Apache Hive

Part 3

by Sumit Mittal

TRENDYTECH
UPLIFT YOUR CAREER!

Apache Hive Exercise 3

TRENDY TECH

UPLIFT YOUR CAREER!

Complex data types in Hive

Hive has support for 4 types of Complex Data:

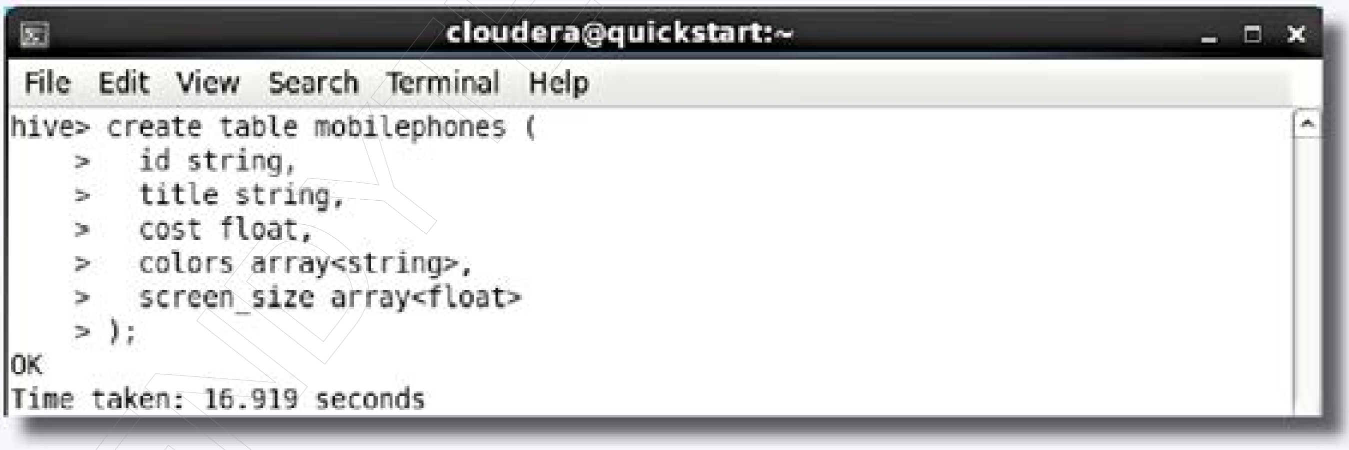
1. Array
2. Map
3. Struct
4. Union (Rarely used because of incomplete support in Hive)

Arrays

Collection of items of similar data type. An array can contain one or more values of the same data type.

Create a table with array data types:

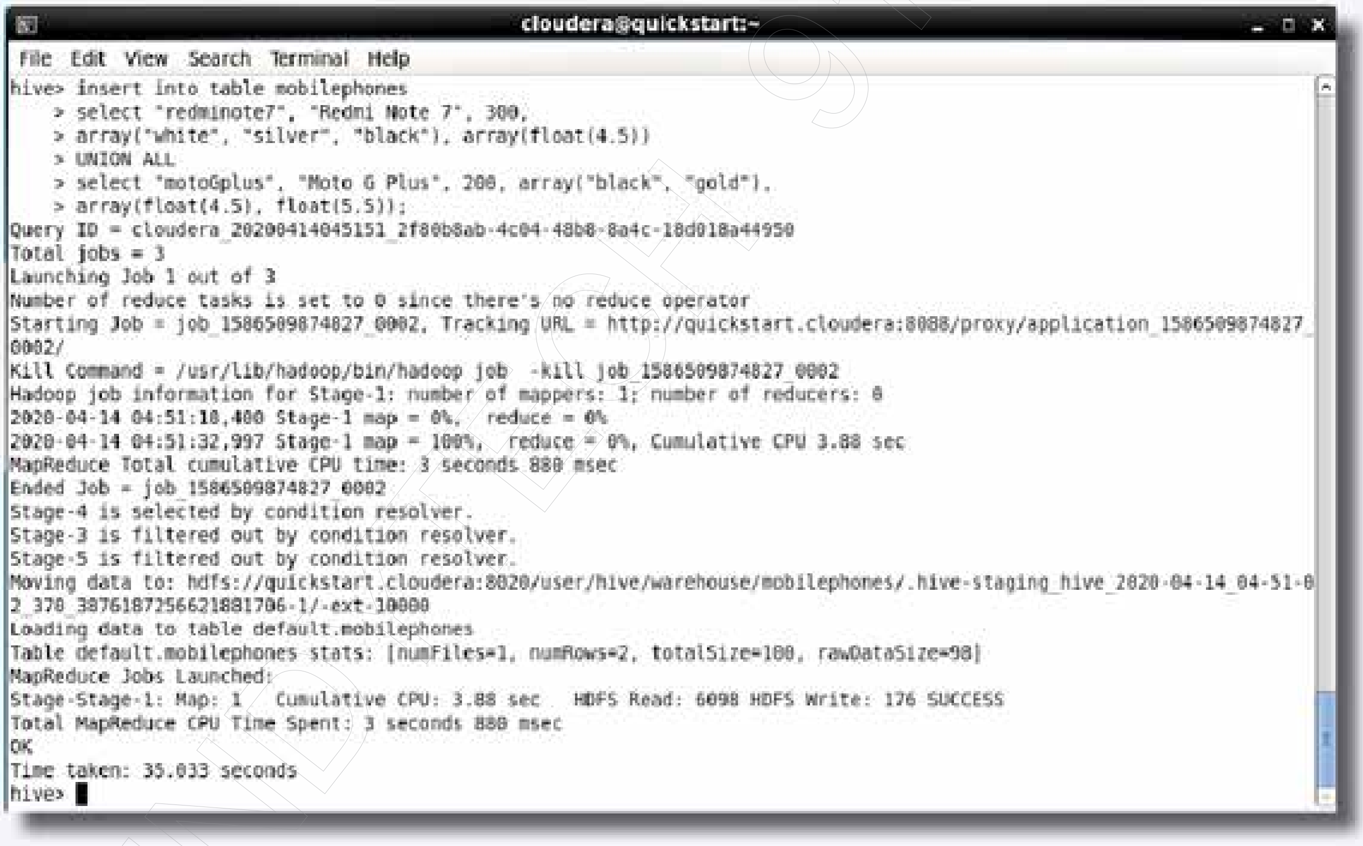
```
create table mobilephones (
  id string,
  title string,
  cost float,
  colors array<string>,
  screen_size array<float>
);
```



```
hive> create table mobilephones (
    >   id string,
    >   title string,
    >   cost float,
    >   colors array<string>,
    >   screen_size array<float>
    > );
OK
Time taken: 16.919 seconds
```

Load data into the array data type table:

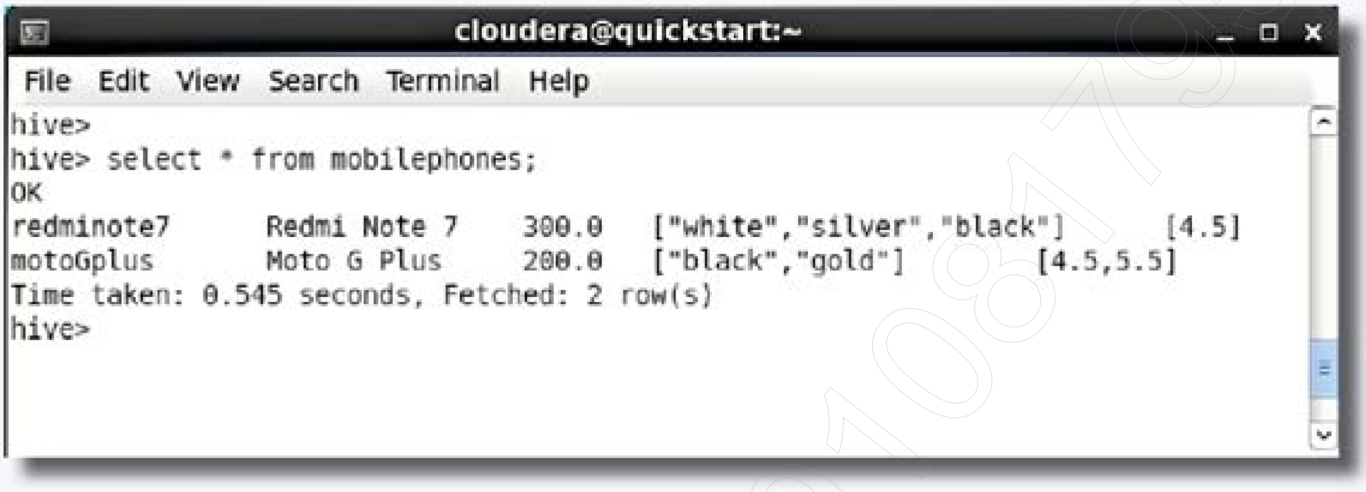
```
insert into table mobilephones
select "redminote7", "Redmi Note 7", 300,
array("white", "silver", "black"),
array(float(4.5))
UNION ALL
select "motoGplus", "Moto G Plus", 200,
array("black", "gold"),
array(float(4.5), float(5.5));
```



```
hive> insert into table mobilephones
    > select "redminote7", "Redmi Note 7", 300,
    > array("white", "silver", "black"), array(float(4.5))
    > UNION ALL
    > select "motoGplus", "Moto G Plus", 200, array("black", "gold"),
    > array(float(4.5), float(5.5));
Query ID = cloudera_20200414045151_2f80b8ab-4c04-48b8-8a4c-18d018a44950
Total jobs = 3
Launching Job 1 out of 3
Number of reduce tasks is set to 0 since there's no reduce operator
Starting Job = job_1586509874827_0002, Tracking URL = http://quickstart.cloudera:8088/proxy/application_1586509874827_
0002/
Kill Command = /usr/lib/hadoop/bin/hadoop job  -kill job_1586509874827_0002
Hadoop job information for Stage-1: number of mappers: 1; number of reducers: 0
2020-04-14 04:51:18,400 Stage-1 map = 0%,  reduce = 0%
2020-04-14 04:51:32,997 Stage-1 map = 100%,  reduce = 0%, Cumulative CPU 3.88 sec
MapReduce Total cumulative CPU time: 3 seconds 880 msec
Ended Job = job_1586509874827_0002
Stage-4 is selected by condition resolver.
Stage-3 is filtered out by condition resolver.
Stage-5 is filtered out by condition resolver.
Moving data to: hdfs://quickstart.cloudera:8020/user/hive/warehouse/mobilephones/.hive-staging_hive_2020-04-14_04-51-0
2_370_3876187256621881706-1/-ext-10000
Loading data to table default.mobilephones
Table default.mobilephones stats: [numFiles=1, numRows=2, totalSize=100, rawDataSize=98]
MapReduce Jobs Launched:
Stage-Stage-1: Map: 1   Cumulative CPU: 3.88 sec   HDFS Read: 6098 HDFS Write: 176 SUCCESS
Total MapReduce CPU Time Spent: 3 seconds 880 msec
OK
Time taken: 35.033 seconds
hive> █
```

