: 1/1      Reducer 2: 0/1
INFO  : Map 1: 1/1      Reducer 2: 0(+1)/1
INFO  : Map 1: 1/1      Reducer 2: 1/1
+----------------------------------------------------------------------------+--------------+------------+------------------+------------------+--+
|                                product_title                               |  product_id  | sentiment  | sentiment_range  | avg_star_rating  |
+----------------------------------------------------------------------------+--------------+------------+------------------+------------------+--+
| 9-11                                                                       | 1583224890   | negative   | -0.0004          | 3.76             |
| American Psycho                                                            | 0679735771   | negative   | -0.0004          | 3.52             |
| 1st to Die: A Novel (Women's Murder Club, No 1)                            | 0446610038   | negative   | -0.0005          | 3.55             |
| The Hunting of the President: The Ten-Year Campaign to Destroy Bill and Hillary Clinton | 0312245475   | negative   | -0.0005          | 4.55             |
| Pop Goes the Weasel (Alex Cross)                                           | 0446608815   | negative   | -0.0005          | 3.45             |
| Will They Ever Trust Us Again?: Letters From the War Zone                  | 0743271521   | negative   | -0.0006          | 3.82             |
| Gods and Generals: A Novel of the Civil War (Civil War Trilogy)            | 0345422473   | negative   | -0.0006          | 3.96             |
| Isle of Dogs (Andy Brazil)                                                 | 0425182908   | negative   | -0.0006          | 1.46             |
| The Chamber                                                                | 0440220602   | negative   | -0.0007          | 3.58             |
| SSN                                                                        | 0425173534   | negative   | -0.0007          | 1.93             |
+----------------------------------------------------------------------------+--------------+------------+------------------+------------------+--+
10 rows selected (6.482 seconds)
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082>
```

16. Run the following shell commands to make sure that the directory tmp/data/info is there and that beeline command will work:

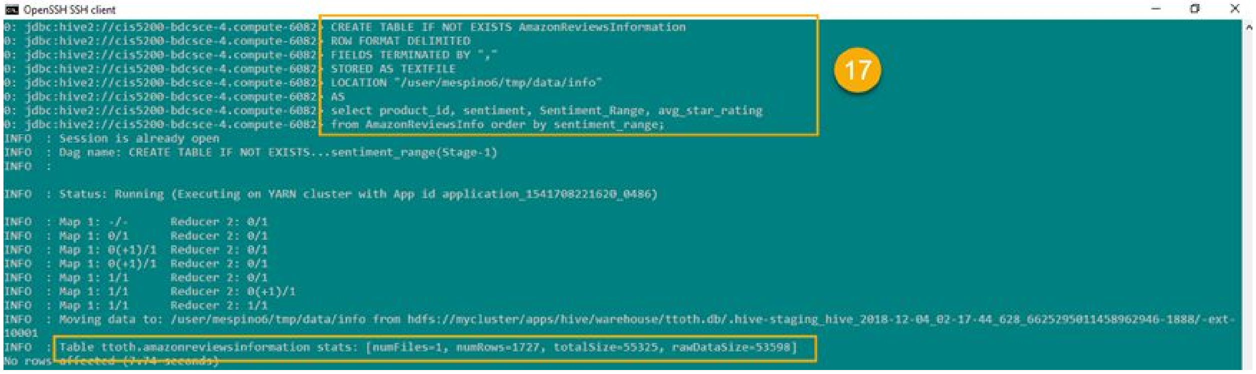
hdfs dfs -mkdir tmp/data/info
hdfs dfs -chmod -R o+w tmp/



```
drwxr-xrwx   - mespino6 hdfs          0 2018-12-04 03:19 /user/mespino6/tmp/data
-bash-4.1$ hdfs dfs -mkdir tmp/data/info
-bash-4.1$ hdfs dfs -chmod -R o+w tmp/
```

17. Download the file to HDFS path"/user/mespino6/tmp/data/info":

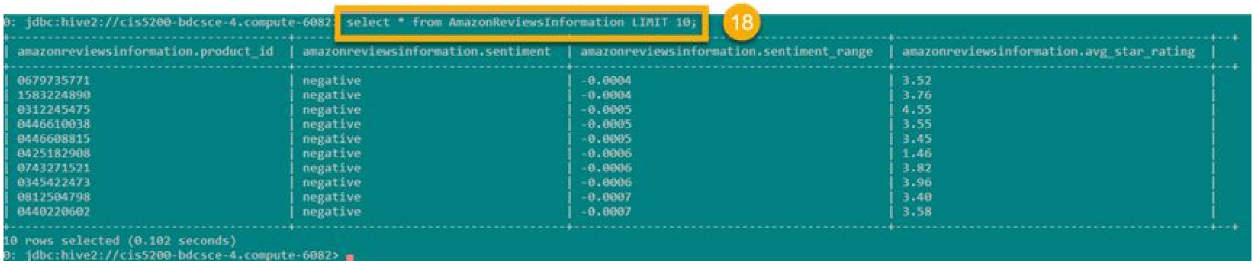
```
CREATE TABLE IF NOT EXISTS AmazonReviewsInformation
ROW FORMAT DELIMITED
FIELDS TERMINATED BY ","
STORED AS TEXTFILE
LOCATION "/user/mespino6/tmp/data/info"
AS
select product_id, sentiment, Sentiment_Range, avg_star_rating
from AmazonReviewsInfo order by sentiment_range;
```



```
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> CREATE TABLE IF NOT EXISTS AmazonReviewsInformation
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> ROW FORMAT DELIMITED
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> FIELDS TERMINATED BY ","
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> STORED AS TEXTFILE
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> LOCATION "/user/mespino6/tmp/data/info"
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> AS
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> select product_id, sentiment, Sentiment_Range, avg_star_rating
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> from AmazonReviewsInfo order by sentiment_range;
