

Handling Queries on Streaming Data

Group ID - 5

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MOTIVATION

The motivation behind this research was to make MMDB's efficient enough so that they can be picked over hand crafted systems which are very costly to maintain. If MMDBs would offer better support for streaming workloads, it would make them well-suited for analytical streaming workloads.

The motivation behind this implementation is to answer the user's query in the least possible time with the real time updates of the data using a main memory database system thereby handling the streaming data workload efficiently.

OBJECTIVE

The objective of the research paper was to explore how off-the-shelf Main memory database systems can be extended to sufficiently satisfy the requirements of analytics on fast data. Another intent of this paper is to close the gap between the extended versions of MMDB's and the modern streaming systems.

The objective of our implementation is to create and manage the database in such a way that we are able to answer the user's analytical queries on the basis of the combination of the historical data and the real time streaming data as fast as possible.

ABSTRACT

Today's streaming applications demand high throughput rates and fast analysis on the data. Every minute the datasets keep expanding which leads to lesser and lesser Query Execution Time. As the dataset becomes large, it becomes difficult for the query and the system to deliver results without any latencies. In this implementation, we tend to reduce the overall response time of the queries on the continuous streaming data by working on mostly the latest updates and keeping the history of results memorized in the system.

INTRODUCTION

Streaming data is the continuous flow of data generated by various sources. By using stream processing technology, data streams can be processed, stored, analyzed, and acted upon as it's generated in real-time. Data streams enable companies to use real-time analytics to monitor their activities. The generated data can be processed through time-series data analytics techniques to report what is happening.

There are many methods to handle real time data. Various streaming platforms like Apache kafka, Spark, confluent and many more handle this real time streaming data.

A database is information that is set up for easy access, management and updating. Computer databases typically store aggregations of data records or files that contain information, such as sales transactions, customer data, financials and product information. H2 is a relational database management system written in Java. It can be embedded in Java applications or run in client-server mode. It is an open-source lightweight Java based database which primarily deals with relational data.

In the further sections, we discuss the setup and working of the H2 database and running the user queries on a streaming workload. A new technique is proposed to handle the streaming data to minimize the query execution time as well as the query response time.

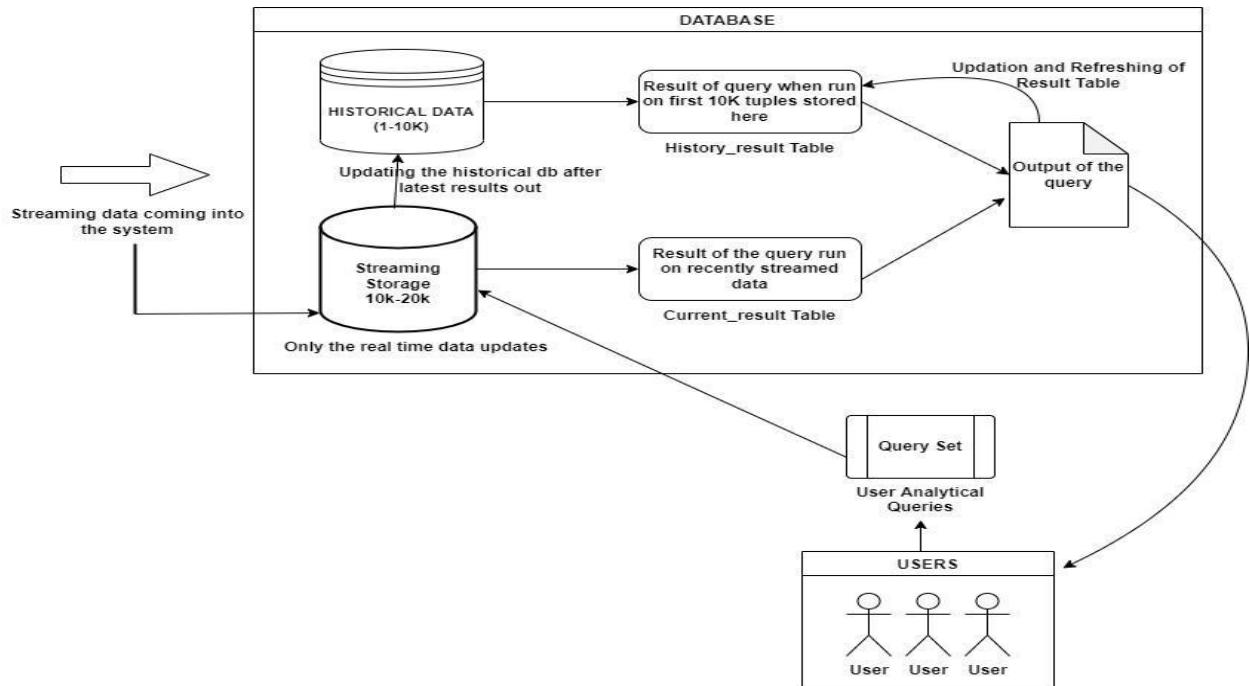
TECHNIQUE DETAILS

1. Proposed Technique

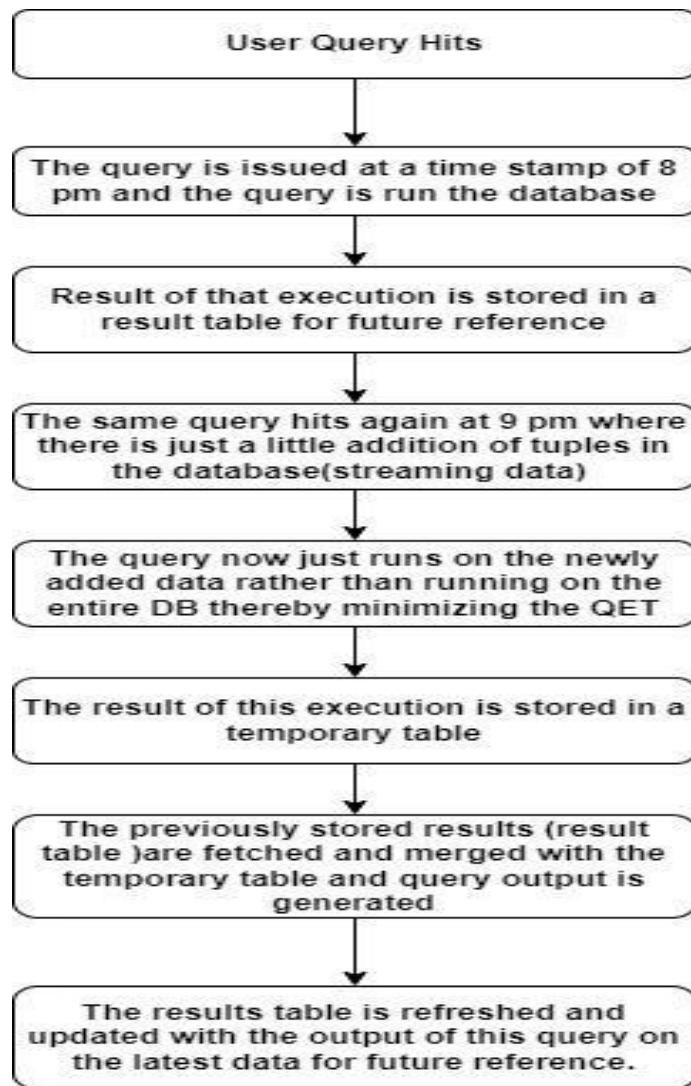
- Data streaming is the process of transmitting a continuous flow of data. This data keeps on increasing with time as more and more real time data keeps getting updated.
- The user queries have to run on very large datasets as the data keeps coming in real time, increasing the size of the database every minute thereby making the execution of queries time consuming.
- In our implementation, we hit the queries in such a way that the overall response time of the queries is optimized and the results are generated as quickly as possible.

- A certain query runs on a database and gives the result to the user. During this process it takes a certain amount of time that we call QET.
- Since we are talking about the streaming data and dealing with the real time updates on that, there will be an addition of data to the existing database after every few minutes/seconds.
- When the same query hits again, in the conventional method, we used to run the query again, on the updated database which now has a larger size than before leading to a greater QET.
- In our approach, when we run a query on a certain amount of data, we store those results and the next time the same query is put up again, we just run the query on the new addition of data (streaming data) and combine its result with the past stored results of the historical data and display it to the user.

2. Workflow Diagram



3. Flow Diagram



4. Implementation Status : Completed

EXPERIMENTAL SETUP DETAILS

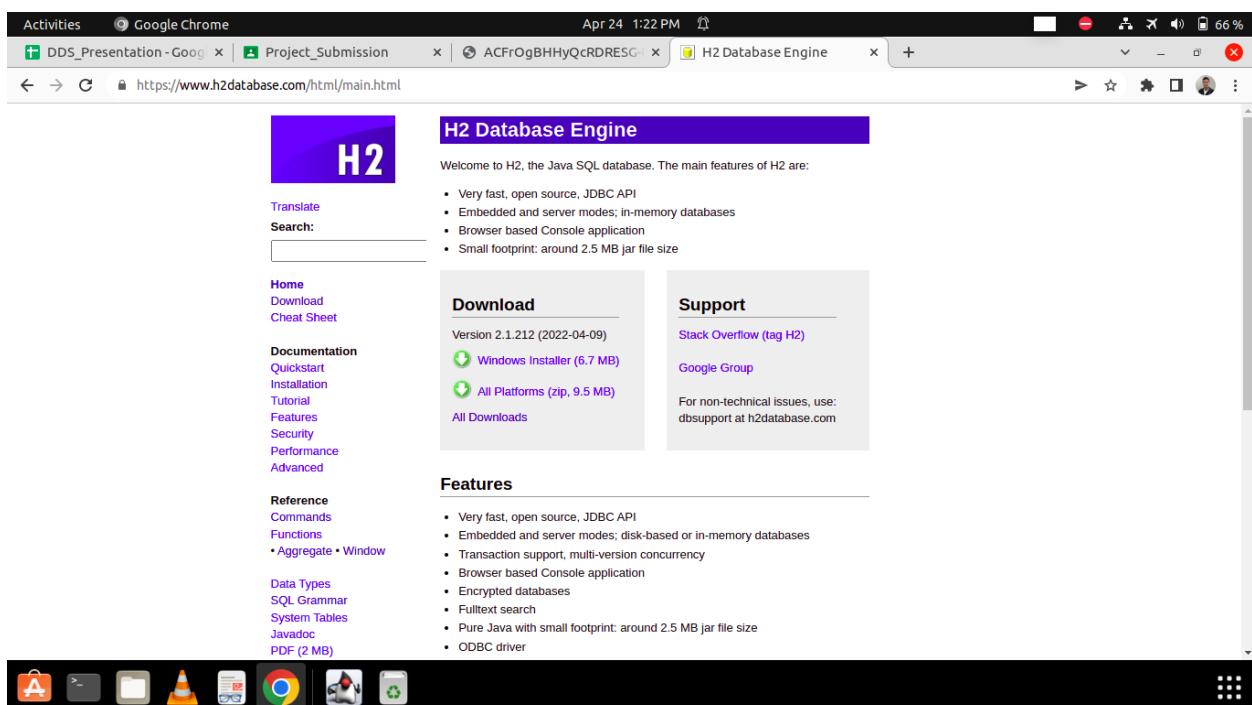
1. Software Setup

- a. Name of DBMS : H2 Main Memory Database
- b. Implementation Status of H2 : Complete
- c. Single Node Setup : Yes
- d. Installation Steps:
 - i. Pre-requisites
 - 1. OS - Linux 21.10
 - 2. DBMS tool & Version : H2 DBMS - Version 2.1.212
 - 3. Hardware Requirements : Linux Ubuntu 21.10, Intel Core i3, CPU@1.70GHz x 4, OS Type = 64 bit, RAM = 4GB.