Display all records of table:

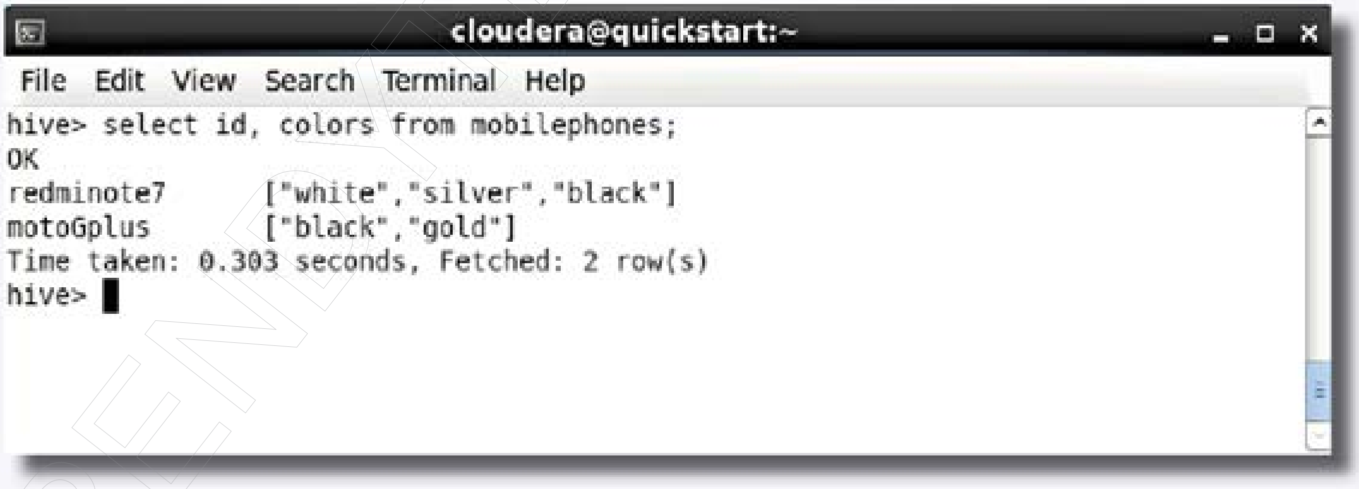
```
select * from mobilephones;
```



```
hive>
hive> select * from mobilephones;
OK
redminote7      Redmi Note 7    300.0   ["white","silver","black"]      [4.5]
motoGplus       Moto G Plus     200.0   ["black","gold"]        [4.5,5.5]
Time taken: 0.545 seconds, Fetched: 2 row(s)
hive>
```

Display records with all array elements:

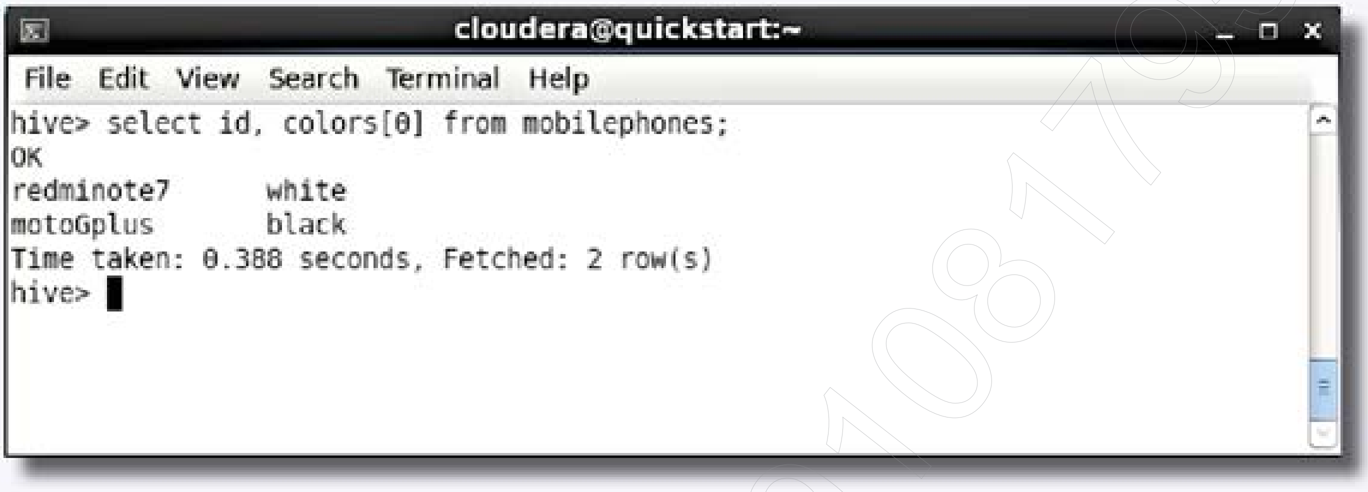
```
select id, colors from mobilephones;
```



```
hive> select id, colors from mobilephones;
OK
redminote7      ["white","silver","black"]
motoGplus       ["black","gold"]
Time taken: 0.303 seconds, Fetched: 2 row(s)
hive>
```

Display records with 1st element of an array:

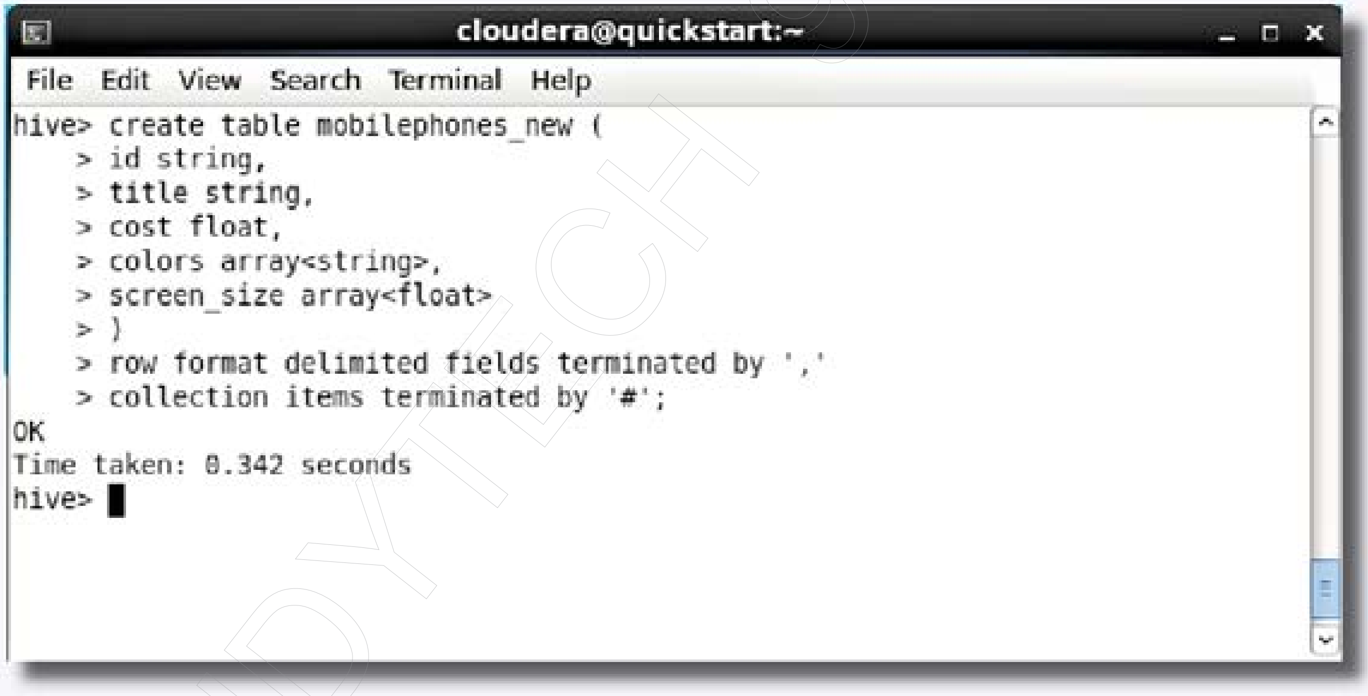
```
select id, colors[0] from mobilephones;
```



```
hive> select id, colors[0] from mobilephones;
OK
redminote7      white
motoGplus       black
Time taken: 0.388 seconds, Fetched: 2 row(s)
hive> 
```

Create a new table with array data type:

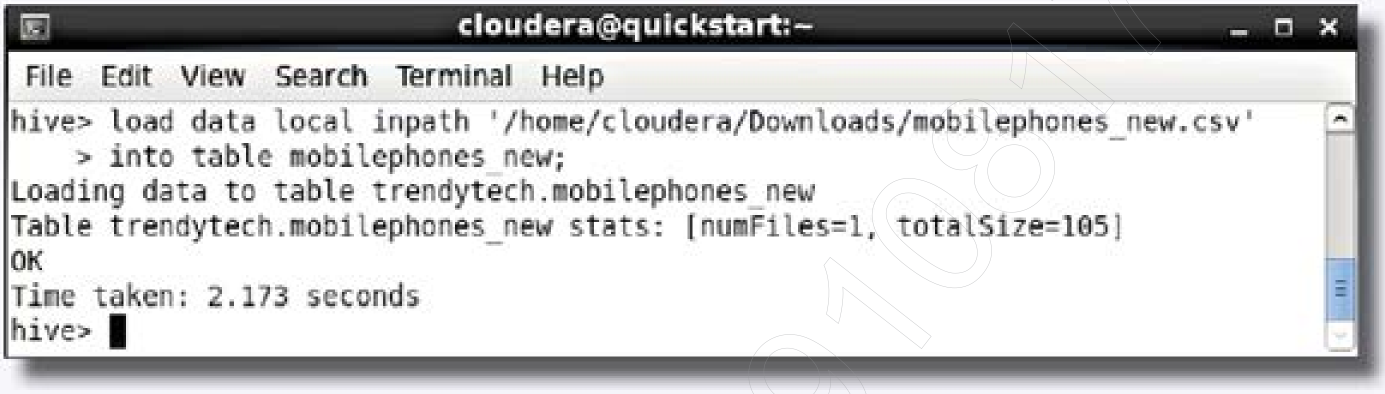
```
create table mobilephones_new (
id string,
title string,
cost float,
colors array<string>,
screen_size array<float>
)
row format delimited fields terminated by ','
collection items terminated by '#';
```



```
hive> create table mobilephones_new (
    > id string,
    > title string,
    > cost float,
    > colors array<string>,
    > screen_size array<float>
    > )
    > row format delimited fields terminated by ','
    > collection items terminated by '#';
OK
Time taken: 0.342 seconds
hive> 
```

Load data to the above table:

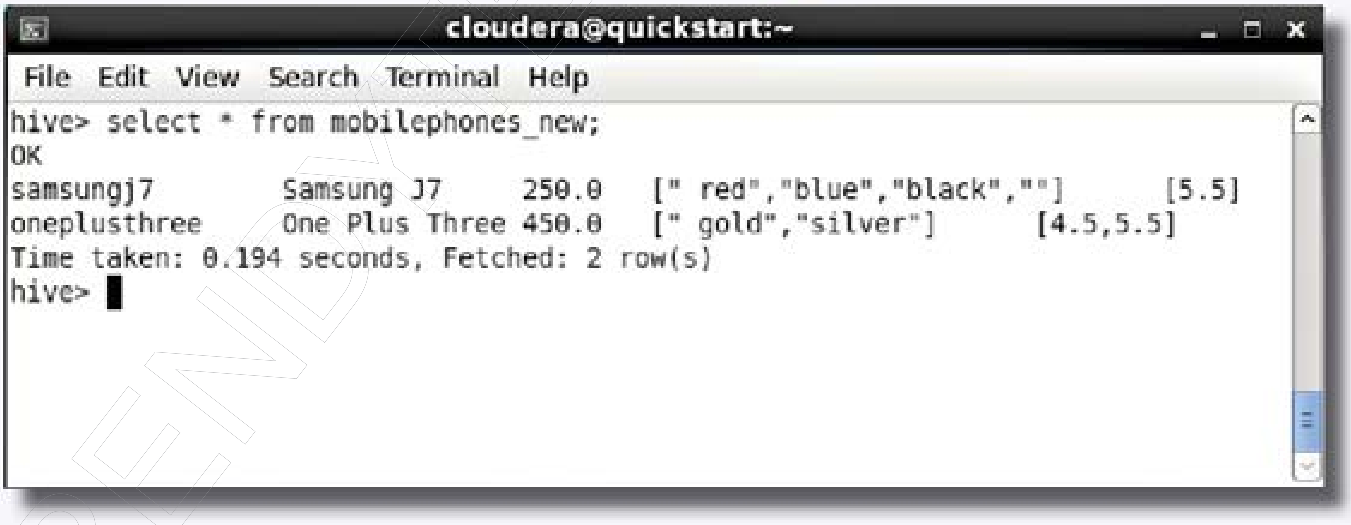
```
load data local inpath '/home/cloudera/Downloads/
mobilephones_new.csv'
into table mobilephones_new;
```



```
hive> load data local inpath '/home/cloudera/Downloads/mobilephones_new.csv'
    > into table mobilephones_new;
Loading data to table trendytech.mobilephones_new
Table trendytech.mobilephones_new stats: [numFiles=1, totalSize=105]
OK
Time taken: 2.173 seconds
hive> 
```

Display all records of table:

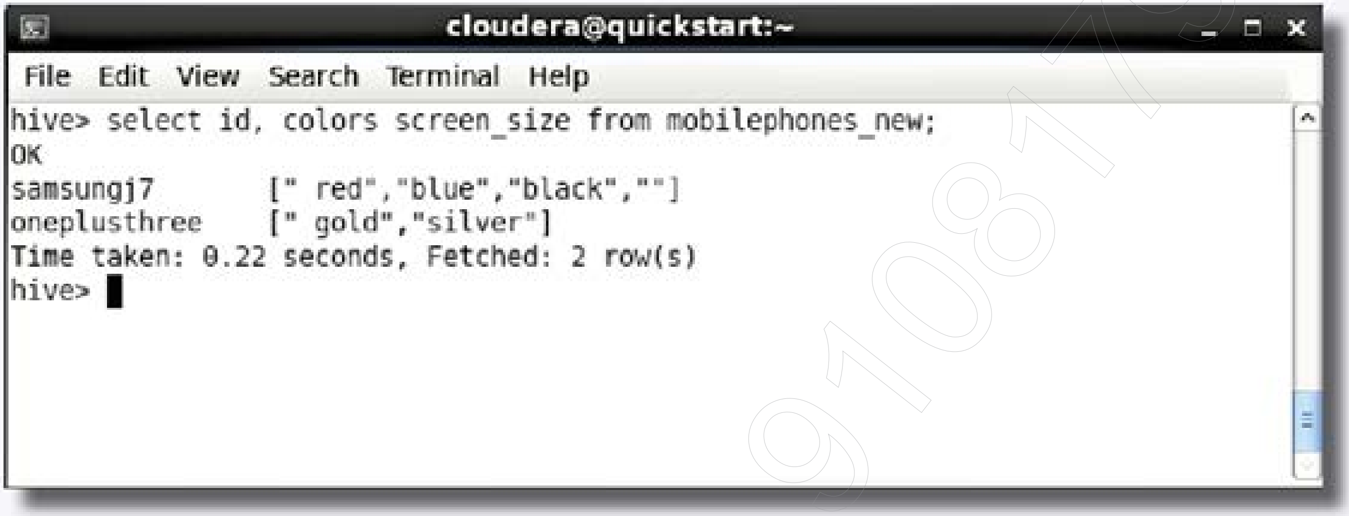
```
select * from mobilephones_new;
```



```
hive> select * from mobilephones_new;
OK
samsungj7       Samsung J7      250.0   [" red","blue","black",""]      [5.5]
oneplusthree    One Plus Three 450.0    [" gold","silver"]      [4.5,5.5]
Time taken: 0.194 seconds, Fetched: 2 row(s)
hive> 
```

Display records with all array elements:

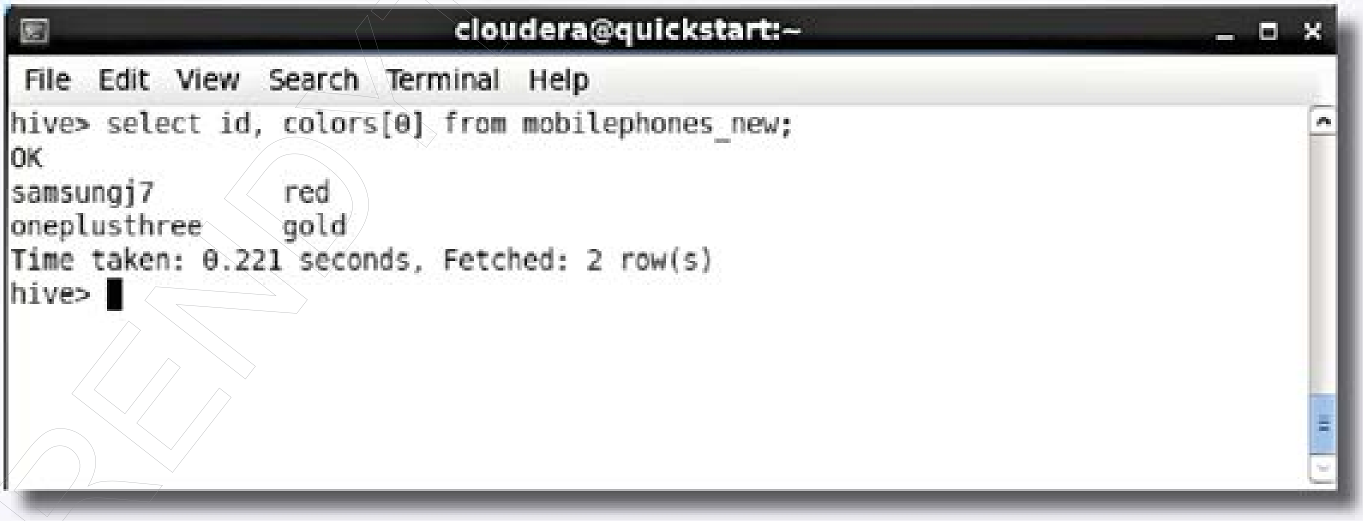
```
select id, colors screen_size from
mobilephones_new;
```



```
hive> select id, colors screen_size from mobilephones_new;
OK
samsungj7       [" red","blue","black",""]
oneplusthree    [" gold","silver"]
Time taken: 0.22 seconds, Fetched: 2 row(s)
hive> 
```

Display records of 1st elements of array:

```
select id, colors[0] from mobilephones_new;
```