INFO  : Session is already open
INFO  : Dag name: CREATE TABLE IF NOT EXISTS...sentiment_range(Stage-1)
INFO  :

INFO  : Status: Running (Executing on YARN cluster with App id application_1541708221620_0486)

INFO  : Map 1: -/-      Reducer 2: 0/1
INFO  : Map 1: 0/1      Reducer 2: 0/1
INFO  : Map 1: 0(+1)/1  Reducer 2: 0/1
INFO  : Map 1: 0(+1)/1  Reducer 2: 0/1
INFO  : Map 1: 1/1      Reducer 2: 0/1
INFO  : Map 1: 1/1      Reducer 2: 0(+1)/1
INFO  : Map 1: 1/1      Reducer 2: 1/1
INFO  : Moving data to: /user/mespino6/tmp/data/info from hdfs://mycluster/apps/hive/warehouse/ttoth.db/.hive-staging_hive_2018-12-04_02-17-44_628_6625295011458962946-1888/-ext-
10001
INFO  : Table ttoth.amazonreviewsinformation stats: [numFiles=1, numRows=1727, totalSize=55325, rawDataSize=53598]
No rows affected (7.74 seconds)
```

18. You have to query data from the table to see if it has the correct data and values:

SELECT* from AmazonReviewsInfo LIMIT 10;



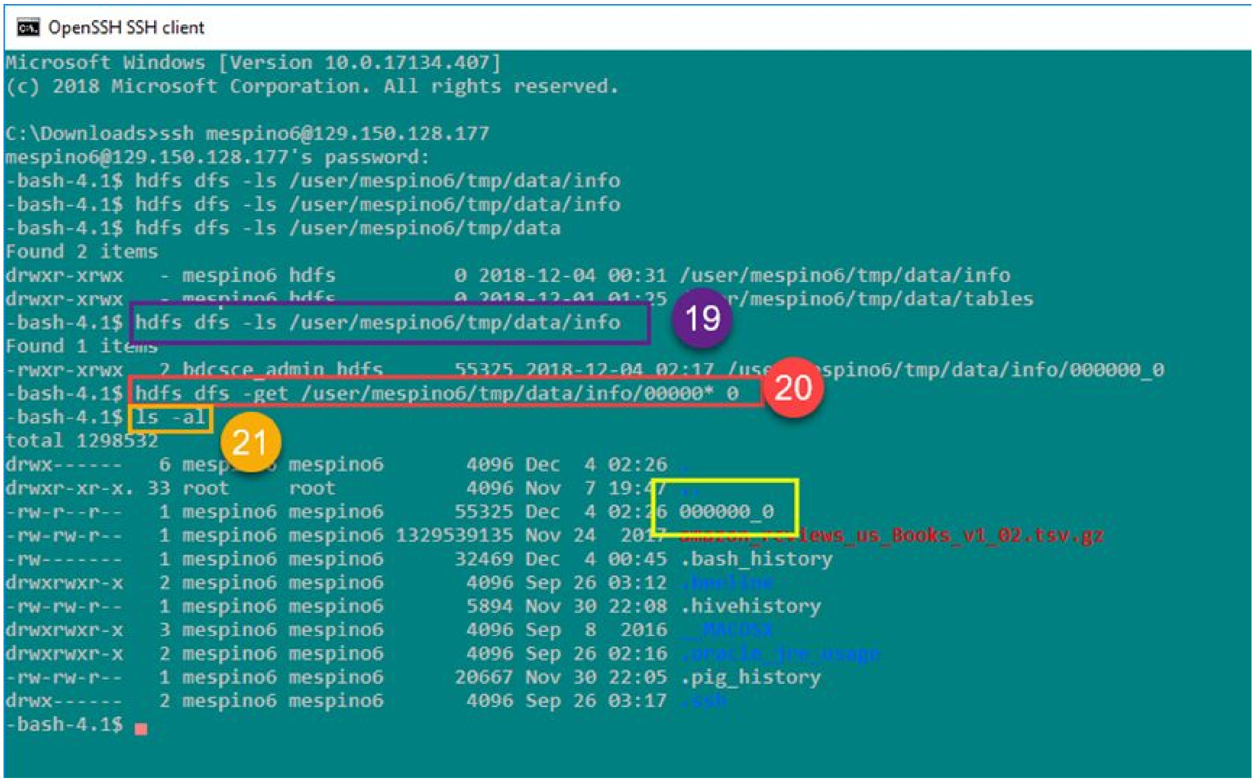
```
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082> select * from AmazonReviewsInformation LIMIT 10;
+----------------------------------------+------------------------------------+----------------------------------------------+--------------------------------------------+--+
| amazonreviewsinformation.product_id  | amazonreviewsinformation.sentiment  | amazonreviewsinformation.sentiment_range  | amazonreviewsinformation.avg_star_rating  |
+----------------------------------------+------------------------------------+----------------------------------------------+--------------------------------------------+--+
| 0679735771                            | negative                            | -0.0004                                    | 3.52                                       |
| 1583224890                            | negative                            | -0.0004                                    | 3.76                                       |
| 0312245475                            | negative                            | -0.0005                                    | 4.55                                       |
| 0446610038                            | negative                            | -0.0005                                    | 3.55                                       |
| 0446608815                            | negative                            | -0.0005                                    | 3.45                                       |
| 0425182908                            | negative                            | -0.0006                                    | 1.46                                       |
| 0743271521                            | negative                            | -0.0006                                    | 3.82                                       |
| 0345422473                            | negative                            | -0.0006                                    | 3.96                                       |
| 0812504798                            | negative                            | -0.0007                                    | 3.40                                       |
| 0440220602                            | negative                            | -0.0007                                    | 3.58                                       |
+----------------------------------------+------------------------------------+----------------------------------------------+--------------------------------------------+--+
10 rows selected (0.102 seconds)
0: jdbc:hive2://cis5200-bdcsce-4.compute-6082>
```

Open another terminal with git bash, minty, or putty, which is to connect the Oracle Cloud to download the output file 000000_0 at the HDFS path "/user/mespino6/tmp/data/info":

19.