2. Actual Steps

For our experimental setup, we have downloaded the All platforms zip file (9.5 MB) and installed it in our Linux Ubuntu (21.10) system.

After unzipping the downloaded file, we run its shell script file.



Activities Terminal Apr 24 1:25 PM

```
mayank@mayank:~/Downloads/h2-2022-04-09/h2/bin$ ./h2.sh
Gtk-Message: 18:20:46.528: Failed to load module "canberra-gtk-module"
Opening in existing browser session.
libva error: /usr/lib/x86_64-linux-gnu/dri/iHD_drv_video.so init failed
[21196:21196:0100:000000.833208:ERROR:sandbox_linux.cc(377)] Initializesandbox() called with multiple threads in process gpu-process.
Exception in thread "AWT-EventQueue-0" java.lang.UnsupportedOperationException: The system tray is not supported on the current platform.
    at java.desktop/java.awt.SystemTray.getSystemTray(SystemTray.java:188)
    at java.desktop/sun.awt.X11.XTrayIconPeer$4$1.run(XTrayIconPeer.java:222)
    at java.desktop/java.awt.event.InvocationEvent.dispatch(InvocationEvent.java:313)
    at java.desktop/java.awt.EventQueue.dispatchEventImpl(EventQueue.java:770)
    at java.desktop/java.awt.EventQueue$4.run(EventQueue.java:721)
    at java.desktop/java.awt.EventQueue$4.run(EventQueue.java:715)
    at java.base/java.security.AccessController.doPrivileged(Native Method)
    at java.base/java.security.ProtectionDomain$JavaSecurityAccessImpl.doIntersectionPrivilege(ProtectionDomain.java:85)
    at java.base/java.security.ProtectionDomain$JavaSecurityAccessImpl.doIntersectionPrivilege(ProtectionDomain.java:95)
    at java.desktop/java.awt.EventQueue$5.run(EventQueue.java:745)
    at java.desktop/java.awt.EventQueue$5.run(EventQueue.java:743)
    at java.base/java.security.AccessController.doPrivileged(Native Method)
    at java.base/java.security.ProtectionDomain$JavaSecurityAccessImpl.doIntersectionPrivilege(ProtectionDomain.java:85)
    at java.desktop/java.awt.EventQueue$4.dispatch(EventQueue.java:742)
    at java.desktop/java.awt.EventQueue.pumpOneEventForFilters(EventDispatchThread.java:203)
    at java.desktop/java.awt.EventQueue.pumpEventsForFilter(EventDispatchThread.java:124)
    at java.desktop/java.awt.EventQueue.pumpEventsForHierarchy(EventDispatchThread.java:113)
    at java.desktop/java.awt.EventQueue.pumpEvents(EventDispatchThread.java:109)
    at java.desktop/java.awt.EventQueue.pumpEvents(EventDispatchThread.java:101)
    at java.desktop/java.awt.EventQueue.run(EventDispatchThread.java:96)
Exception in thread "AWT-EventQueue-0" java.lang.UnsupportedOperationException: The system tray is not supported on the current platform.
    at java.desktop/java.awt.SystemTray.getSystemTray(SystemTray.java:188)
    at java.desktop/sun.awt.X11.XTrayIconPeer$4$1.run(XTrayIconPeer.java:222)
    at java.desktop/java.awt.event.InvocationEvent.dispatch(InvocationEvent.java:313)
    at java.desktop/java.awt.EventQueue$4.dispatch(EventQueue.java:770)
    at java.desktop/java.awt.EventQueue$4.run(EventQueue.java:721)
    at java.desktop/java.awt.EventQueue$4.run(EventQueue.java:715)
    at java.base/java.security.AccessController.doPrivileged(Native Method)
    at java.base/java.security.ProtectionDomain$JavaSecurityAccessImpl.doIntersectionPrivilege(ProtectionDomain.java:85)
```

Activities Google Chrome Apr 24 1:27 PM

H2 Console Not secure | http://172.17.0.1:8082/login.jsp?jsessionid=aab28a8600250650b350c59691490063

English Preferences Tools Help

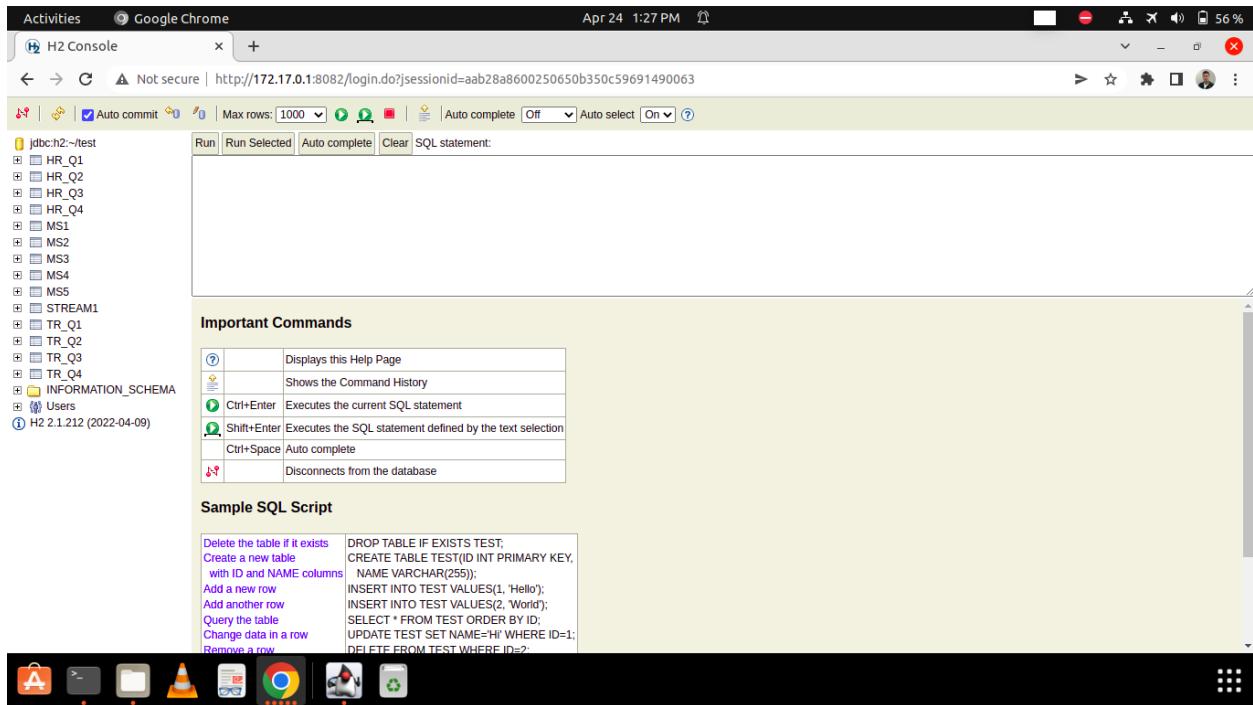
Login

Saved Settings: Generic H2 (Embedded) Setting Name: Generic H2 (Embedded) Save Remove

Driver Class: org.h2.Driver JDBC URL: jdbc:h2:~/test User Name: sa Password:

Connect Test Connection





- Path Folder: '/home/mayank/Downloads/'

3. Experimental Runsteps

```

Activities Terminal Apr 24 1:25 PM
mayank@mayank: ~/Downloads/h2-2022-04-09/h2/bin

Gtk-Message: 18:26:46.528: Failed to load module "canberra-gtk-module"
Opening in existing browser session.
ltbva error: /usr/lib/x86_64-linux-gnu/dri/iHD_drv_video.so init failed
[21196:21196:0100/00000.833208:ERROR:sandbox_linux.cc(377)] InitializeSandbox() called with multiple threads in process gpu-process.
Exception in thread "AWT-EventQueue-0" java.lang.UnsupportedOperationException: The system tray is not supported on the current platform.
at java.desktop/java.awt.SystemTray.getSystemTray(SystemTray.java:188)
at java.desktop/sun.awt.X11.XTrayIconPeer$451.run(XTrayIconPeer.java:222)
at java.desktop/java.awt.event.InvocationEvent.dispatch(InvocationEvent.java:313)
at java.desktop/java.awt.EventQueue.dispatchEventImpl(EventQueue.java:770)
at java.desktop/java.awt.EventQueue$4.run(EventQueue.java:721)
at java.desktop/java.awt.EventQueue$4.run(EventQueue.java:715)
at java.base/java.security.AccessController.doPrivileged(Native Method)
at java.base/java.security.ProtectionDomain$JavaSecurityAccessImpl.doIntersectionPrivilege(ProtectionDomain.java:85)
at java.base/java.security.ProtectionDomain$JavaSecurityAccessImpl.doIntersectionPrivilege(ProtectionDomain.java:95)
at java.desktop/java.awt.EventQueue$5.run(EventQueue.java:745)
at java.desktop/java.awt.EventQueue$5.run(EventQueue.java:743)
at java.base/java.security.AccessController.doPrivileged(Native Method)
at java.base/java.security.ProtectionDomain$JavaSecurityAccessImpl.doIntersectionPrivilege(ProtectionDomain.java:85)
at java.desktop/java.awt.EventQueue.dispatchEvent(EventQueue.java:742)
at java.desktop/java.awt.EventQueue$2.run(EventQueue.java:203)
at java.desktop/java.awt.EventQueue$2.run(EventDispatchThread.java:124)
at java.desktop/java.awt.EventQueue$3.pumpEventsForHierarchy(EventDispatchThread.java:113)
at java.desktop/java.awt.EventQueue$3.pumpEvents(EventDispatchThread.java:109)
at java.desktop/java.awt.EventQueue$3.pumpEvents(EventDispatchThread.java:101)
at java.desktop/java.awt.EventQueue$3.run(EventDispatchThread.java:98)
at java.desktop/java.awt.EventQueue$3.run(EventDispatchThread.java:96)
Exception in thread "AWT-EventQueue-0" java.lang.UnsupportedOperationException: The system tray is not supported on the current platform.
at java.desktop/java.awt.SystemTray.getSystemTray(SystemTray.java:188)
at java.desktop/sun.awt.X11.XTrayIconPeer$451.run(XTrayIconPeer.java:222)
at java.desktop/java.awt.event.InvocationEvent.dispatch(InvocationEvent.java:313)
at java.desktop/java.awt.EventQueue.dispatchEventImpl(EventQueue.java:770)
at java.desktop/java.awt.EventQueue$4.run(EventQueue.java:721)
at java.desktop/java.awt.EventQueue$4.run(EventQueue.java:715)
at java.base/java.security.AccessController.doPrivileged(Native Method)
at java.base/java.security.ProtectionDomain$JavaSecurityAccessImpl.doIntersectionPrivilege(ProtectionDomain.java:85)
  