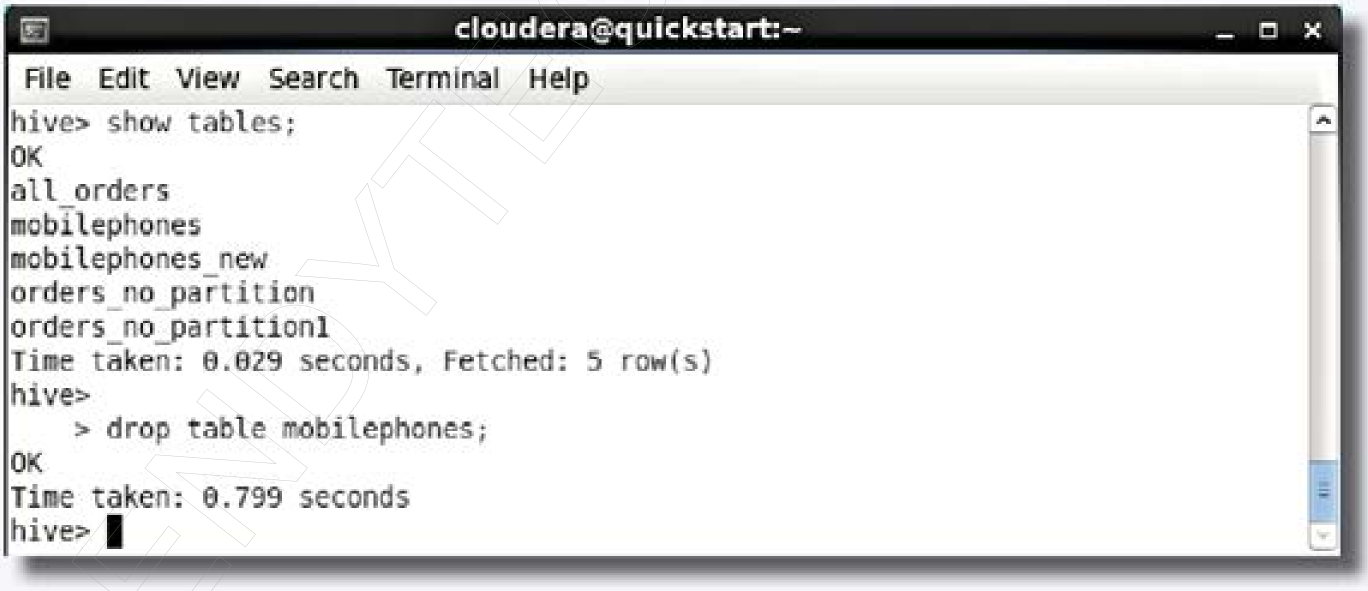
```
hive> select id, colors[0] from mobilephones_new;
OK
samsungj7       red
oneplusthree    gold
Time taken: 0.221 seconds, Fetched: 2 row(s)
hive> 
```

Map

The Map is collection of key-value pairs or unordered collection of pairs. Map has no fixed size. The value is accessed using a unique key. Keys and values have their own data types.

Drop the *mobilephones* table which we have created earlier:

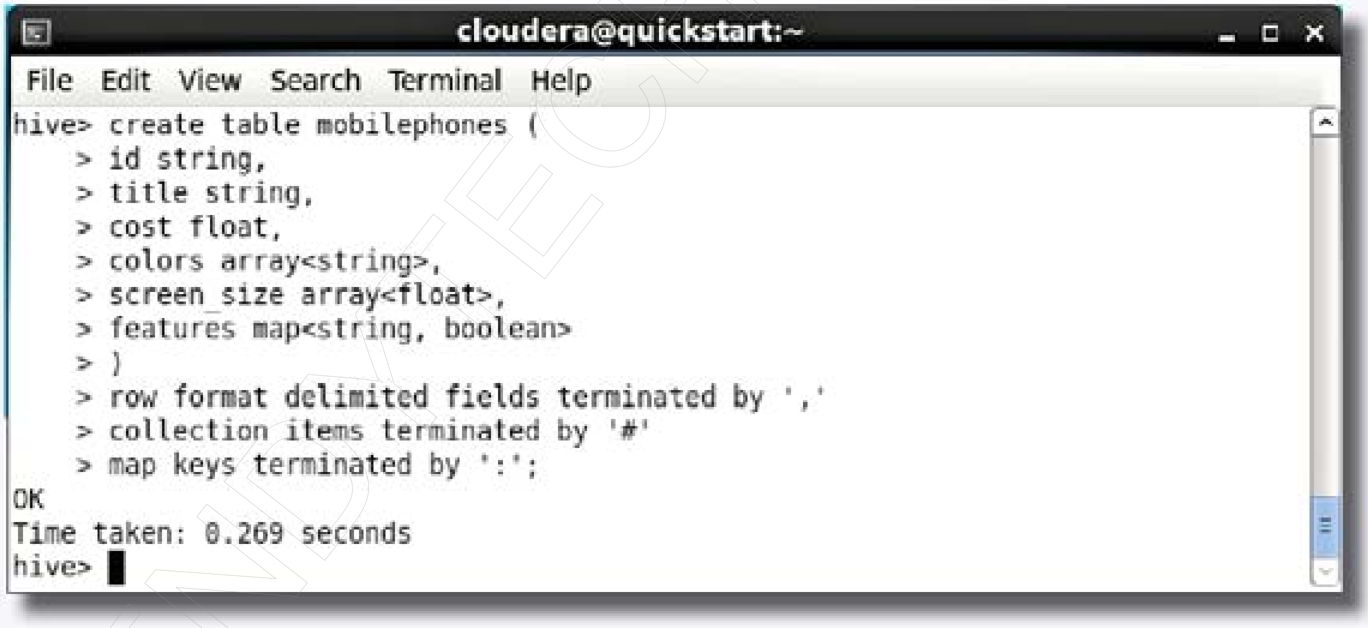
```
drop table mobilephones;
```



```
hive> show tables;
OK
all_orders
mobilephones
mobilephones_new
orders_no_partition
orders_no_partition1
Time taken: 0.029 seconds, Fetched: 5 row(s)
hive>
    > drop table mobilephones;
OK
Time taken: 0.799 seconds
hive>
```

Create a table with map data types:

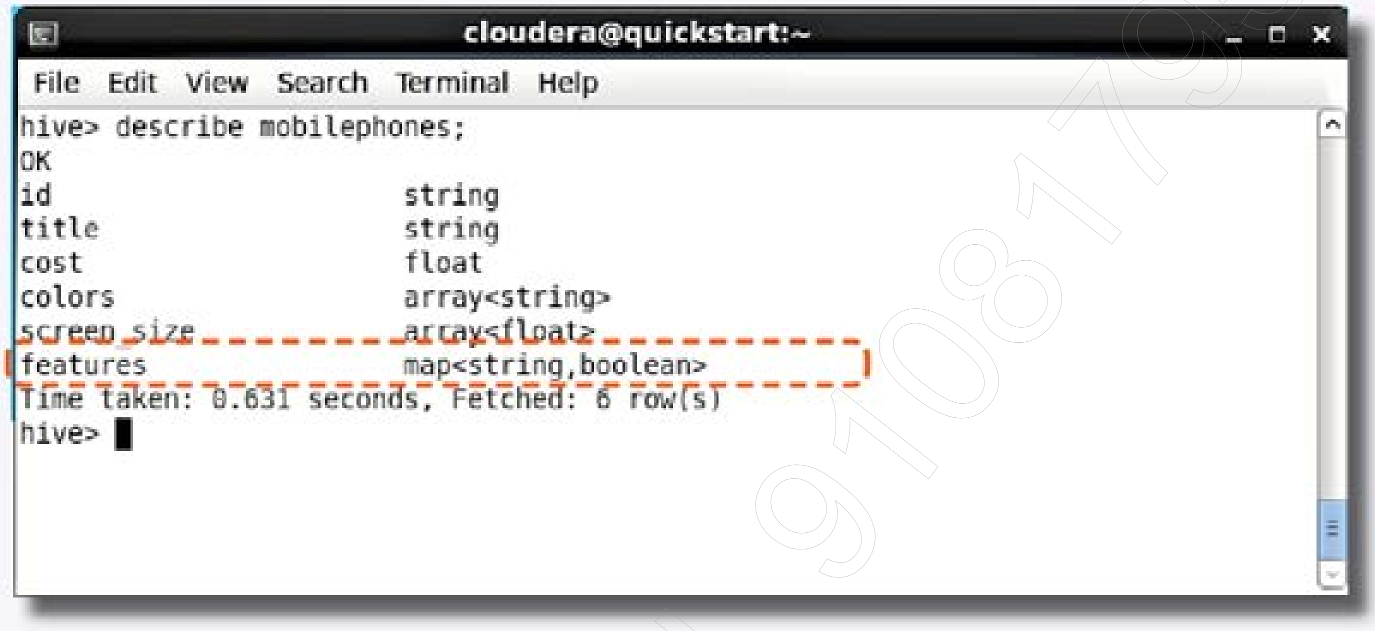
```
create table mobilephones (
id string,
title string,
cost float,
colors array<string>,
screen_size array<float>,
features map<string, boolean>
)
row format delimited fields terminated by ','
collection items terminated by '#'
map keys terminated by ':';
```



```
hive> create table mobilephones (
    > id string,
    > title string,
    > cost float,
    > colors array<string>,
    > screen_size array<float>,
    > features map<string, boolean>
    > )
    > row format delimited fields terminated by ','
    > collection items terminated by '#'
    > map keys terminated by ':';
OK
Time taken: 0.269 seconds
hive> 
```

