

## Perform Extraction:

## 2.a) Extract all the sales CSV files to a single MySQL table.

CSV file input

Table output

**Execution Results**

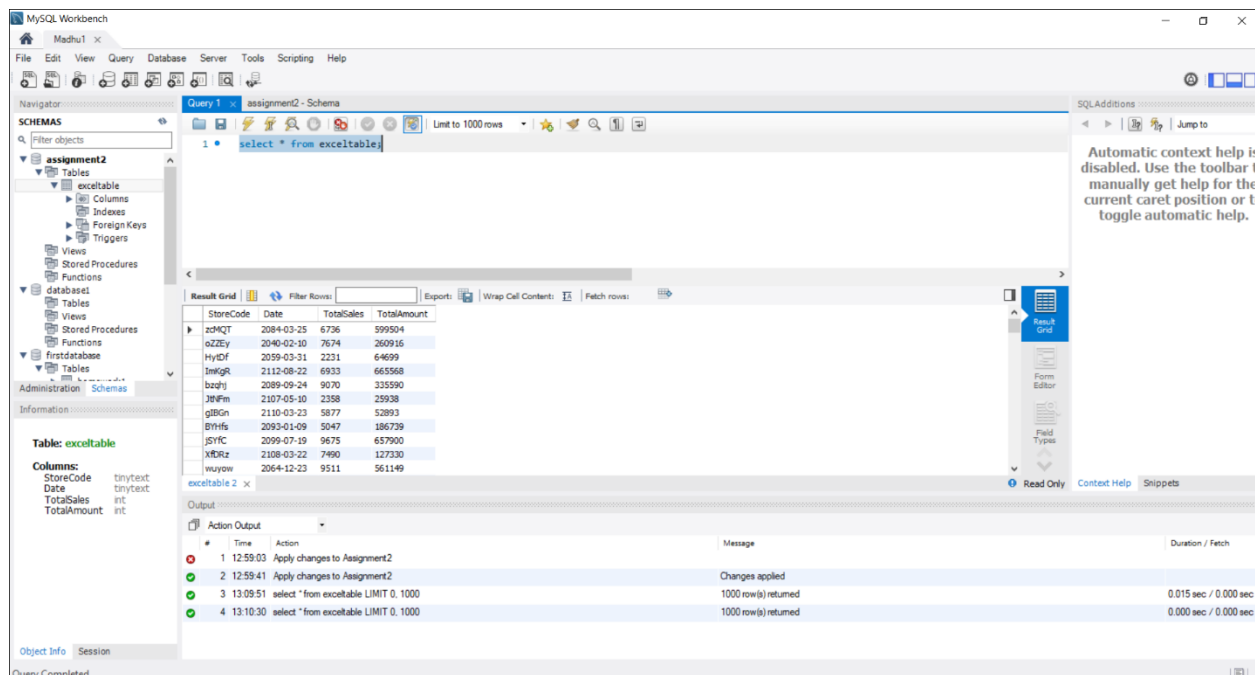
| # | Stepname       | Copynr | Read    | Written | Input   | Output  | Updated | Rejected | Errors | Active   | Time    | Speed (r/s) | input/output |
|---|----------------|--------|---------|---------|---------|---------|---------|----------|--------|----------|---------|-------------|--------------|
| 1 | CSV file input | 0      | 0       | 1000000 | 1000100 | 0       | 100     | 0        | 0      | Finished | 1mn 35s | 10,501      | -            |
| 2 | Table output   | 0      | 1000000 | 1000000 | 0       | 1000000 | 0       | 0        | 0      | Finished | 1mn 36s | 10,394      | -            |