hdfs dfs -ls /user/mespino6/tmp/data/info

20.
hdfs dfs -get /user/mespino6/tmp/data/info/00000*_0

21. ls -al



```
Microsoft Windows [Version 10.0.17134.407]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Downloads>ssh mespino6@129.150.128.177
mespino6@129.150.128.177's password:
-bash-4.1$ hdfs dfs -ls /user/mespino6/tmp/data/info
-bash-4.1$ hdfs dfs -ls /user/mespino6/tmp/data/info
-bash-4.1$ hdfs dfs -ls /user/mespino6/tmp/data
Found 2 items
drwxr-xrwx   - mespino6 hdfs          0 2018-12-04 00:31 /user/mespino6/tmp/data/info
drwxr-xrwx   - mespino6 hdfs          0 2018-12-01 01:25 /user/mespino6/tmp/data/tables
-bash-4.1$ hdfs dfs -ls /user/mespino6/tmp/data/info
Found 1 items
-rwxr-xrwx   2 bdcsce_admin hdfs      55325 2018-12-04 02:17 /user/mespino6/tmp/data/info/000000_0
-bash-4.1$ hdfs dfs -get /user/mespino6/tmp/data/info/00000*_0
-bash-4.1$ ls -al
total 1298532
drwx------    6 mespino6 mespino6       4096 Dec  4 02:26 .
drwxr-xr-x. 33 root      root           4096 Nov  7 19:47 ..
-rw-r--r--    1 mespino6 mespino6      55325 Dec  4 02:26 000000_0
-rw-rw-r--    1 mespino6 mespino6 1329539135 Nov 24  2017 amazon_reviews_us_Books_v1_02.tsv.gz
-rw-------    1 mespino6 mespino6      32469 Dec  4 00:45 .bash_history
drwxrwxr-x    2 mespino6 mespino6       4096 Sep 26 03:12 .beeline
-rw-rw-r--    1 mespino6 mespino6       5894 Nov 30 22:08 .hivehistory
drwxrwxr-x    3 mespino6 mespino6       4096 Sep  8  2016 __MACOSX
drwxrwxr-x    2 mespino6 mespino6       4096 Sep 26 02:16 .oracle_jre_usage
-rw-rw-r--    1 mespino6 mespino6      20667 Nov 30 22:05 .pig_history
drwx------    2 mespino6 mespino6       4096 Sep 26 03:17 .ssh
-bash-4.1$
```