```

Activities Google Chrome

Apr 24 1:27 PM 56%

H2 Console Not secure | http://172.17.0.1:8082/login.jsp?sessionId=aab28a8600250650b350c59691490063

English Preferences Tools Help

Login

Saved Settings: Generic H2 (Embedded)

Setting Name: Generic H2 (Embedded) Save Remove

Driver Class: org.h2.Driver

JDBC URL: jdbc:h2:~/test

User Name: sa

Password:

Connect Test Connection



Activities Google Chrome

Apr 24 1:27 PM 56%

H2 Console Not secure | http://172.17.0.1:8082/login.do?sessionId=aab28a8600250650b350c59691490063

Auto commit Max rows: 1000 Auto complete Off Auto select On

jdbc:h2:~/test

Run Run Selected Auto complete Clear SQL statement:

HR_Q1 HR_Q2 HR_Q3 HR_Q4 MS1 MS2 MS3 MS4 MS5 STREAM TR_Q1 TR_Q2 TR_Q3 TR_Q4 INFORMATION_SCHEMA Users H2 2.1.212 (2022-04-09)

Important Commands

?	Displays this Help Page
!	Shows the Command History
Ctrl+Enter	Executes the current SQL statement
Shift+Enter	Executes the SQL statement defined by the text selection
Ctrl+Space	Auto complete
Logout	Disconnects from the database

Sample SQL Script

```

Delete the table if it exists
CREATE TABLE TEST(ID INT PRIMARY KEY,
NAME VARCHAR(255));
INSERT INTO TEST VALUES('Hello');
INSERT INTO TEST VALUES('World');
SELECT * FROM TEST ORDER BY ID;
UPDATE TEST SET NAME='Hi' WHERE ID=1;
DELETE FROM TEST WHERE ID=2;
  
```

Activities Google Chrome April 23 10:44 PM 76 %

H2 Console Not secure | http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632

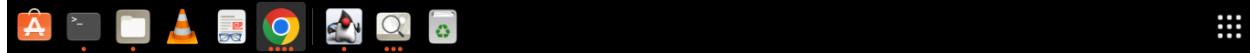
Auto commit Max rows: 1000 Auto complete Off Auto select On ?

Run Run Selected Auto complete Clear SQL statement:

```
CREATE table ms3() as
SELECT * from csvread('/home/mayank/Downloads/stream3.csv',null,'charset=UTF-8 fieldSeparator=,')
```

CREATE table ms3() as
SELECT * from csvread('/home/mayank/Downloads/stream3.csv',null,'charset=UTF-8 fieldSeparator=,');
Update count: 0
(315 ms)

jdbc:h2:~:test HR_Q1 HR_Q2 HR_Q3 HR_Q4 MS1 MS2 MS3 STREAM1 TR_Q1 TR_Q2 TR_Q3 TR_Q4 INFORMATION_SCHEMA Users H2 2.1.212 (2022-04-09)



Activities Google Chrome April 23 11:31 PM 51 %

H2 Console Not secure | http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632

Auto commit Max rows: 1000 Auto complete Off Auto select On ?

Run Run Selected Auto complete Clear SQL statement:

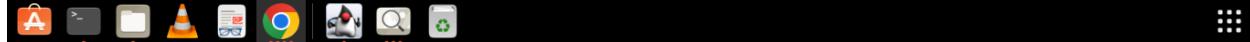
```
SELECT DISTINCT garagecode FROM HR_Q2 UNION SELECT DISTINCT garagecode FROM TR_Q2
```

SELECT DISTINCT garagecode FROM HR_Q2 UNION SELECT DISTINCT garagecode FROM TR_Q2;

GARAGECODE
BRUUNS
BUGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SKOLEBAKKEN

(6 rows, 1 ms)

jdbc:h2:~:test HR_Q1 HR_Q2 HR_Q3 HR_Q4 MS1 MS2 MS3 MS4 STREAM1 TR_Q1 TR_Q2 TR_Q3 TR_Q4 INFORMATION_SCHEMA Users H2 2.1.212 (2022-04-09)



- Number of times experiment was executed: a query set of 4 queries were considered. Each query was run on each stream of data.
- Each query was run 5 times on each stream in demonstrating traditional approach. So Total query runs = 20
- In our approach each query runs =20
- Every query result storage=20 times

Query Workload:

Query 1: Display distinct garages available for parking.

SELECT DISTINCT (garagecode) FROM stream1

QUERY 2: Display the name of the garages that are presently vacant.

SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount=0

QUERY 3: Display the name of the garages that are extremely crowded with vehicle count>=700.

SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount>=700

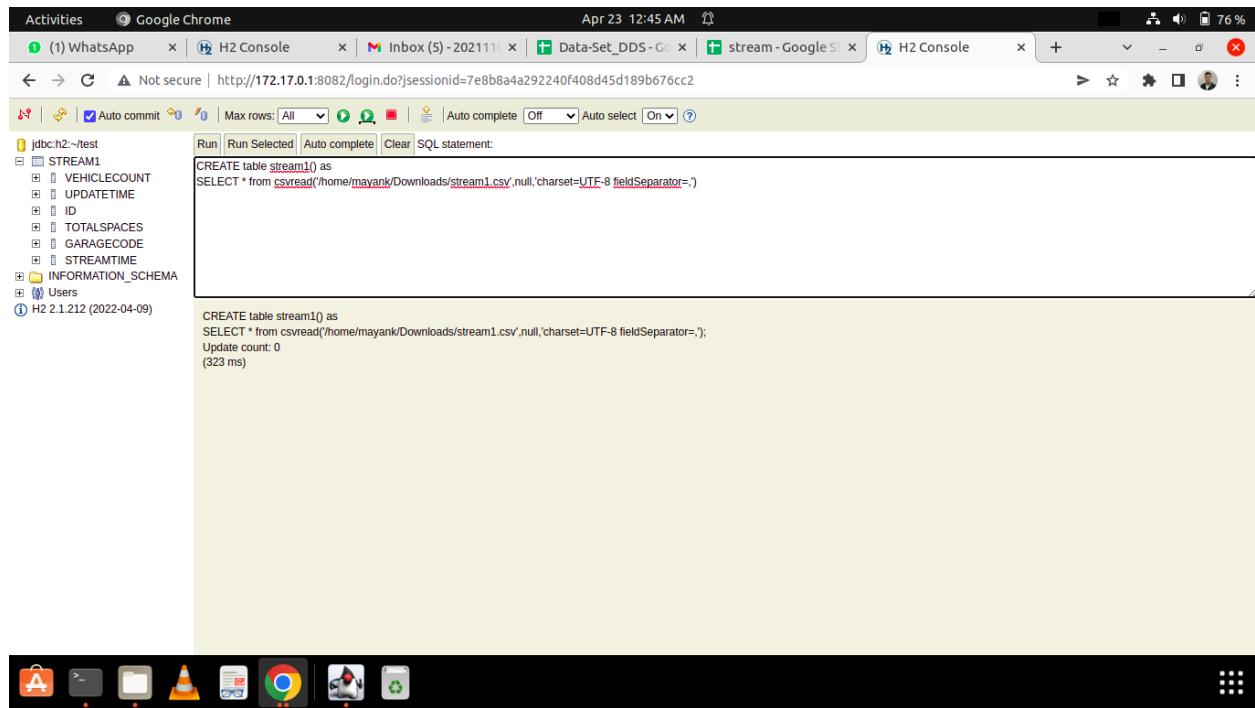
QUERY 4: Display the name of garages that are overloaded and the parking is full.

SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount>=totalspaces

EXPERIMENT WORKING:

TRADITIONAL WAY OF HANDLING DATABASE

Creation of Table: STREAM_1 (10k Tuples)



```
CREATE table stream1() as
SELECT * from csvread('/home/mayank/Downloads/stream1.csv',null,'charset=UTF-8 fieldSeparator=;')

CREATE table stream1() as
SELECT * from csvread('/home/mayank/Downloads/stream1.csv',null,'charset=UTF-8 fieldSeparator=;')
Update count: 0
(323 ms)
```

DATA LOADING= 10K Tuples

Activities Google Chrome April 23 12:46 AM

(1) WhatsApp x | H2 Console x | Inbox (5) - 202111 x | Data-Set_DDS - Go x | stream - Google Slides x | H2 Console x + - 76 %

Not secure | http://172.17.0.1:8082/login.do?sessionid=7e8b8a4a292240f408d45d189b676cc2

Auto commit Max rows: All Run Selected Auto complete Clear SQL statement:

```
SELECT * from csvread('/home/mayank/Downloads/stream1.csv',null,'charset=UTF-8 fieldSeparator=,')
```

STREAM1

	2014-07-01 10:20:49	10023	TUU	SALLING	2014-11-03 10:18:44
0	2014-07-01 18:56:49	10024	65	NORREPORT	2014-11-03 16:18:44
0	2014-07-01 18:56:49	10025	512	SKOLEBAKKEN	2014-11-03 16:18:44
265	2014-07-01 18:56:49	10026	1240	SCANDCENTER	2014-11-03 16:18:44
373	2014-07-01 18:56:49	10027	953	BRUUNS	2014-11-03 16:18:44
250	2014-07-01 18:56:49	10028	130	BUSGADEHUSET	2014-11-03 16:18:44
160	2014-07-01 18:56:49	10029	400	MAGASIN	2014-11-03 16:18:44
41	2014-07-01 18:56:49	10030	210	KALKVAERKSVEJ	2014-11-03 16:18:44
210	2014-07-01 18:56:49	10031	700	SALLING	2014-11-03 16:18:44
0	2014-07-01 19:26:50	10032	65	NORREPORT	2014-11-03 16:18:44
0	2014-07-01 19:26:50	10033	512	SKOLEBAKKEN	2014-11-03 16:18:44
249	2014-07-01 19:26:50	10034	1240	SCANDCENTER	2014-11-03 16:18:44
304	2014-07-01 19:26:50	10035	953	BRUUNS	2014-11-03 16:18:44
248	2014-07-01 19:26:50	10036	130	BUSGADEHUSET	2014-11-03 16:18:44
155	2014-07-01 19:26:50	10037	400	MAGASIN	2014-11-03 16:18:44
40	2014-07-01 19:26:50	10038	210	KALKVAERKSVEJ	2014-11-03 16:18:44
183	2014-07-01 19:26:50	10039	700	SALLING	2014-11-03 16:18:44

(10000 rows, 303 ms)

QUERY 1: DISPLAY DISTINCT GARAGES AVAILABLE FOR PARKING.