Describe to see the table schema:

```
describe mobilephones;
```

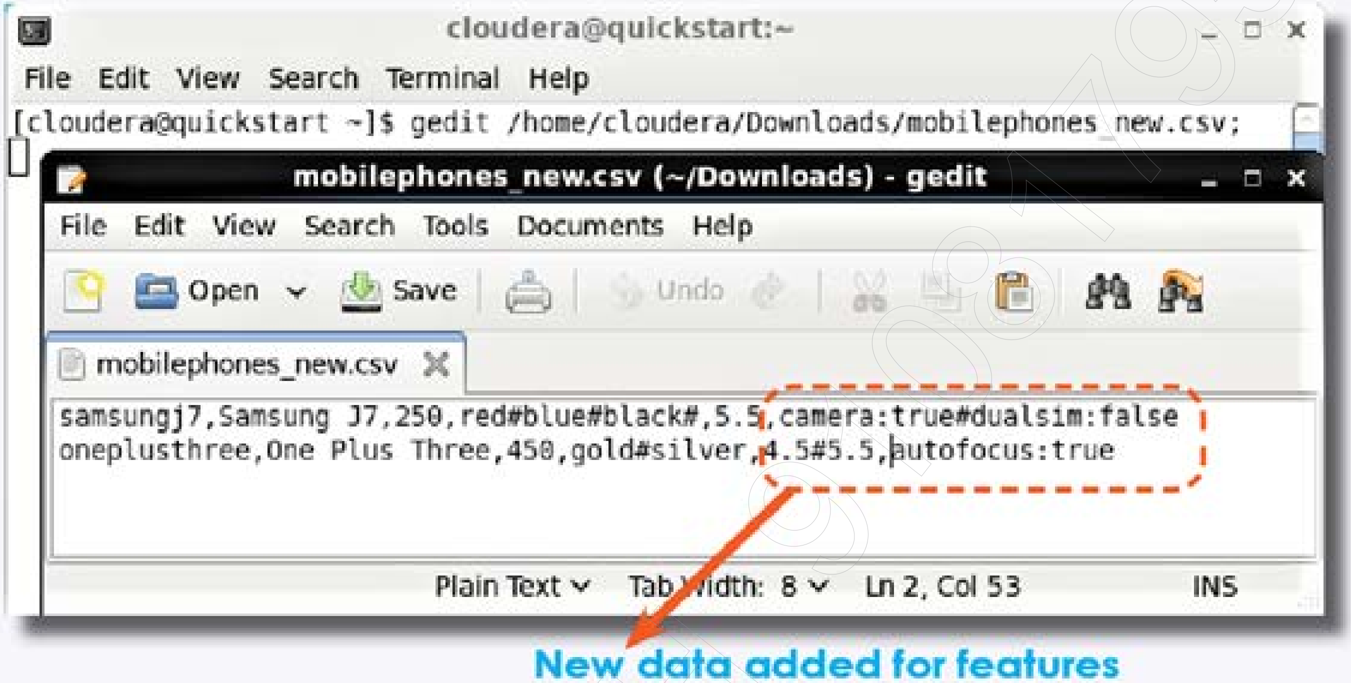


```
hive> describe mobilephones;
OK
id                      string
title                   string
cost                    float
colors                  array<string>
screen_size             array<float>
features                map<string,boolean>
Time taken: 0.631 seconds, Fetched: 6 row(s)
hive> 
```

Note: Now we have to edit the mobilephones_new.csv file to add features

Edit the existing *mobilephones_new.csv* file:

```
gedit /home/cloudera/Downloads/mobilephones_new.csv;
```


cloudera@quickstart:~
File Edit View Search Terminal Help
mobilephones_new.csv (~/Downloads) - gedit
File Edit View Search Tools Documents Help
Open Save Undo
mobilephones_new.csv
Plain Text Tab Width: 8 Ln 2, Col 53 INS

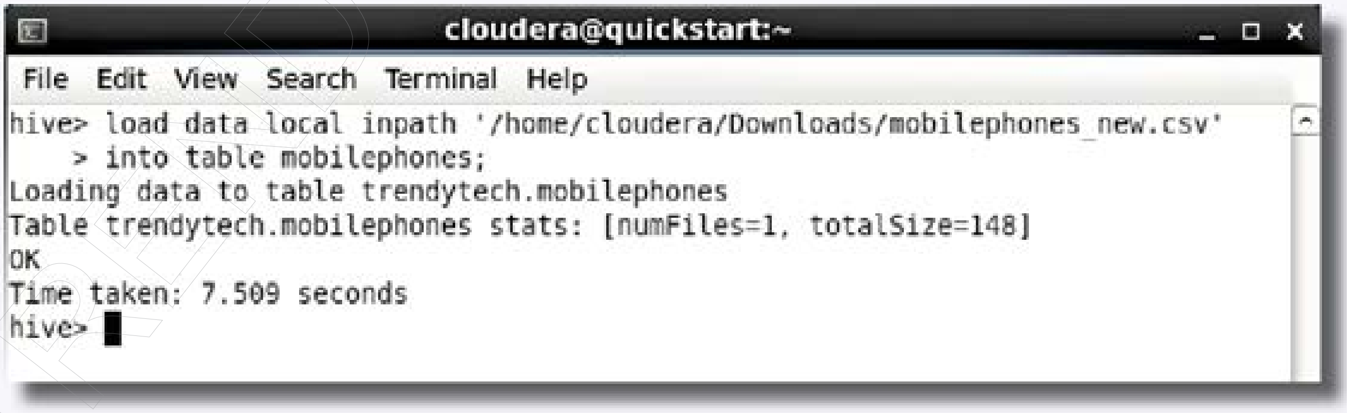
```
[cloudera@quickstart ~]$ gedit /home/cloudera/Downloads/mobilephones_new.csv;
```

```
samsungj7,Samsung J7,250,red#blue#black#,5.5,camera:true#dualsim:false
oneplusthree,One Plus Three,450,gold#silver,4.5#5.5,autofocus:true
```

New data added for features

Now load data into the *mobilephones* table:

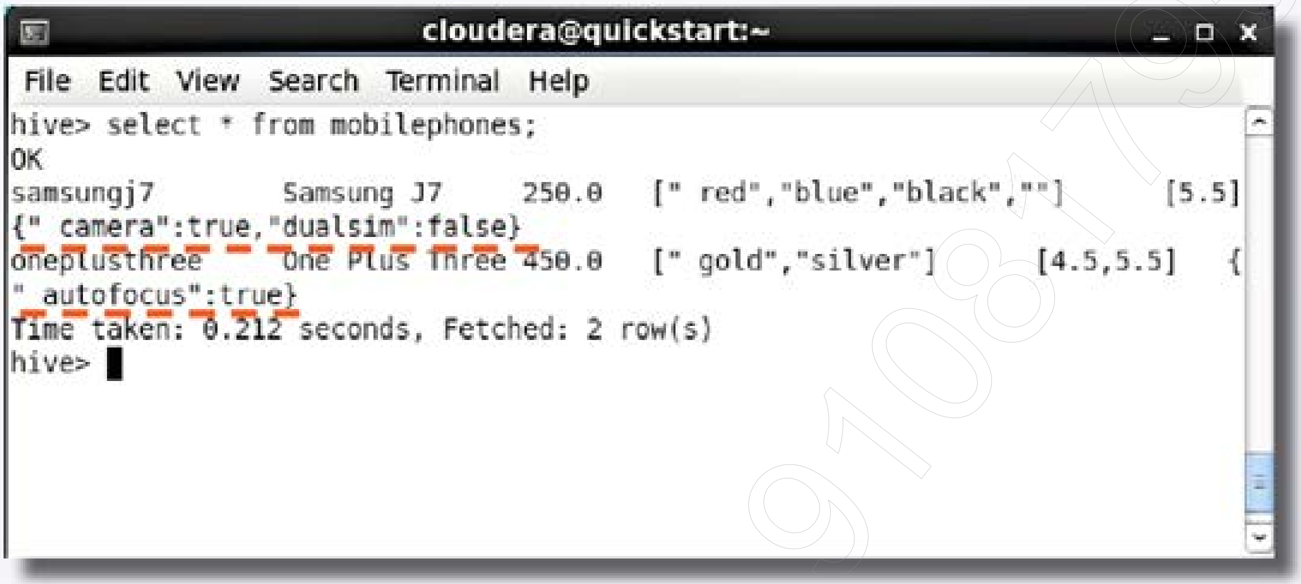
```
load data local inpath '/home/cloudera/
Downloads/mobilephones_new.csv'
into table mobilephones;
```



```
hive> load data local inpath '/home/cloudera/Downloads/mobilephones_new.csv'
    > into table mobilephones;
Loading data to table trendytech.mobilephones
Table trendytech.mobilephones stats: [numFiles=1, totalSize=148]
OK
Time taken: 7.509 seconds
hive>
```

Display records of table:

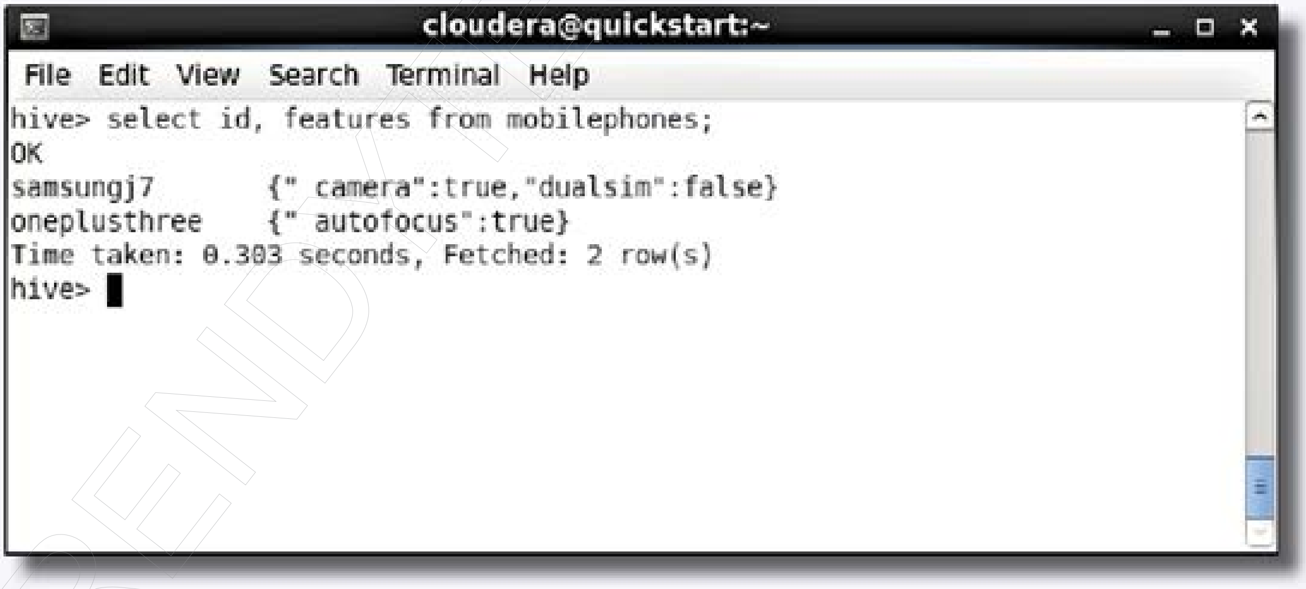
```
select * from mobilephones;
```



```
hive> select * from mobilephones;
OK
samsungj7        Samsung J7     250.0   [" red","blue","black",""]      [5.5]
{" camera":true,"dualsim":false}
oneplusthree     One Plus Three 450.0   [" gold","silver"]      [4.5,5.5]   {
" autofocus":true}
Time taken: 0.212 seconds, Fetched: 2 row(s)
hive>
```