22. For Windows user, you may use psftp to download the file. You need to download it at http://the.earth.li/~sgtatham/putty/latest/w64/psftp.exe. In order to download 000000_0, you have to run psftp as follows:

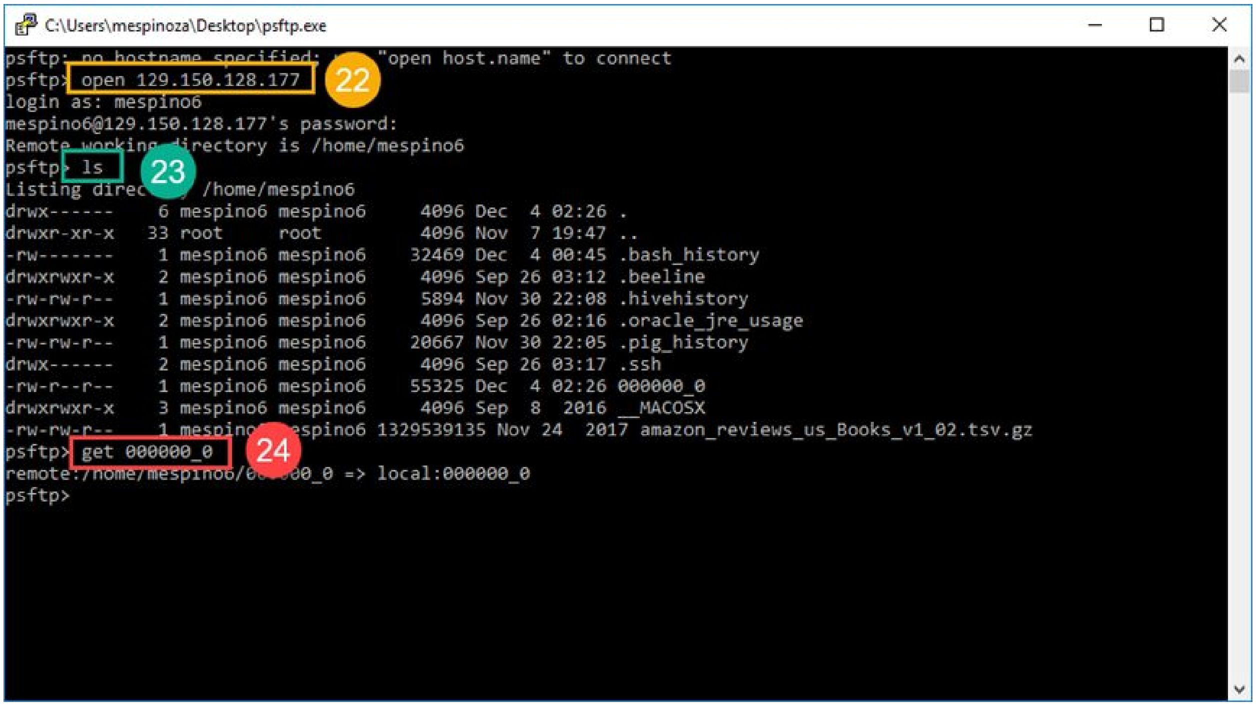
open 129.150.128.177

23. List directory to make sure you are in the right place:

ls

24. Download the file 000000_0 using get command:

get 000000_0



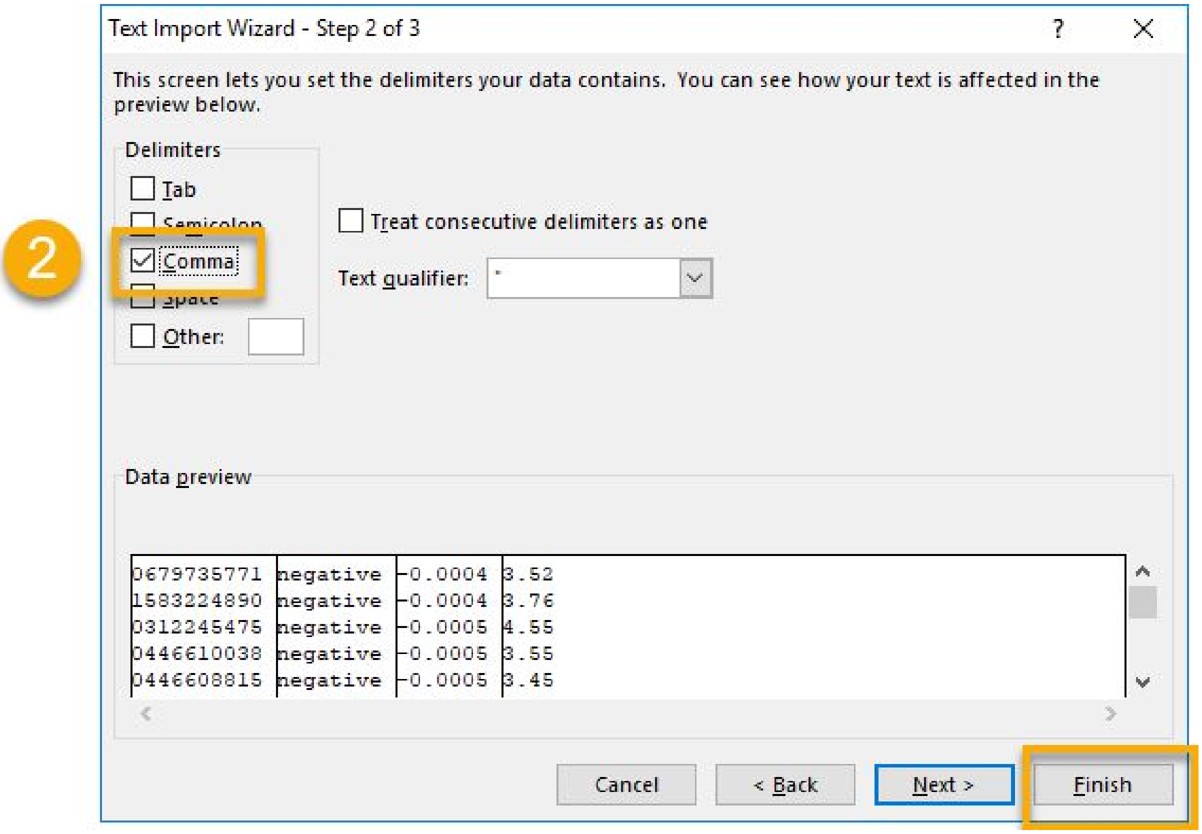
C:\Users\mespinoza\Desktop\psftp.exe

```
psftp: no hostname specified;     "open host.name" to connect
psftp> open 129.150.128.177
login as: mespino6
mespino6@129.150.128.177's password:
Remote working directory is /home/mespino6
psftp> ls
Listing direc     /home/mespino6
drwx------    6 mespino6 mespino6      4096 Dec  4 02:26 .
drwxr-xr-x   33 root     root          4096 Nov  7 19:47 ..
-rw-------    1 mespino6 mespino6     32469 Dec  4 00:45 .bash_history
drwxrwxr-x    2 mespino6 mespino6      4096 Sep 26 03:12 .beeline
-rw-rw-r--    1 mespino6 mespino6      5894 Nov 30 22:08 .hivehistory
drwxrwxr-x    2 mespino6 mespino6      4096 Sep 26 02:16 .oracle_jre_usage
-rw-rw-r--    1 mespino6 mespino6     20667 Nov 30 22:05 .pig_history
drwx------    2 mespino6 mespino6      4096 Sep 26 03:17 .ssh
-rw-r--r--    1 mespino6 mespino6     55325 Dec  4 02:26 000000_0
drwxrwxr-x    3 mespino6 mespino6      4096 Sep  8  2016 __MACOSX
-rw-rw-r--    1 mespino    espino6 1329539135 Nov 24  2017 amazon_reviews_us_Books_v1_02.tsv.gz
psftp> get 000000_0
remote:/home/mespino6/0   00_0 => local:000000_0
psftp>
```

STEP 5: Loading Data Into Power BI

1. You have to open the following file in Excel using the Text Import Wizard.

2. You have to specify Comma as a Delimiter.



Text Import Wizard - Step 2 of 3

This screen lets you set the delimiters your data contains. You can see how your text is affected in the preview below.