SELECT DISTINCT (garagecode) FROM stream1

Activities Google Chrome April 23 2:38 PM

H2 Console x +

Not secure | http://172.17.0.1:8082/login.do?sessionid=6cdc9dd4254ec69d65390955e6eb236c

Auto commit Max rows: 1000 Run Selected Auto complete Clear SQL statement:

```
SELECT DISTINCT (garagecode) FROM stream1
```

STREAM1

GARAGECODE
BRUUNS
BUSGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN

(8 rows, 332 ms)

QUERY 2: DISPLAY THE NAME OF GARAGES THAT ARE PRESENTLY VACANT.

```
SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount=0
```

The screenshot shows the H2 Console interface running in a Google Chrome browser window. The title bar indicates it's a Google Chrome window. The main area displays a SQL query and its results. The query is:

```
SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount=0;
```

The results show four rows of data:

GARAGECODE
BRUUNS
BUSGADEHUSET
NORREPORT
SKOLEBAKKEN

(4 rows, 314 ms)

QUERY 3: DISPLAY THE NAME OF GARAGES THAT ARE EXTREMELY CROWDED WITH VEHICLE COUNT >= 700.

```
SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount>=700
```

Activities Google Chrome

H2 Console

Not secure | http://172.17.0.1:8082/login.do?sessionid=6cdc9dd4254ec69d65390955e6eb236c

Auto commit Max rows: All Run Selected Auto complete Clear SQL statement:

SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount>=700

jdbc:h2:~/test
STREAM1
INFORMATION_SCHEMA
Users
H2 2.1.212 (2022-04-09)

Run Run Selected Auto complete Clear SQL statement:

SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount>=700;

GARAGECODE
BRUUNS
SALLING
SCANDCENTER

(3 rows, 28 ms)

QUERY 4: DISPLAY THE NAME OF GARAGES THAT ARE OVERLOADED AND THE PARKING IS FULL.

SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount>=totalspaces

Activities Google Chrome

Apr 23 2:42 PM 84 %

H2 Console

Not secure | http://172.17.0.1:8082/login.do?jsessionid=6cdc9dd4254ec69d65390955e6eb236c

Auto commit Max rows: All Auto complete Off Auto select On

jdbc:h2:~/test Run Run Selected Auto complete Clear SQL statement:

SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount>totalspaces;

SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount>totalspaces;

GARAGECODE
BRUUNS
BUGADEHUSET
KALKVAERKSVEJ
MAGASIN
SALLING
SCANDCENTER

(6 rows, 51 ms)

172.17.0.1:8082/query.do?jsessionid=6cdc9dd4254ec69d65390...



STREAM_1 (total= 20 K Tuples)
New data streamed(10k) + previous 10k(historical)

Activities Google Chrome

H2 Console Tutorial

Not secure | http://172.17.0.1:8082/login.do?sessionid=5716e647c40cdac92efa15c004e397c6

Auto commit Max rows: All Auto complete Off Auto select On ?

jdbc:h2:~/test Run Run Selected Auto complete Clear SQL statement:

STREAM1

```
INSERT INTO STREAM1
SELECT * from csvread('/home/mayank/Downloads/STREAM1.csv',null,'charset=UTF-8 fieldSeparator=,')
```

ID	2014-07-27 20:31:49	20023_700	SALLING	2014-11-03 10:19:11
82	2014-07-27 20:31:49	20024_65	NORREPORT	2014-11-03 16:19:11
512	2014-07-27 20:31:49	20025_512	SKOLEBAKKEN	2014-11-03 16:19:11
182	2014-07-27 20:31:49	20026_1240	SCANDCENTER	2014-11-03 16:19:11
78	2014-07-27 20:31:49	20027_953	BRUUNS	2014-11-03 16:19:11
75	2014-07-27 20:31:49	20028_130	BUSGADEHUSET	2014-11-03 16:19:11
22	2014-07-27 20:31:49	20029_400	MAGASIN	2014-11-03 16:19:11
6	2014-07-27 20:31:49	20030_210	KALKVAERKSVEJ	2014-11-03 16:19:11
32	2014-07-27 20:31:49	20031_700	SALLING	2014-11-03 16:19:11
80	2014-07-27 21:01:49	20032_65	NORREPORT	2014-11-03 16:19:11
512	2014-07-27 21:01:49	20033_512	SKOLEBAKKEN	2014-11-03 16:19:11
179	2014-07-27 21:01:49	20034_1240	SCANDCENTER	2014-11-03 16:19:11
99	2014-07-27 21:01:49	20035_953	BRUUNS	2014-11-03 16:19:11
67	2014-07-27 21:01:49	20036_130	BUSGADEHUSET	2014-11-03 16:19:11
20	2014-07-27 21:01:49	20037_400	MAGASIN	2014-11-03 16:19:11
7	2014-07-27 21:01:49	20038_210	KALKVAERKSVEJ	2014-11-03 16:19:11
28	2014-07-27 21:01:49	20039_700	SALLING	2014-11-03 16:19:11

(20000 rows, 106 ms)

Query 1:

Activities Google Chrome April 23 3:11 PM 26 %

H2 Console x how to insert types into x java - Import csv in h2 dyn x Tutorial x +

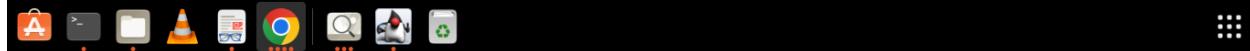
Not secure | http://172.17.0.1:8082/login.do?sessionid=6cdc9dd4254ec69d65390955e6eb236c

Auto commit Max rows: All Auto complete Off Auto select On ?

jdbc:h2:~/test Run Run Selected Auto complete Clear SQL statement:

SELECT DISTINCT garagecode FROM stream1

GARAGECODE
BRUUNS
BUSGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN
(8 rows, 38 ms)



QUERY 2:

Activities Google Chrome April 23 3:11 PM 26 %

H2 Console x how to insert types into x java - Import csv in h2 dyn x Tutorial x +

Not secure | http://172.17.0.1:8082/login.do?sessionid=6cdc9dd4254ec69d65390955e6eb236c

Auto commit Max rows: All Auto complete Off Auto select On ?

jdbc:h2:~/test Run Run Selected Auto complete Clear SQL statement:

SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount=0

GARAGECODE
BRUUNS
BUSGADEHUSET
KALKVAERKSVEJ
NORREPORT
SKOLEBAKKEN
(5 rows, 28 ms)



Query 3:

The screenshot shows an H2 Console window running in Google Chrome. The URL is <http://172.17.0.1:8082/login.do?sessionid=6cdc9dd4254ec69d65390955e6eb236c>. The query executed is:

```
SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount>=700;
```

The results are:

GARAGECODE
BRUUNS
NORREPORT
SALLING
SCANDCENTER

(4 rows, 13 ms)

Query 4:

The screenshot shows an H2 Console window running in Google Chrome. The URL is <http://172.17.0.1:8082/login.do?sessionid=6cdc9dd4254ec69d65390955e6eb236c>. The query executed is:

```
SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount>=totalspaces;
```

The results are:

GARAGECODE
BRUUNS
BUSGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN

(8 rows, 19 ms)

STREAM_1 (total= 30 K Tuples)

New data streamed(10k) + previous 20k(historical)

The screenshot shows a Linux desktop environment with a black taskbar at the bottom. On the taskbar, there are icons for a terminal, file manager, browser, and other system applications. The main window is a Google Chrome browser instance titled "Tutorial". The address bar shows the URL <http://172.17.0.1:8082/login.do?sessionid=5716e647c40cdac92efa15c004e397c6>. The title bar also indicates the date and time: Apr 23 3:57 PM.

The content of the browser window is the H2 Console interface. The left sidebar lists databases: "jdbch2~test", "STREAM1", "INFORMATION_SCHEMA", and "Users". The right pane shows the SQL statement being run:

```
INSERT INTO STREAM1
SELECT * from csvread('/home/mayank/Downloads/stream3.csv',null,'charset=UTF-8 fieldSeparator=;')
```

Below the SQL statement, the results are displayed:

```
INSERT INTO STREAM1
SELECT * from csvread('/home/mayank/Downloads/stream3.csv',null,'charset=UTF-8 fieldSeparator=;');
Update count: 10000
(261 ms)
```

Query-1:

Activities Google Chrome

Apr 23 4:04 PM 83 %

H2 Console Tutorial

Not secure | http://172.17.0.1:8082/login.do?sessionid=5716e647c40cdac92efa15c004e397c6

Auto commit Max rows: All Auto complete Off Auto select On

Run Run Selected Auto complete Clear SQL statement:

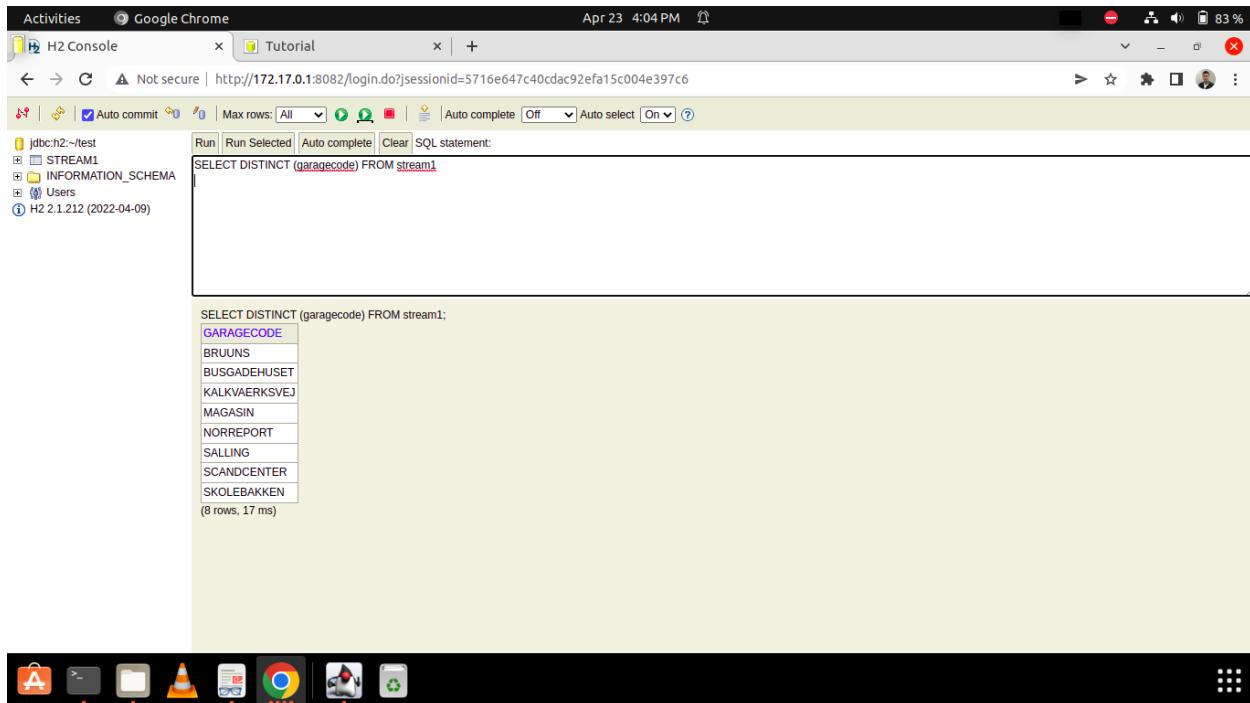
SELECT DISTINCT (garagecode) FROM stream1

jdbc:h2:~/test STREAM1 INFORMATION_SCHEMA Users H2 2.1.212 (2022-04-09)

SELECT DISTINCT (garagecode) FROM stream1;

GARAGECODE
BRUUNS
BUSGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN

(8 rows, 17 ms)



Query-2:

Activities Google Chrome

Apr 23 4:05 PM 78 %

H2 Console Tutorial

Not secure | http://172.17.0.1:8082/login.do?sessionid=5716e647c40cdac92efa15c004e397c6

Auto commit Max rows: All Auto complete Off Auto select On

Run Run Selected Auto complete Clear SQL statement:

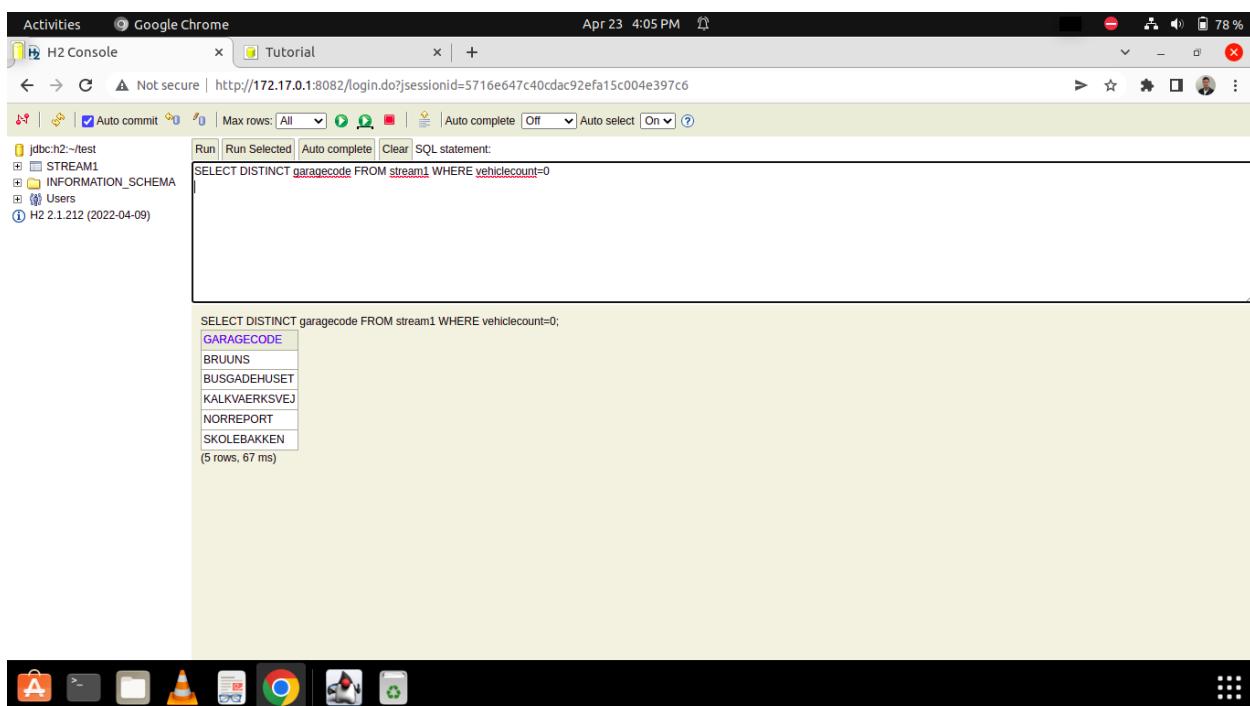
SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount=0

jdbc:h2:~/test STREAM1 INFORMATION_SCHEMA Users H2 2.1.212 (2022-04-09)

SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount=0;

GARAGECODE
BRUUNS
BUSGADEHUSET
KALKVAERKSVEJ
NORREPORT
SKOLEBAKKEN

(5 rows, 67 ms)



Query-3:

Activities Google Chrome

Apr 23 4:05 PM 78 %

H2 Console Tutorial

Not secure | http://172.17.0.1:8082/login.do?sessionid=5716e647c40cdac92efa15c004e397c6

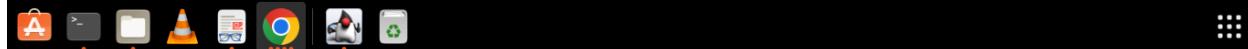
Auto commit Max rows: All Run Selected Auto complete Clear SQL statement: SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount>=700

jdbc:h2:~:test STREAM1 INFORMATION_SCHEMA Users H2 2.1.212 (2022-04-09)

SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount>=700;

GARAGECODE
BRUUNS
NORREPORT
SALLING
SCANDCENTER

(4 rows, 32 ms)



Query-4:

Activities Google Chrome

Apr 23 4:05 PM 78 %

H2 Console Tutorial

Not secure | http://172.17.0.1:8082/login.do?sessionid=5716e647c40cdac92efa15c004e397c6

Auto commit Max rows: All Run Selected Auto complete Clear SQL statement: SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount>=totalspaces

jdbc:h2:~:test STREAM1 INFORMATION_SCHEMA Users H2 2.1.212 (2022-04-09)

SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount>=totalspaces;

GARAGECODE
BRUUNS
BUSGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN

(8 rows, 59 ms)



STREAM_1 (total= 40 K Tuples)
New data streamed(10k) + previous 30k(historical)

Activities Google Chrome

H2 Console Tutorial

Apr 23 4:12 PM

Not secure | http://172.17.0.1:8082/login.do?sessionid=5716e647c40cdac92efa15c004e397c6

Auto commit Max rows: All Auto complete Off Auto select On

jdbc:h2:~/test

STREAM1

INFORMATION_SCHEMA

Users

H2 2.1.212 (2022-04-09)

SQL statement:

Run Run Selected Auto complete Clear

```
INSERT INTO STREAM1
SELECT * from csvread('/home/mayank/Downloads/stream4.csv',null,'charset=UTF-8 fieldSeparator=;')
```

INSERT INTO STREAM1
SELECT * from csvread('/home/mayank/Downloads/stream4.csv',null,'charset=UTF-8 fieldSeparator=;')
Update count: 10000
(559 ms)

Akonix Studio, VLC, LibreOffice, Google Chrome, File Manager, Terminal, Recycle Bin

Query-1:

Activities Google Chrome

Apr 23 4:13 PM 59 %

H2 Console Tutorial

Not secure | http://172.17.0.1:8082/login.do?sessionid=5716e647c40cdac92efa15c004e397c6

Auto commit Max rows: All Auto complete Off Auto select On

Run Run Selected Auto complete Clear SQL statement:

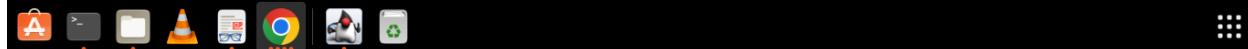
SELECT DISTINCT (garagecode) FROM stream1

jdbc:h2:~/test STREAM1 INFORMATION_SCHEMA Users H2 2.1.212 (2022-04-09)

SELECT DISTINCT (garagecode) FROM stream1;

GARAGECODE
BRUUNS
BUSGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN

(8 rows, 547 ms)



Query-2:

Activities Google Chrome

Apr 23 4:14 PM 59 %

H2 Console Tutorial

Not secure | http://172.17.0.1:8082/login.do?sessionid=5716e647c40cdac92efa15c004e397c6

Auto commit Max rows: All Auto complete Off Auto select On

Run Run Selected Auto complete Clear SQL statement:

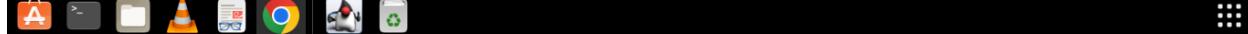
SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount=0

jdbc:h2:~/test STREAM1 INFORMATION_SCHEMA Users H2 2.1.212 (2022-04-09)

SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount=0;

GARAGECODE
BRUUNS
BUSGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SKOLEBAKKEN

(6 rows, 27 ms)



Query-3:

Activities Google Chrome Apr 23 4:14 PM 59 %

H2 Console Tutorial Not secure | http://172.17.0.1:8082/login.do?sessionid=5716e647c40cdac92efa15c004e397c6

Auto commit Max rows: All Run Selected Auto complete Clear SQL statement:

SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount>=700;

GARAGECODE
BRUUNS
NORREPORT
SALLING
SCANDCENTER

(4 rows, 42 ms)

jdbc:h2:~/test STREAM1 INFORMATION_SCHEMA Users H2 2.1.212 (2022-04-09)

Query-4:

Activities Google Chrome Apr 23 4:14 PM 59 %

H2 Console Tutorial Not secure | http://172.17.0.1:8082/login.do?sessionid=5716e647c40cdac92efa15c004e397c6

Auto commit Max rows: All Run Selected Auto complete Clear SQL statement:

SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount>=totalspaces;

GARAGECODE
BRUUNS
BUSGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN

(8 rows, 43 ms)

jdbc:h2:~/test STREAM1 INFORMATION_SCHEMA Users H2 2.1.212 (2022-04-09)

STREAM_1 (total= 50 K Tuples)
New data streamed(10k) + previous 40k(historical)