CSV file input

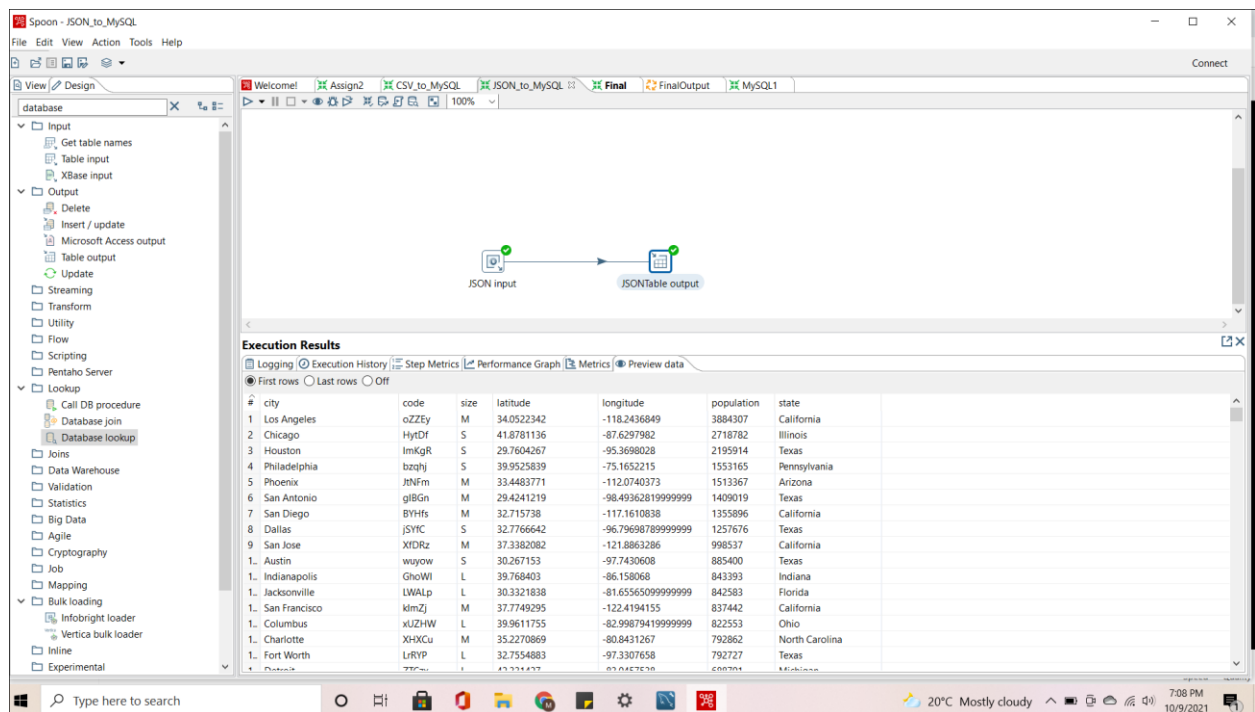
Table output

**Execution Results**

| # | StoreCode | Date       | TotalSales | TotalAmount |
|---|-----------|------------|------------|-------------|
| 1 | zcMOI     | 2084-03-25 | 6736       | 599504      |
| 2 | oZZEy     | 2040-02-10 | 7674       | 260916      |
| 3 | HyDf      | 2059-03-31 | 2231       | 64699       |
| 4 | ImKqR     | 2112-08-22 | 6933       | 665568      |
| 5 | bzqjh     | 2089-09-24 | 9070       | 335590      |
| 6 | JtNFm     | 2107-05-10 | 2358       | 25938       |
| 7 | glBGn     | 2110-03-23 | 5877       | 52893       |
| 8 | BYHfs     | 2093-01-09 | 5047       | 186739      |
| 9 | JSYC      | 2099-07-19 | 9675       | 657900      |



## 2.b) Extract the store JSON file to another MySQL table



The screenshot shows the MySQL Workbench interface. The 'Query 1' window displays the following SQL queries:

```
1 select * from exceltable;  
2  
3 select * from JSONTable;
```

The 'Result Grid' shows the output of the first query, displaying a table with columns: city, code, size, latitude, longitude, population, and state. The data includes cities like Los Angeles, Chicago, Houston, Philadelphia, Phoenix, San Antonio, San Diego, Dallas, San Jose, Austin, and Indianapolis.

The 'Output' window shows the execution log with the following entries:

| # | Time     | Action                                 | Message              | Duration / Fetch      |
|---|----------|--|----------------------|-----------------------|
| 1 | 12:59:03 | Apply changes to Assignment2           |                      |                       |
| 2 | 12:59:41 | Apply changes to Assignment2           | Changes applied      |                       |
| 3 | 13:09:51 | select * from exceltable LIMIT 0, 1000 | 1000 row(s) returned | 0.015 sec / 0.000 sec |
| 4 | 13:10:30 | select * from exceltable LIMIT 0, 1000 | 1000 row(s) returned | 0.000 sec / 0.000 sec |
| 5 | 18:48:27 | select * from exceltable LIMIT 0, 1000 | 1000 row(s) returned | 0.000 sec / 0.000 sec |
| 6 | 18:49:24 | select * from JSONTable LIMIT 0, 1000  | 998 row(s) returned  | 0.000 sec / 0.015 sec |

The status bar at the bottom indicates 'Query Completed'.