Delimiters

□ Tab
□ Semicolon
☑ Comma
□ Space
□ Other:

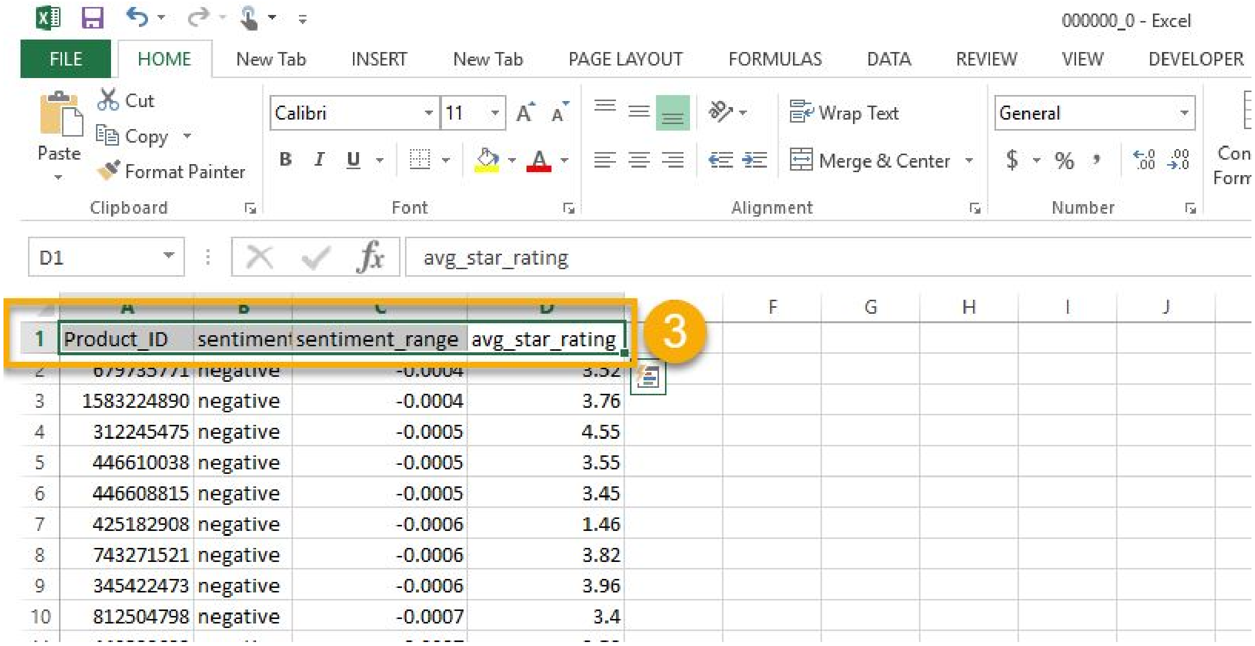
□ Treat consecutive delimiters as one

Text qualifier: "

Data preview

```
0679735771 negative -0.0004 3.52
1583224890 negative -0.0004 3.76
0312245475 negative -0.0005 4.55
0446610038 negative -0.0005 3.55
0446608815 negative -0.0005 3.45
```

3. For the first row of the file, you need to insert the header to each column as follows: Product_ID sentiment sentiment _range avg_star_rating



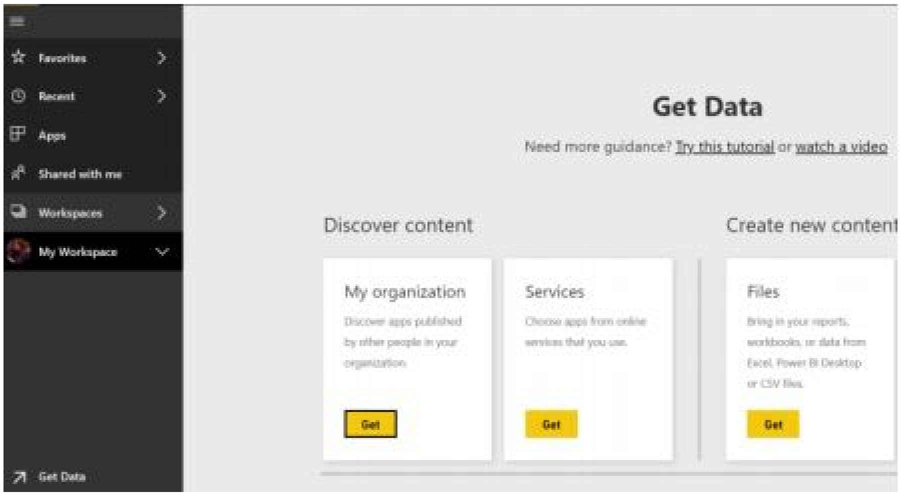
D1 avg_star_rating

	A	B	C	D	F	G	H	I	J
1	Product_ID	sentiment	sentiment_range	avg_star_rating					
2	679735771	negative	-0.0004	3.52					
3	1583224890	negative	-0.0004	3.76					
4	312245475	negative	-0.0005	4.55					
5	446610038	negative	-0.0005	3.55					
6	446608815	negative	-0.0005	3.45					
7	425182908	negative	-0.0006	1.46					
8	743271521	negative	-0.0006	3.82					
9	345422473	negative	-0.0006	3.96					
10	812504798	negative	-0.0007	3.4					

4. Then you have to save the file as comma separated value format, that is, as 000000_0.csv

5. You need to sign in Power BI website using your school account to import the result data into Power BI to visually explore the data.