Activities Google Chrome

Apr 23 4:20 PM 45 %

H2 Console Tutorial

Not secure | http://172.17.0.1:8082/login.do?sessionid=5716e647c40cdac92efa15c004e397c6

Auto commit Max rows: All Auto complete Off Auto select On ?

jdbc:h2:~/test STREAM1 INFORMATION_SCHEMA Users H2 2.1.212 (2022-04-09)

Run Run Selected Auto complete Clear SQL statement:

```
INSERT INTO STREAM1
SELECT * from csvread('/home/mayank/Downloads/stream5.csv',null,'charset=UTF-8 fieldSeparator=;')
```

INSERT INTO STREAM1
SELECT * from csvread('/home/mayank/Downloads/stream5.csv',null,'charset=UTF-8 fieldSeparator=;')
Update count: 10000
(1019 ms)

Query-1:

Activities Google Chrome

Apr 23 4:21 PM 41%

H2 Console Tutorial

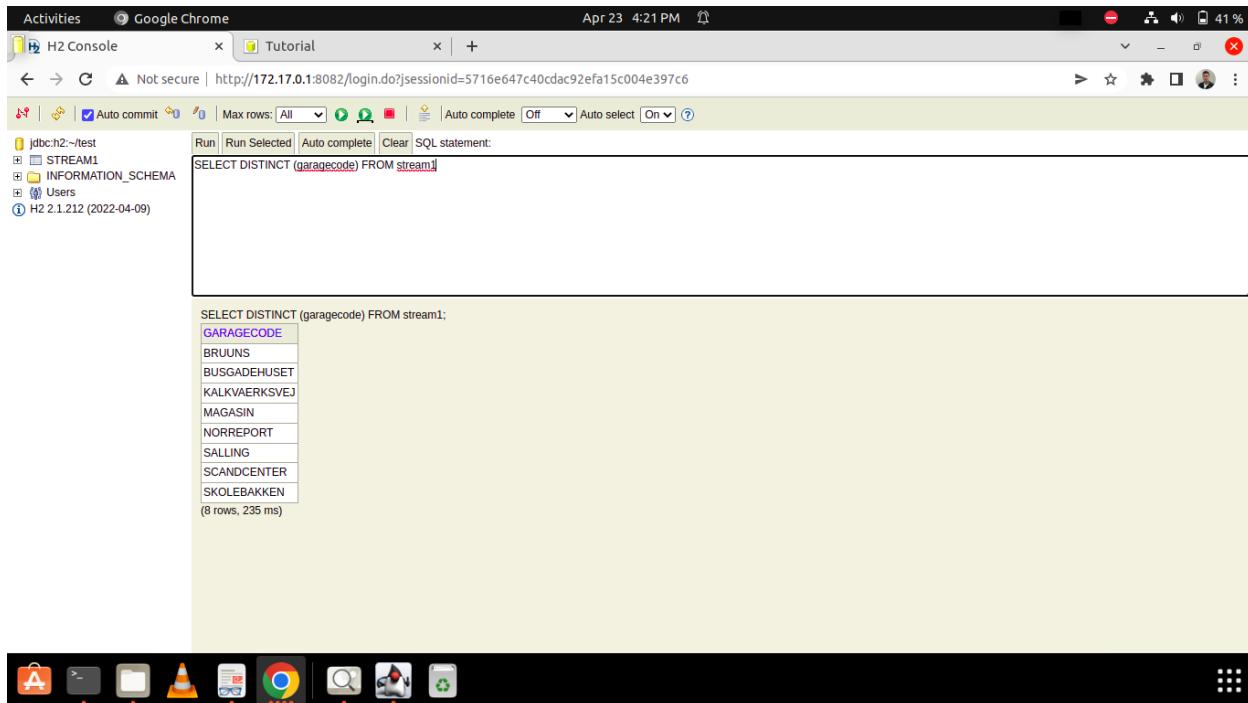
Not secure | http://172.17.0.1:8082/login.do?sessionid=5716e647c40cdac92efa15c004e397c6

Auto commit Max rows: All Auto complete Off Auto select On

Run Run Selected Auto complete Clear SQL statement:

SELECT DISTINCT (garagecode) FROM stream1;

GARAGECODE
BRUUNS
BUSGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN
(8 rows, 235 ms)



Query-2:

Activities Google Chrome

Apr 23 4:22 PM 41%

H2 Console Tutorial

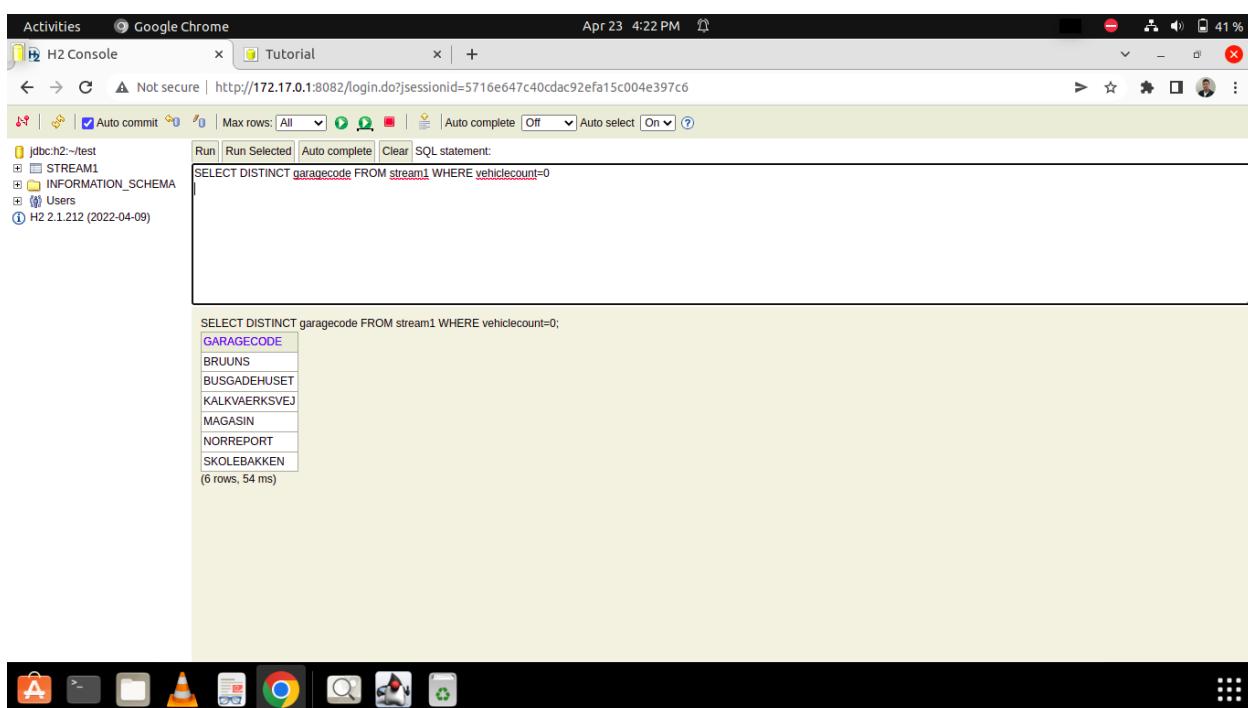
Not secure | http://172.17.0.1:8082/login.do?sessionid=5716e647c40cdac92efa15c004e397c6

Auto commit Max rows: All Auto complete Off Auto select On

Run Run Selected Auto complete Clear SQL statement:

SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount=0;

GARAGECODE
BRUUNS
BUSGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SKOLEBAKKEN
(6 rows, 54 ms)



Query-3:

Activities Google Chrome

Apr 23 4:22 PM 41%

H2 Console Tutorial

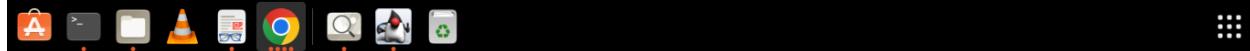
Not secure | http://172.17.0.1:8082/login.do?sessionid=5716e647c40cdac92efa15c004e397c6

Auto commit Max rows: All Run Selected Auto complete Clear SQL statement:

SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount>=700;

GARAGECODE
BRUUNS
NORREPORT
SALLING
SCANDCENTER

(4 rows, 38 ms)



Query-4:

Activities Google Chrome

Apr 23 4:22 PM 41%

H2 Console Tutorial

Not secure | http://172.17.0.1:8082/login.do?sessionid=5716e647c40cdac92efa15c004e397c6

Auto commit Max rows: All Run Selected Auto complete Clear SQL statement:

SELECT DISTINCT garagecode FROM stream1 WHERE vehiclecount>=totalspaces;

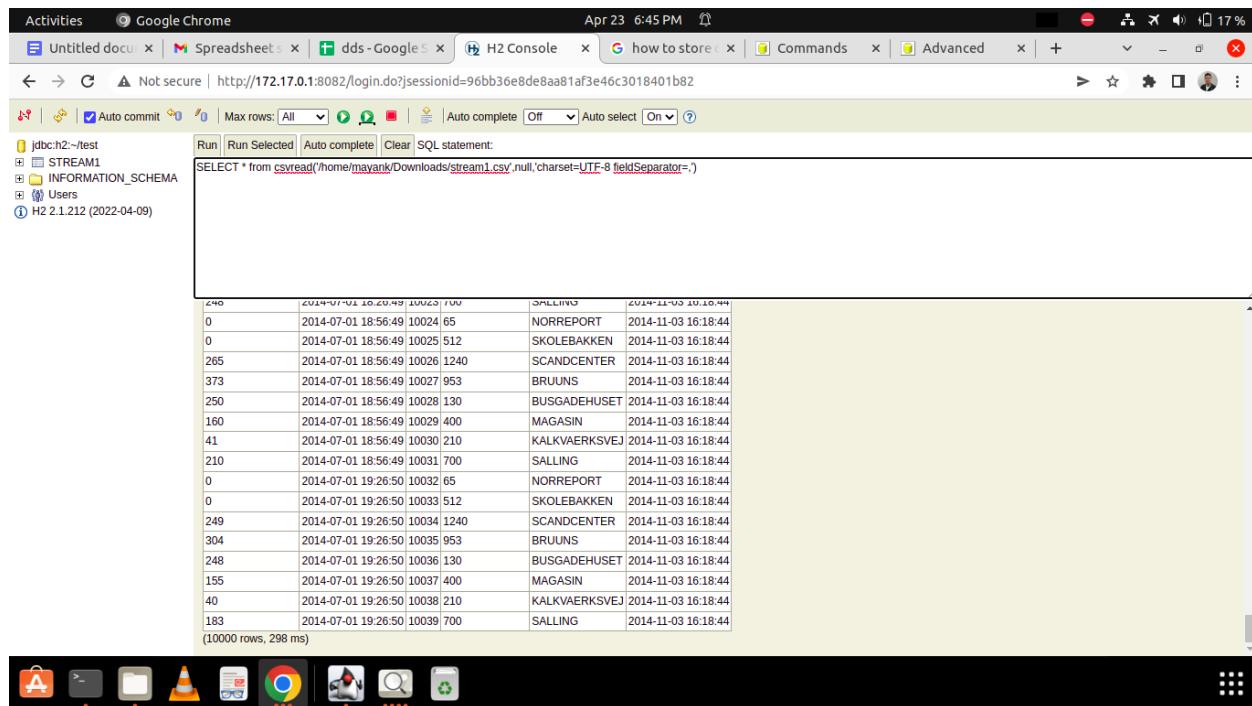
GARAGECODE
BRUUNS
BUSGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN

(8 rows, 41 ms)



OUR METHODOLOGY

DATA LOADED 10K TUPLES:



Activities Google Chrome Apr 23 6:45 PM

Untitled docu | Spreadsheet | dds-Google | H2 Console | G how to store | Commands | Advanced | +

Not secure | http://172.17.0.1:8082/login.do?sessionid=96bb36e8de8aa81af3e46c3018401b82

Auto commit Max rows: All Auto complete Off Auto select On

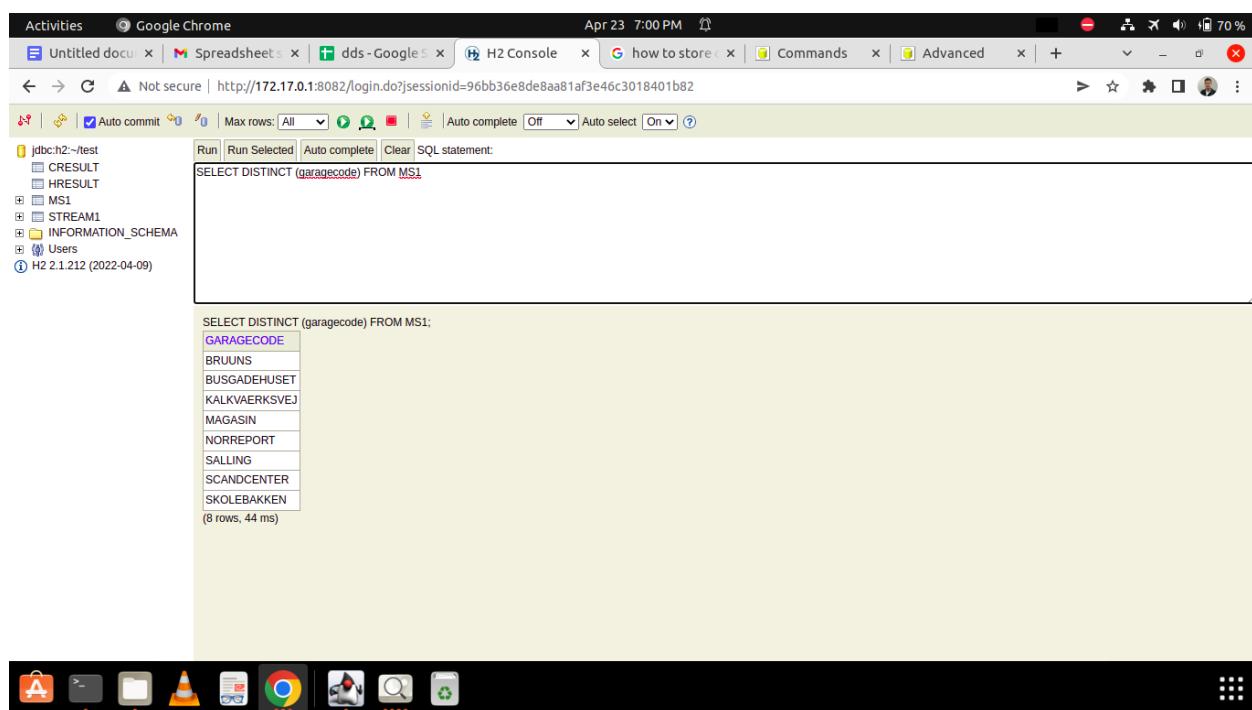
Run Run Selected Auto complete Clear SQL statement:

```
SELECT * from csvread('/home/mayank/Downloads/stream1.csv','null','charset=UTF-8 fieldSeparator=,')
```

garagecode	date	lat	lon	name	type	time
0	2014-07-01 18:56:49	10024	65	NORREPORT		2014-11-03 16:18:44
0	2014-07-01 18:56:49	10025	512	SKOLEBAKKEN		2014-11-03 16:18:44
265	2014-07-01 18:56:49	10026	1240	SCANDCENTER		2014-11-03 16:18:44
373	2014-07-01 18:56:49	10027	953	BRUUNS		2014-11-03 16:18:44
250	2014-07-01 18:56:49	10028	130	BUSGADEHUSET		2014-11-03 16:18:44
160	2014-07-01 18:56:49	10029	400	MAGASIN		2014-11-03 16:18:44
41	2014-07-01 18:56:49	10030	210	KALKVAERKSVEJ		2014-11-03 16:18:44
210	2014-07-01 18:56:49	10031	700	SALLING		2014-11-03 16:18:44
0	2014-07-01 19:26:50	10032	65	NORREPORT		2014-11-03 16:18:44
0	2014-07-01 19:26:50	10033	512	SKOLEBAKKEN		2014-11-03 16:18:44
249	2014-07-01 19:26:50	10034	1240	SCANDCENTER		2014-11-03 16:18:44
304	2014-07-01 19:26:50	10035	953	BRUUNS		2014-11-03 16:18:44
248	2014-07-01 19:26:50	10036	130	BUSGADEHUSET		2014-11-03 16:18:44
155	2014-07-01 19:26:50	10037	400	MAGASIN		2014-11-03 16:18:44
40	2014-07-01 19:26:50	10038	210	KALKVAERKSVEJ		2014-11-03 16:18:44
183	2014-07-01 19:26:50	10039	700	SALLING		2014-11-03 16:18:44

(10000 rows, 298 ms)

QUERY 1:



Activities Google Chrome Apr 23 7:00 PM

Untitled docu | Spreadsheet | dds-Google | H2 Console | G how to store | Commands | Advanced | +

Not secure | http://172.17.0.1:8082/login.do?sessionid=96bb36e8de8aa81af3e46c3018401b82

Auto commit Max rows: All Auto complete Off Auto select On

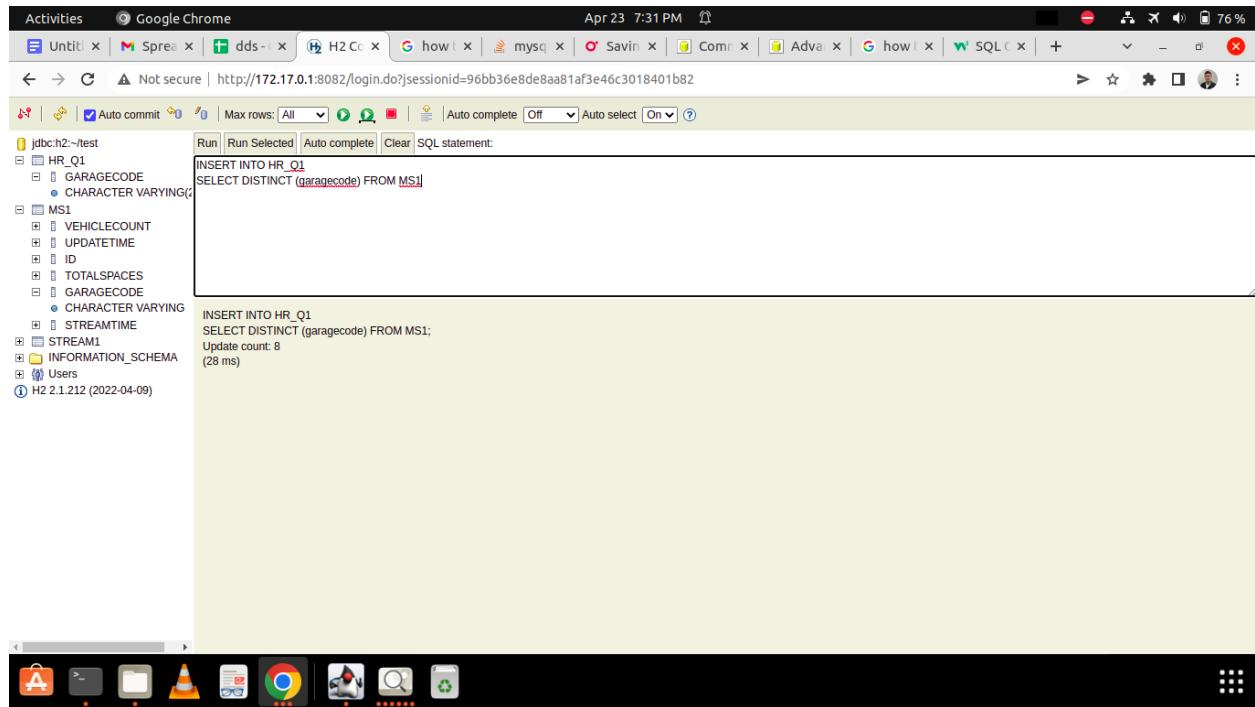
Run Run Selected Auto complete Clear SQL statement:

```
SELECT DISTINCT (garagecode) FROM MS1;
```

GARAGECODE
BRUUNS
BUSGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN

(8 rows, 44 ms)

RESULT OF Q1 STORED IN HR_Q1 TABLE:



The screenshot shows a Google Chrome browser window with multiple tabs open. The active tab is the H2 Console, which displays a SQL query and its execution results.