Display the *features* column data:

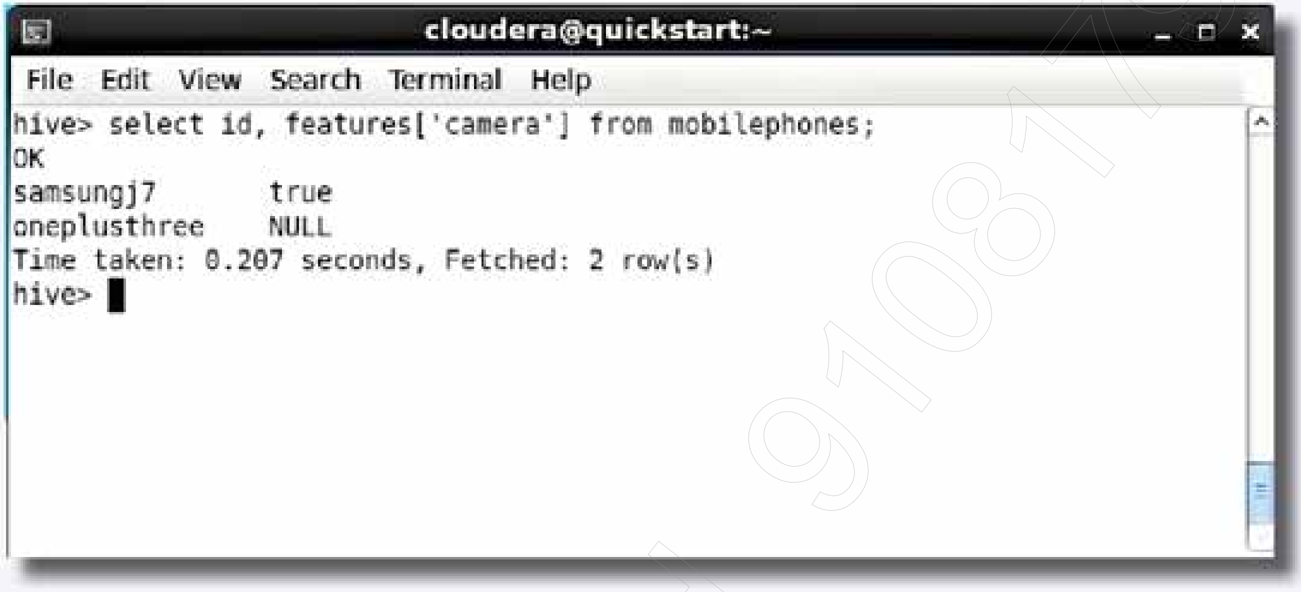
```
select id, features from mobilephones;
```



```
hive> select id, features from mobilephones;
OK
samsungj7       {" camera":true,"dualsim":false}
oneplusthree    {" autofocus":true}
Time taken: 0.303 seconds, Fetched: 2 row(s)
hive>
```

Display individual records of Map:

```
select id, features['camera'] from
mobilephones;
```



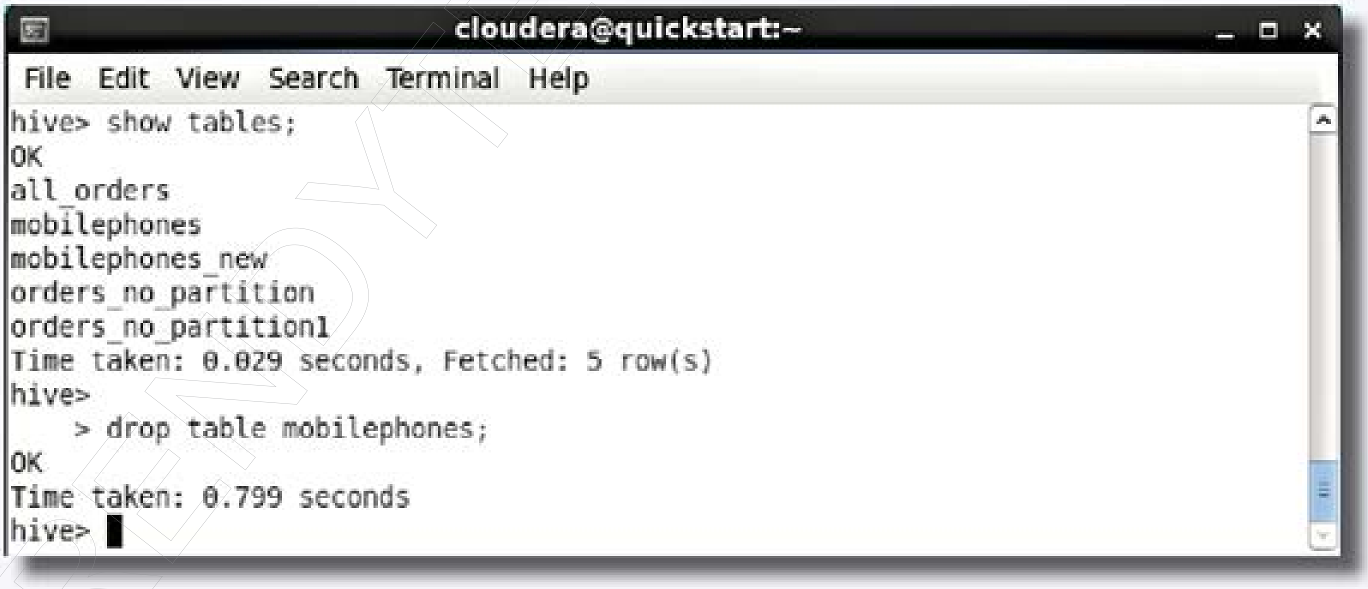
```
hive> select id, features['camera'] from mobilephones;
OK
samsungj7       true
oneplusthree    NULL
Time taken: 0.207 seconds, Fetched: 2 row(s)
hive> 
```

Struct

Struct logically groups different types of data together into one entity. Each individual bit of data within a Struct can have different data types. Struct can hold any number of values. Each value referenced by a name.

Drop again the *mobilephones* table which we have created earlier:

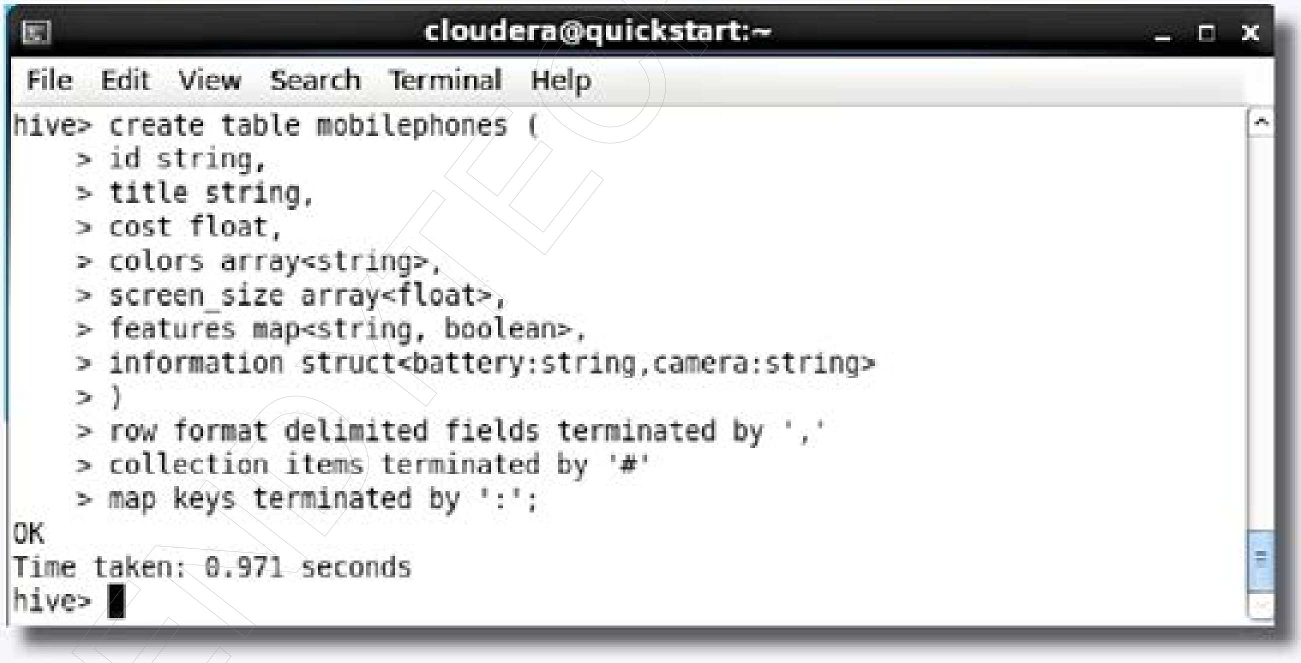
```
drop table mobilephones;
```



```
hive> show tables;
OK
all_orders
mobilephones
mobilephones_new
orders_no_partition
orders_no_partition1
Time taken: 0.029 seconds, Fetched: 5 row(s)
hive>
    > drop table mobilephones;
OK
Time taken: 0.799 seconds
hive> 
```

Create a table with struct data type:

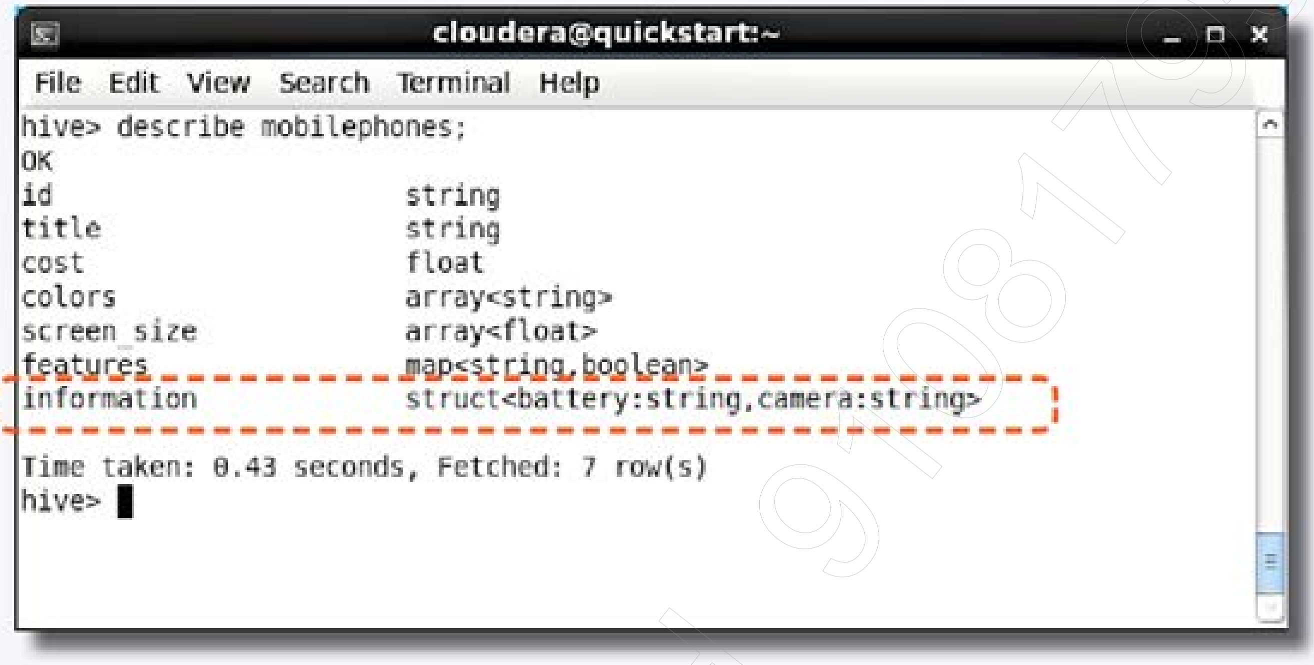
```
create table mobilephones (
id string,
title string,
cost float,
colors array<string>,
screen_size array<float>,
features map<string, boolean>,
information struct<battery:string,camera:string>
)
row format delimited fields terminated by ','
collection items terminated by '#'
map keys terminated by ':';
```



```
hive> create table mobilephones (
    > id string,
    > title string,
    > cost float,
    > colors array<string>,
    > screen_size array<float>,
    > features map<string, boolean>,
    > information struct<battery:string,camera:string>
    > )
    > row format delimited fields terminated by ','
    > collection items terminated by '#'
    > map keys terminated by ':';
OK
Time taken: 0.971 seconds
hive> 
```

Describe to see the table schema:

```
describe mobilephones;
```



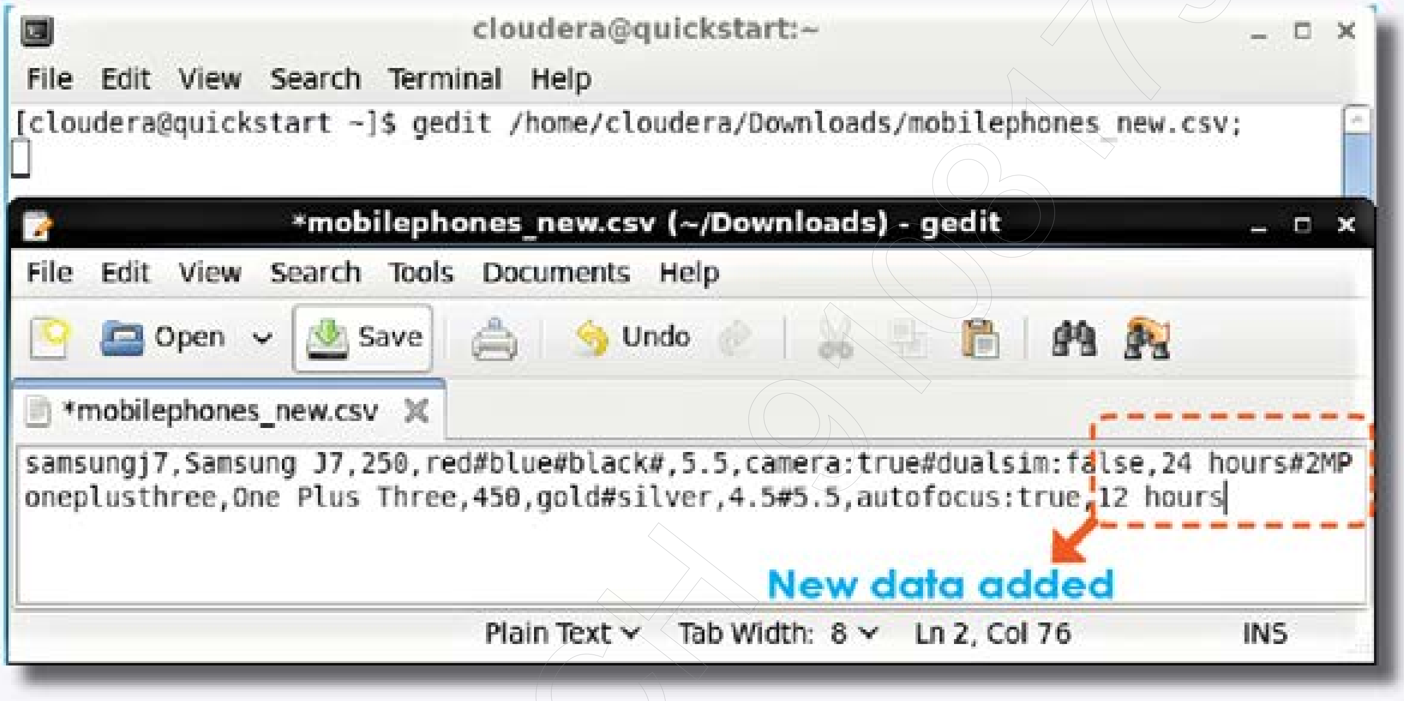
```
hive> describe mobilephones;
OK
id                      string
title                   string
cost                    float
colors                  array<string>
screen_size             array<float>
features                map<string,boolean>
information             struct<battery:string,camera:string>

Time taken: 0.43 seconds, Fetched: 7 row(s)
hive> 
```

Note: Now we have to edit the *mobilephones_new.csv* file to add information column data.

Edit the existing *mobilephones_new.csv* file to add new data for Struct column:

```
gedit /home/cloudera/Downloads/mobilephones_new.csv;
```


cloudera@quickstart:~
File Edit View Search Terminal Help

```
[cloudera@quickstart ~]$ gedit /home/cloudera/Downloads/mobilephones_new.csv;
```

*mobilephones_new.csv (~/Downloads) - gedit
File Edit View Search Tools Documents Help
Open
Save
Undo
*mobilephones_new.csv

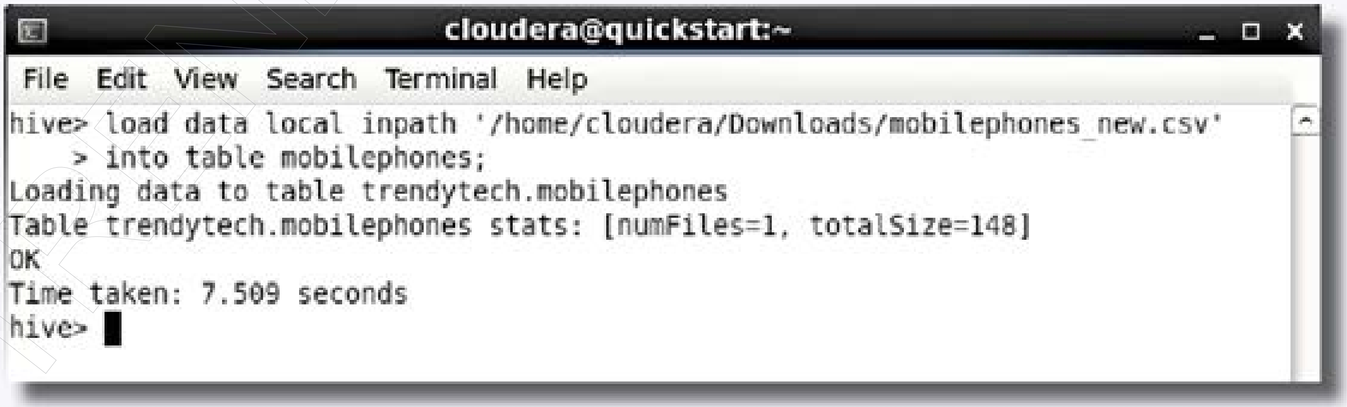
```
samsungj7,Samsung J7,250,red#blue#black#,5.5,camera:true#dualsim:false,24 hours#2MP
oneplusthree,One Plus Three,450,gold#silver,4.5#5.5,autofocus:true,12 hours
```

New data added

Plain Text
Tab Width: 8
Ln 2, Col 76
INS

Now load data into the *mobilephones* table:

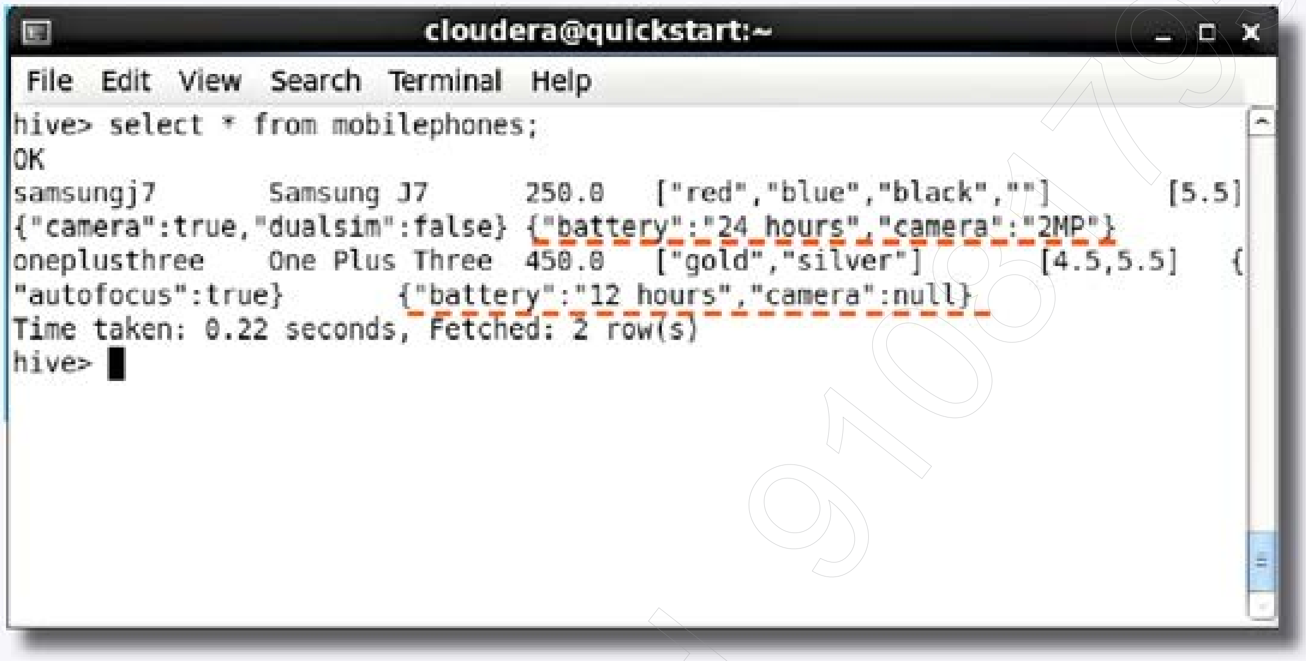
```
load data local inpath '/home/cloudera/
Downloads/mobilephones_new.csv'
into table mobilephones;
```



```
hive> load data local inpath '/home/cloudera/Downloads/mobilephones_new.csv'
    > into table mobilephones;
Loading data to table trendytech.mobilephones
Table trendytech.mobilephones stats: [numFiles=1, totalSize=148]
OK
Time taken: 7.509 seconds
hive> 
```

Display records of the Struct table:

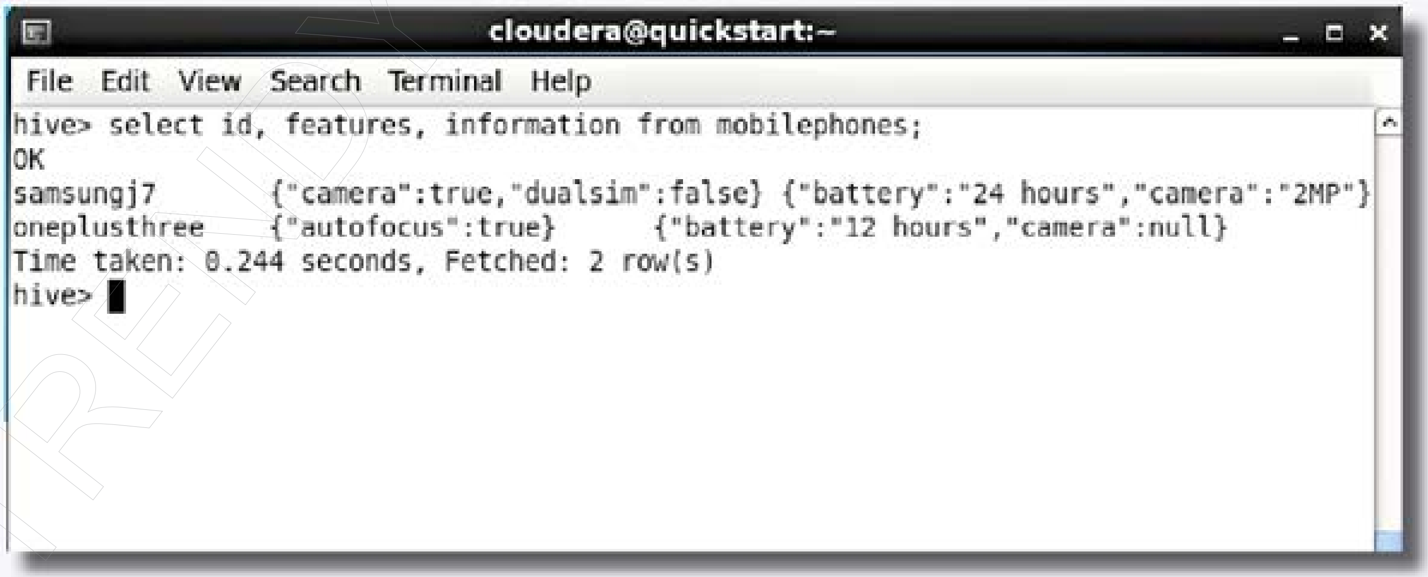
```
select * from mobilephones;
```



```
hive> select * from mobilephones;
OK
samsungj7       Samsung J7      250.0   ["red","blue","black",""]       [5.5]
{"camera":true,"dualsim":false} {"battery":"24 hours","camera":"2MP"}
oneplusthree    One Plus Three  450.0   ["gold","silver"]       [4.5,5.5]    {
"autofocus":true}       {"battery":"12 hours","camera":null}
Time taken: 0.22 seconds, Fetched: 2 row(s)
hive>
```

Display the *features* with *information* column data:

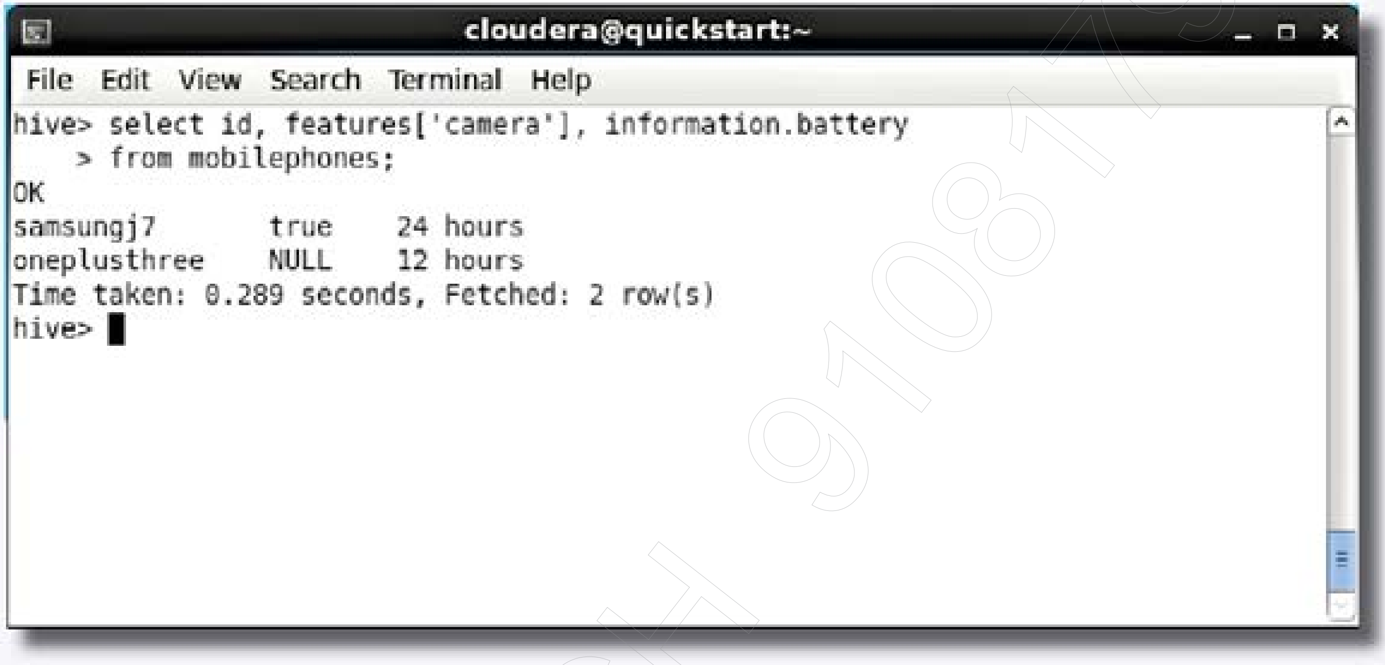
```
select id, features, information from
mobilephones;
```



```
hive> select id, features, information from mobilephones;
OK
samsungj7       {"camera":true,"dualsim":false} {"battery":"24 hours","camera":"2MP"}
oneplusthree    {"autofocus":true}      {"battery":"12 hours","camera":null}
Time taken: 0.244 seconds, Fetched: 2 row(s)
hive>
```

Display individual records of Map and Struct:

```
select id, features['camera'], information.battery
from mobilephones;
```



```
hive> select id, features['camera'], information.battery
    > from mobilephones;
OK
samsungj7       true    24 hours
oneplusthree    NULL    12 hours
Time taken: 0.289 seconds, Fetched: 2 row(s)
hive> 
```

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Trainer	Mr. Sumit Mittal
LinkedIn	https://www.linkedin.com/in/bigdatabysumit/
Website	https://trendytech.in/courses/big-data-online-training/
Phone	9108179578
Email	trendytech.sumit@gmail.com
Youtube	TrendyTech
Twitter	@BigdataBySumit
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