6. Open a web browser and go to sign in with your school account at:
https://app.powerbi.com



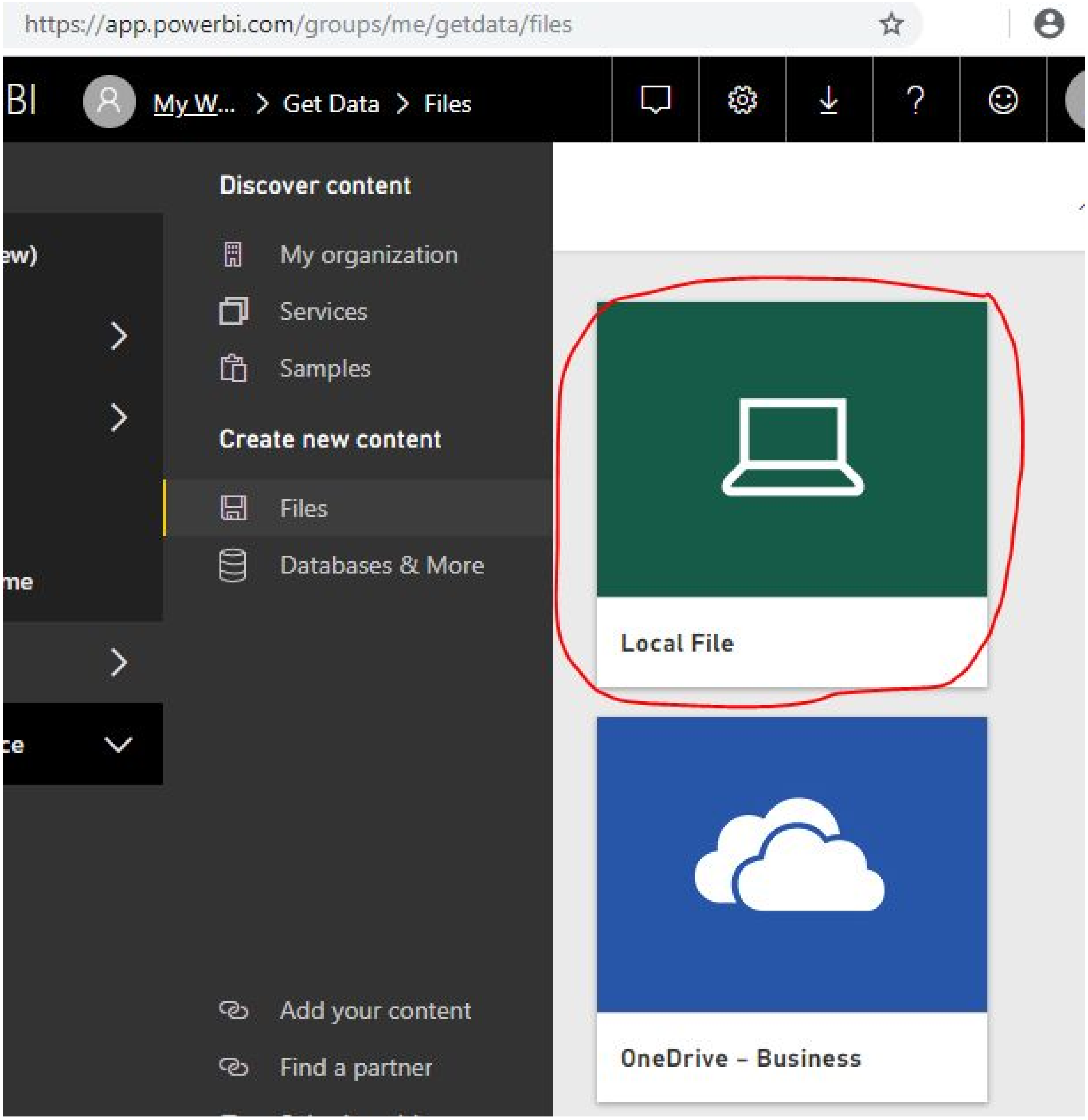
Need more guidance? Try this tutorial or watch a video

Discover apps published by other people in your organization.

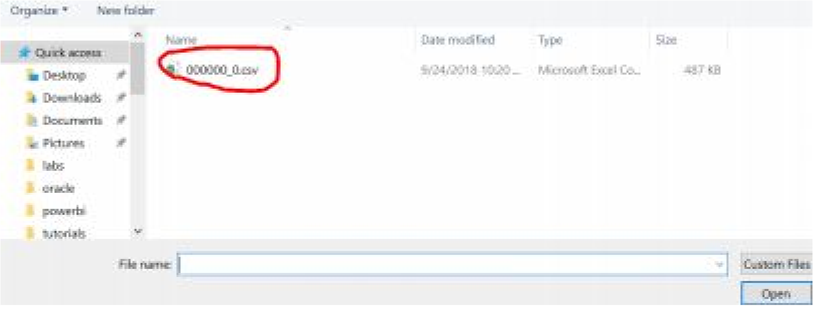
Choose apps from online services that you use.

Bring in your reports, workbooks, or data from Excel, Power BI Desktop or CSV files.