### 3. Perform Outer Join (or Lookup):

The screenshot shows the Apache Spark IDE (Spoon) interface. The 'Design' view displays a data flow diagram with the following components:

```
graph LR; CSVTableInput[CSVTable input] --> DatabaseLookup[Database lookup]; DatabaseLookup --> FinalTableOutput[FinalTable output];
```

The 'Execution Results' window shows the following log entries:

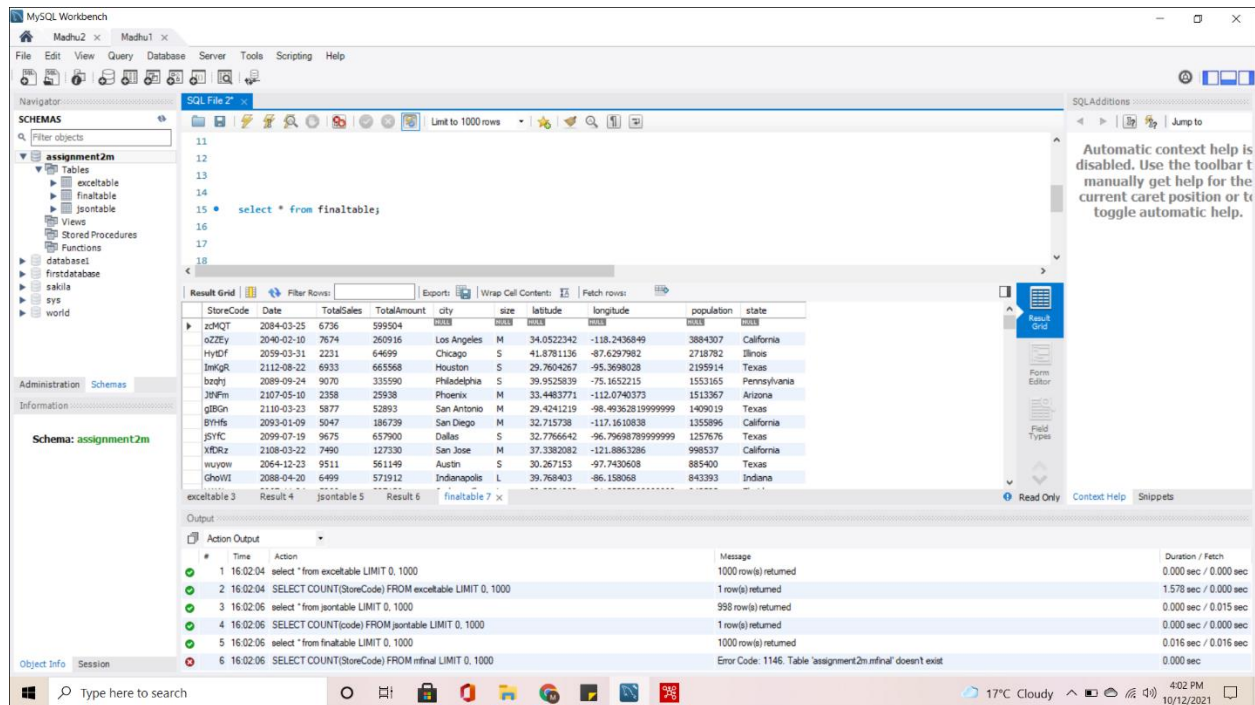
```
2021/10/13 10:40:46 - Database lookup0 - line#: 950000  
2021/10/13 10:40:46 - FinalTable output0 - line#: 950000  
2021/10/13 10:41:08 - CSVTable input0 - ITTableInput.LogLineNumber!  
2021/10/13 10:41:08 - CSVTable input0 - ITTableInput.LogFinishedReadingQuery!  
2021/10/13 10:41:08 - CSVTable input0 - Finished processing (I=1000000, O=0, R=0, W=1000000, U=0, E=0)  
2021/10/13 10:41:13 - Database lookup0 - line#: 1000000  
2021/10/13 10:41:13 - Database lookup0 - Finished processing (I=998998, O=0, R=1000000, W=1000000, U=0, E=0)  
2021/10/13 10:41:13 - FinalTable output0 - line#: 1000000  
2021/10/13 10:41:13 - FinalTable output0 - Finished processing (I=0, O=1000000, R=1000000, W=1000000, U=0, E=0)  
2021/10/13 10:41:13 - Spoon - The transformation has finished!!
```

The screenshot shows the Apache Spoon - m interface. The top menu bar includes File, Edit, View, Action, Tools, and Help. The left sidebar shows a tree view of the project structure, including Transformations, Run configurations, Database connections, Steps, Hops, Partition schemas, Slave server, Kettle cluster schemas, Hadoop clusters, VFS Connections, and Data Services. The main canvas displays a data flow diagram with three steps: CSVTable input, Database lookup, and FinalTable output, connected by arrows. The bottom panel shows the Execution Results tab, which includes a table with the following data:

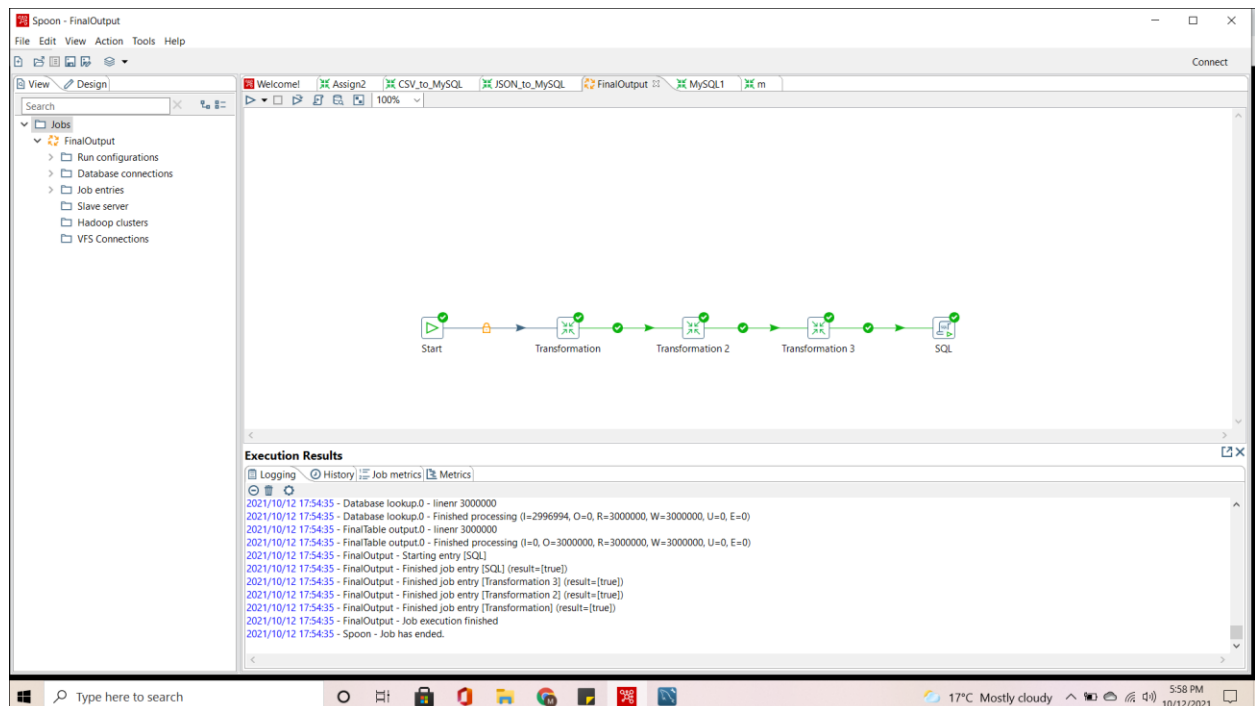
| # | Stepname          | Copynr | Read    | Written | Input   | Output  | Updated | Rejected | Errors | Active   | Time    | Speed (i/s) | Input/output |
|---|-------------------|--------|---------|---------|---------|---------|---------|----------|--------|----------|---------|-------------|--------------|
| 1 | CSVTable input    | 0      | 0       | 1000000 | 1000000 | 0       | 0       | 0        | 0      | Finished | 8mn 58s | 1,857       | -            |
| 2 | Database lookup   | 0      | 1000000 | 1000000 | 998998  | 0       | 0       | 0        | 0      | Finished | 9mn 3s  | 1,839       | -            |
| 3 | FinalTable output | 0      | 1000000 | 1000000 | 0       | 1000000 | 0       | 0        | 0      | Finished | 9mn 4s  | 1,838       | -            |

The screenshot shows the Apache Spoon - m interface. The top menu bar includes File, Edit, View, Action, Tools, and Help. The left sidebar shows a tree view of the project structure, including Transformations, Run configurations, Database connections, Steps, Hops, Partition schemas, Slave server, Kettle cluster schemas, Hadoop clusters, VFS Connections, and Data Services. The main canvas displays a data flow diagram with three steps: CSVTable input, Database lookup, and FinalTable output, connected by arrows. The bottom panel shows the Execution Results tab, which includes a table with the following data:

| # | StoreCode | Date       | TotalSales | TotalAmount | city         | size | latitude   | longitude          | population | state        |
|---|-----------|------------|------------|-------------|--------------|------|------------|--------------------|------------|--------------|
| 1 | zcMQI     | 2084-03-25 | 6736       | 599504      | NA           | NA   | NA         | NA                 | NA         | NA           |
| 2 | oZZEz     | 2040-02-10 | 7674       | 260916      | Los Angeles  | M    | 34.0522342 | -118.2436849       | 3884307    | California   |
| 3 | HydF      | 2059-03-31 | 2231       | 64699       | Chicago      | S    | 41.8781136 | -87.6297982        | 2718782    | Illinois     |
| 4 | lmKqR     | 2112-08-22 | 6933       | 665568      | Houston      | S    | 29.7604267 | -95.3698028        | 2195914    | Texas        |
| 5 | bzqhj     | 2089-09-24 | 9070       | 335590      | Philadelphia | S    | 39.9525839 | -75.1652215        | 1553165    | Pennsylvania |
| 6 | JNFM      | 2107-05-10 | 2358       | 25938       | Phoenix      | M    | 33.4483771 | -112.0740373       | 1513367    | Arizona      |
| 7 | glBGn     | 2110-03-23 | 5877       | 52893       | San Antonio  | M    | 29.4241219 | -98.49362819999999 | 1409019    | Texas        |
| 8 | BYHfs     | 2093-01-09 | 5047       | 186739      | San Diego    | M    | 32.715738  | -117.1610838       | 1355896    | California   |
| 9 | JSYC      | 2099-07-19 | 9675       | 657900      | Dallas       | S    | 32.7766642 | -96.79698789999999 | 1257676    | Texas        |



4. Create a Kettle job to include all the transformations created above.



**Execution Results**

| Job / Job Entry  | Comment                | Result  | Reason                      | Filename                    | Nr | Log date          |
|------------------|------------------------|---------|-----------------------------|-----------------------------|----|-------------------|
| Start            | Start of job execution | Success | start                       |                             | 0  | 2021/10/12 17:... |
| Transformation   | Job execution finished | Success | Followed unconditional link | file:///E:/526%20Data%20... | 1  | 2021/10/12 17:... |
| Transformation 2 | Start of job execution | Success | Followed link after success | file:///E:/526%20Data%20... | 2  | 2021/10/12 17:... |
| Transformation 3 | Start of job execution | Success | Followed link after success | file:///E:/526%20Data%20... | 3  | 2021/10/12 17:... |
| SQL              | Start of job execution | Success | Followed link after success | file:///E:/526%20Data%20... | 3  | 2021/10/12 17:... |
| SQL              | Job execution finished | Success | finished                    |                             | 3  | 2021/10/12 17:... |
| Job: FinalOutput | Job execution finished | Success | finished                    |                             | 3  | 2021/10/12 17:... |

4.a) For those source data rows that do not match a lookup row, set all the column values from the Lookup step to have 'NA' as their values

**Execution Results**

| # | StoreCode | Date       | TotalSales | TotalAmount | city         | size | latitude   | longitude           | population | state        |
|---|-----------|------------|------------|-------------|--------------|------|------------|---------------------|------------|--------------|
| 1 | zcMQf     | 2084-03-25 | 6736       | 599504      | NA           | NA   | NA         | NA                  | NA         | NA           |
| 2 | oZZEY     | 2040-02-10 | 7674       | 260916      | Los Angeles  | M    | 34.0522342 | -118.2436849        | 3884307    | California   |
| 3 | Hytdf     | 2059-03-31 | 2231       | 64699       | Chicago      | S    | 41.8781136 | -87.6297982         | 2718782    | Illinois     |
| 4 | ImKqR     | 2112-08-22 | 6933       | 665568      | Houston      | S    | 29.7604267 | -95.3698028         | 2195914    | Texas        |
| 5 | bzqHj     | 2089-09-24 | 9070       | 335590      | Philadelphia | S    | 39.9525839 | -75.1652215         | 1553165    | Pennsylvania |
| 6 | JNFM      | 2107-05-10 | 2358       | 25938       | Phoenix      | M    | 33.4483771 | -112.0740373        | 1513367    | Arizona      |
| 7 | glBGn     | 2110-03-23 | 5877       | 52893       | San Antonio  | M    | 29.4241219 | -98.493628199999999 | 1409019    | Texas        |
| 8 | BYHfs     | 2093-01-09 | 5047       | 186739      | San Diego    | M    | 32.715738  | -117.1610838        | 1355896    | California   |
| 9 | JSYC      | 2099-07-19 | 9675       | 657900      | Dallas       | S    | 32.7766642 | -96.796987899999999 | 1257676    | Texas        |