7. Once you sign in, you will see the following pages. Select Local File to upload your output file “000000_0.csv”

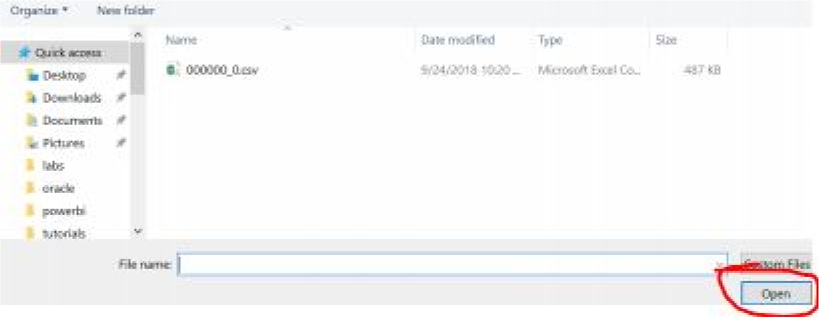


8. You will see the following window popped up:



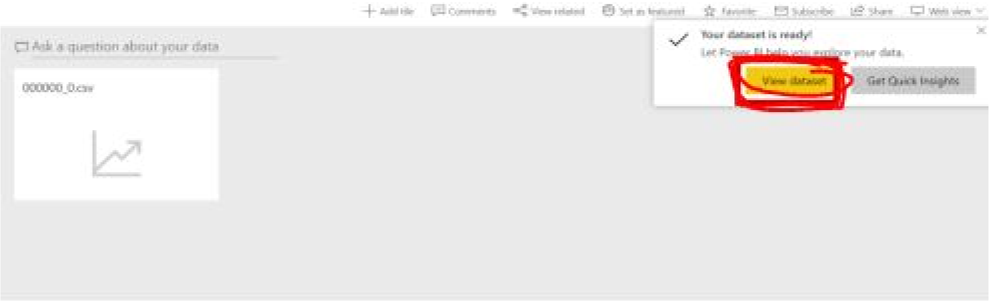
Name	Date modified	Type	Size
000000_0.csv	9/24/2018 10:20 ...	Microsoft Excel Co...	487 KB

9. Select the file and open it:



Name	Date modified	Type	Size
000000_0.csv	9/24/2018 10:20 ...	Microsoft Excel Co...	487 KB

10. Now you will see the following page at your Power BI. Select “View dataset”:



Your dataset is ready!

Let Power BI help you explore your data.

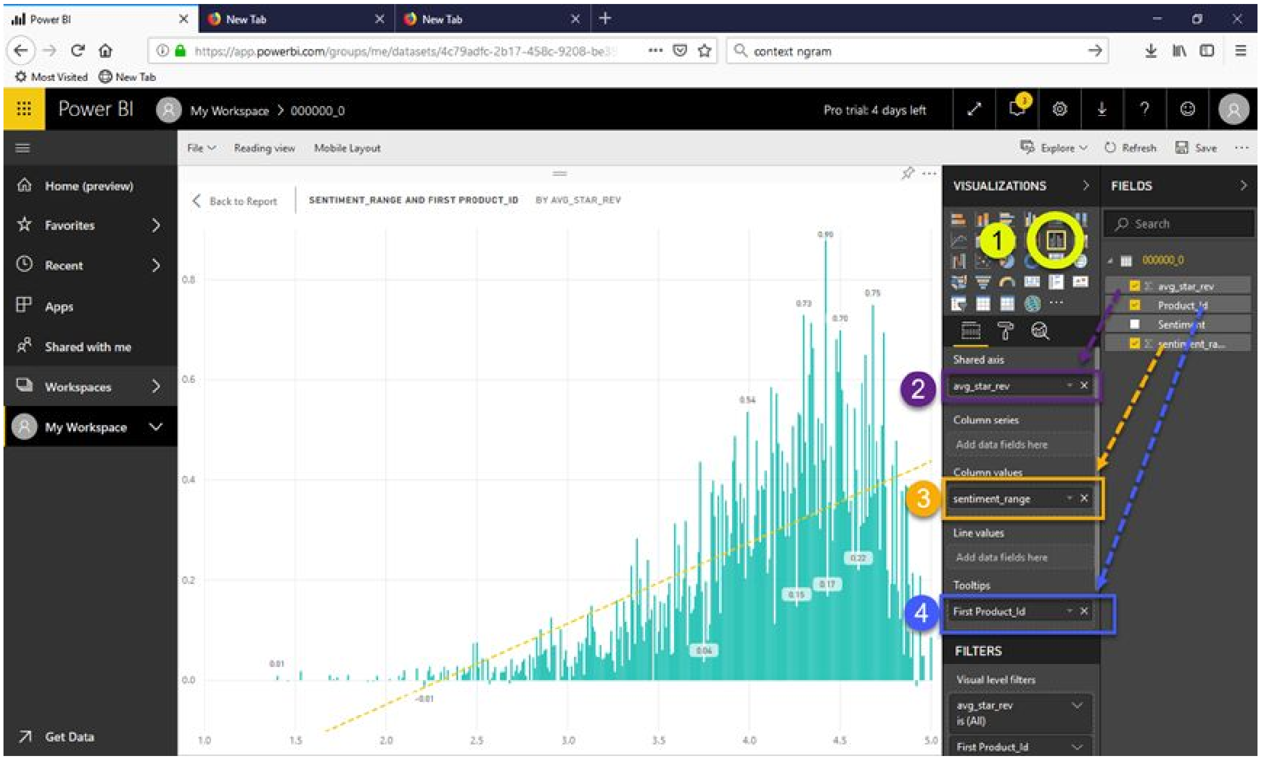
STEP 6: Visualizing Data In Power BI

1. Select graph

2. Drag avg_star_rating under shared axis

3. Drag sentiment_range under Column values

4. Drag Product_Id under Tooltips

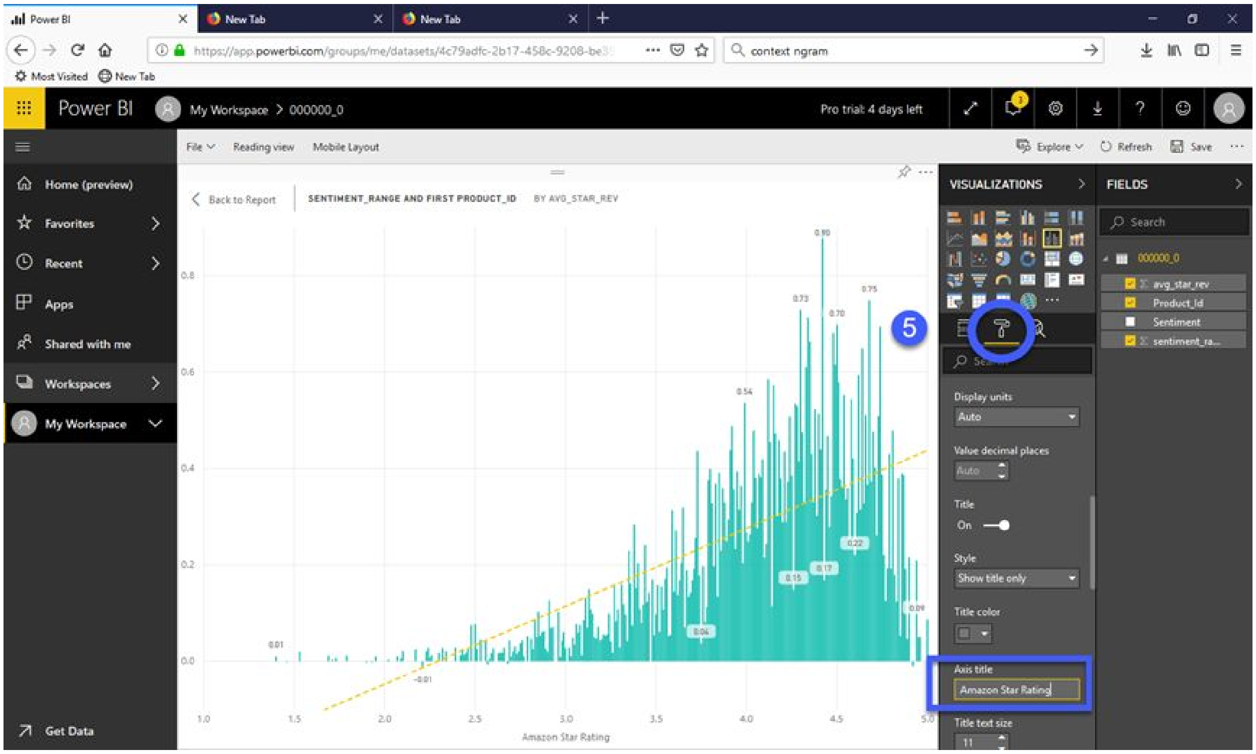


Shared axis: avg_star_rev

Column values: sentiment_range

Tooltips: First Product_Id

5. Go to design tab and change Axis title to Amazon Star Rating



Display units: Auto

Value decimal places: Auto

Title: On

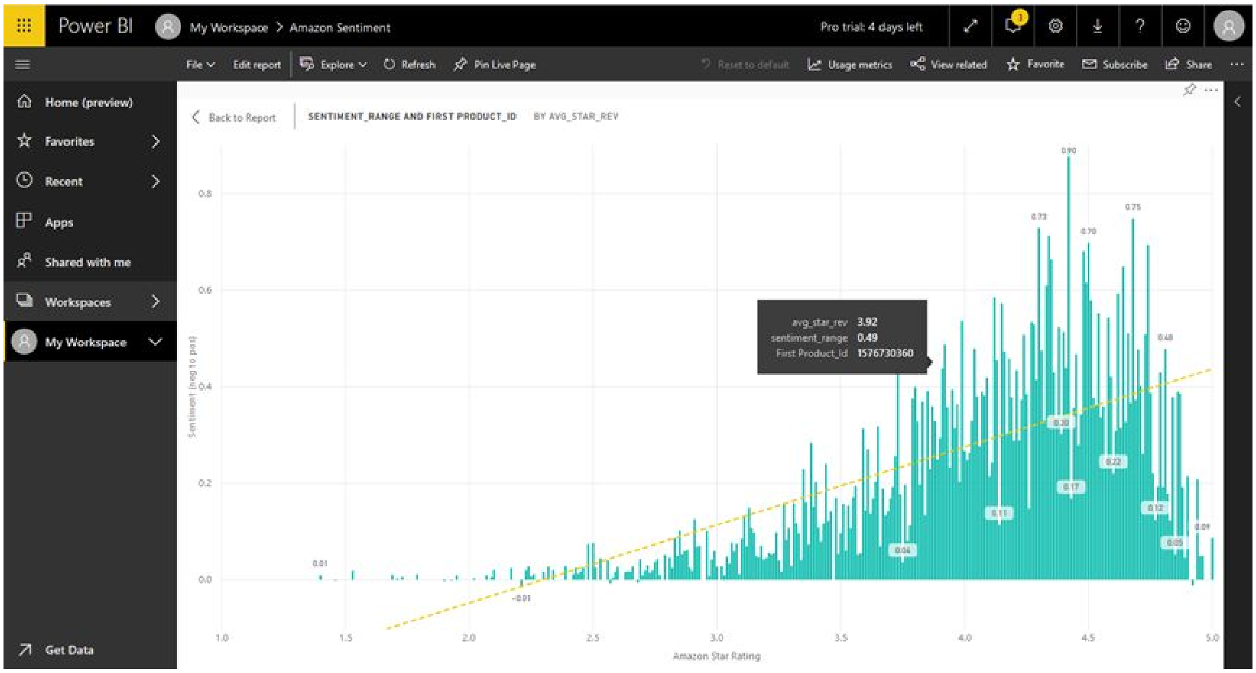
Style: Show title only

Title color

Axis title: Amazon Star Rating

Title text size: 11

6. Hide the Visualizations options and you have your bar graph displayed in full!



avg_star_rev 3.92
sentiment_range 0.49
First Product_Id 1576730360