SQL Statement:

```
INSERT INTO HR_Q1
SELECT DISTINCT (garagecode) FROM MS1;
```

Execution Results:

```
INSERT INTO HR_Q1
SELECT DISTINCT (garagecode) FROM MS1;
Update count: (28 ms)
```

Database Schema (Left Sidebar):

- jdbc:h2:~/test
- HR_Q1
 - GARAGECODE
 - CHARACTER VARYING(10)
- MS1
 - VEHICLECOUNT
 - UPDATETIME
 - ID
 - TOTALSPACES
 - GARAGECODE
 - CHARACTER VARYING(10)
 - STREAMTIME
- STREAM1
- INFORMATION_SCHEMA
- Users

System Information:

Apr 23 7:31 PM

76 %

QUERY 2:

The screenshot shows an H2 Console window with the following details:

- Toolbar:** Activities, Google Chrome, Untitled docu, Spreadsheet, dds - Google S, H2 Console, how to store, how to create, SQL CREATE T.
- Header:** April 23 7:46 PM, Not secure | http://172.17.0.1:8082/login.do?sessionid=96bb36e8de8aa81af3e46c3018401b82
- Left Sidebar:** jdbc:h2:~/test, HR_Q1, GARAGECODE, MS1, STREAM1, INFORMATION_SCHEMA, Users, H2 2.1.212 (2022-04-09).
- SQL Statement:** SELECT DISTINCT garagecode FROM MS1 WHERE vehiclecount=0
- Results:** GARAGECODE, BRUUNS, BUGADEHUSET, NORREPORT, SKOLEBAKKEN (4 rows, 45 ms)

RESULT OF Q2 STORED IN HR_Q2 TABLE:

The screenshot shows an H2 Console window with the following details:

- Toolbar:** Activities, Google Chrome, Untitled docu, Spreadsheet, dds - Google S, H2 Console, how to store, how to create, SQL CREATE T.
- Header:** April 23 7:54 PM, Not secure | http://172.17.0.1:8082/login.do?sessionid=96bb36e8de8aa81af3e46c3018401b82
- Left Sidebar:** jdbc:h2:~/test, HR_Q1, HR_Q2, MS1, STREAM1, INFORMATION_SCHEMA, Users, H2 2.1.212 (2022-04-09).
- SQL Statement:** INSERT INTO HR_Q2 SELECT DISTINCT garagecode FROM MS1 WHERE vehiclecount=0
- Results:** INSERT INTO HR_Q2 SELECT DISTINCT garagecode FROM MS1 WHERE vehiclecount=0; Update count: (22 ms)

QUERY 3:

The screenshot shows a Linux desktop environment with a terminal window open. The terminal window has a title bar "H2 Console" and a status bar indicating "Apr 23 7:58 PM". The main area of the terminal displays a SQL query:

```
SELECT DISTINCT garagecode FROM MS1 WHERE vehiclecount>=700
```

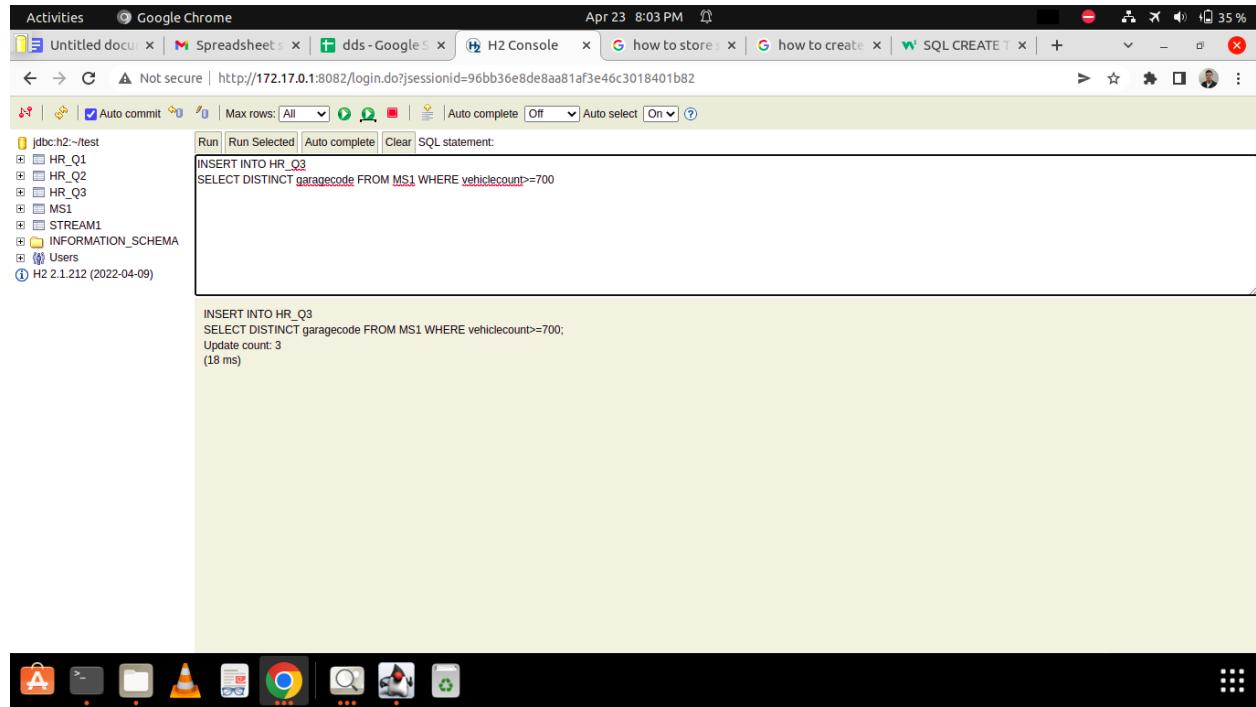
The results of the query are shown in a table:

GARAGECODE
BRUUNS
SALLING
SCANDCENTER

Below the table, it says "(3 rows, 21 ms)".

The desktop environment includes a dock at the bottom with various icons, and the system tray is visible at the top right.

RESULT OF Q3 STORED IN HR_Q3 TABLE:



The screenshot shows an Android application window titled "Google Chrome". Inside the window, there is a title bar with "Activities" and "Google Chrome" and a status bar showing "Apr 23 8:03 PM" and "35%". Below this is a toolbar with various icons. The main content area displays an H2 Console interface. On the left, there is a sidebar with a tree view of database schemas: "jdbc:h2:~/test", "HR_Q1", "HR_Q2", "HR_Q3", "MS1", "STREAM1", "INFORMATION_SCHEMA", and "Users". The right side of the interface has tabs for "Run", "Run Selected", "Auto complete", "Clear", and "SQL statement". Below these tabs, the SQL code is shown:

```
INSERT INTO HR_Q3
SELECT DISTINCT garagecode FROM MS1 WHERE vehiclecount>=700
```

Below the SQL code, the results of the query execution are displayed:

```
INSERT INTO HR_Q3
SELECT DISTINCT garagecode FROM MS1 WHERE vehiclecount>=700;
Update count: 3
(18 ms)
```

QUERY 4:

The screenshot shows an H2 Console window running in Google Chrome. The URL is <http://172.17.0.1:8082/login.do?sessionid=96bb36e8de8aa81af3e46c3018401b82>. The SQL statement executed is:

```
SELECT DISTINCT garagecode FROM MS1 WHERE vehiclecount>=totalspaces;
```

The results are displayed in a table:

GARAGECODE
BRUUNS
BUGADEHUSET
KALKVAERKSVEJ
MAGASIN
SALLING
SCANDCENTER

(6 rows, 16 ms)

RESULT OF Q4 STORED IN HR_Q4 TABLE:

The screenshot shows an H2 Console window running in Google Chrome. The URL is <http://172.17.0.1:8082/login.do?sessionid=96bb36e8de8aa81af3e46c3018401b82>. The SQL statements executed are:

```
INSERT INTO HR_Q4  
SELECT DISTINCT garagecode FROM MS1 WHERE vehiclecount>=totalspaces;
```

The results of the insertion are shown:

```
INSERT INTO HR_Q4  
SELECT DISTINCT garagecode FROM MS1 WHERE vehiclecount>=totalspaces;  
Update count: 6  
(17 ms)
```

NEXT 10K TUPLES (REAL TIME DATA) LOADED:(TOTAL 20K= 10H &10N)

The screenshot shows an H2 Console window in Google Chrome. The URL is <http://172.17.0.1:8082/login.do?sessionid=96bb36e8de8aa81af3e46c3018401b82>. The left sidebar lists databases: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, STREAM1, INFORMATION_SCHEMA, and Users. The main area shows the following SQL statement:

```
CREATE table ms2() as
SELECT * from csvread('/home/mayank/Downloads/stream2.csv',null,'charset=UTF-8 fieldSeparator=,')
```

Below the statement, the output is:

```
CREATE table ms2() as
SELECT * from csvread('/home/mayank/Downloads/stream2.csv',null,'charset=UTF-8 fieldSeparator=,')
Update count: 0
(313 ms)
```

The bottom of the window shows a toolbar with various icons.

QUERY 1:

The screenshot shows an H2 Console window in Google Chrome. The URL is <http://172.17.0.1:8082/login.do?sessionid=96bb36e8de8aa81af3e46c3018401b82>. The left sidebar lists databases: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, STREAM1, INFORMATION_SCHEMA, and Users. The main area shows the following SQL statement:

```
SELECT DISTINCT (garagecode) FROM MS2
```

Below the statement, the output is:

```
SELECT DISTINCT (garagecode) FROM MS2:
GARAGECODE
BRUUNS
BUGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN
(8 rows, 47 ms)
```

The bottom of the window shows a toolbar with various icons.

RESULT STORED IN TR_Q1:

Activities Google Chrome

H2 Console

Not secure | http://172.17.0.1:8082/login.do?sessionid=96bb36e8de8aa81af3e46c3018401b82

Auto commit Max rows: All Auto complete Off Auto select On

Run Run Selected Auto complete Clear SQL statement:

```
INSERT INTO TR_Q1
SELECT DISTINCT (garagecode) FROM MS2
```

INSERT INTO TR_Q1
SELECT DISTINCT (garagecode) FROM MS2;
Update count: 8
(13 ms)

jdbc:h2:~/test

HR_Q1 HR_Q2 HR_Q3 HR_Q4 MS1 MS2 STREAM TR_Q1 INFORMATION_SCHEMA Users

H2 2.1.212 (2022-04-09)

A Show Applications

Detailed description: This screenshot shows an H2 Console window running in a Linux desktop environment. The window title is 'H2 Console'. The URL is 'http://172.17.0.1:8082/login.do?sessionid=96bb36e8de8aa81af3e46c3018401b82'. The SQL statement entered is 'INSERT INTO TR_Q1 SELECT DISTINCT (garagecode) FROM MS2'. The result shows an update count of 8 rows in 13ms. The left sidebar lists databases: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, STREAM, TR_Q1, and INFORMATION_SCHEMA. The bottom taskbar has icons for various applications like a browser, file manager, terminal, and system tools.

MERGING RESULTS OF HR_Q1 & TR_Q1 (OUTPUT):

Activities Google Chrome

H2 Console

Not secure | http://172.17.0.1:8082/login.do?sessionid=96bb36e8de8aa81af3e46c3018401b82

Auto commit Max rows: All Auto complete Off Auto select On

Run Run Selected Auto complete Clear SQL statement:

```
SELECT DISTINCT garagecode FROM HR_Q1 UNION SELECT DISTINCT garagecode FROM TR_Q1
```

SELECT DISTINCT garagecode FROM HR_Q1 UNION SELECT DISTINCT garagecode FROM TR_Q1;

GARAGECODE
BRUUNS
BUGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN

(8 rows, 42 ms)

jdbc:h2:~/test

HR_Q1 HR_Q2 HR_Q3 HR_Q4 MS1 MS2 STREAM TR_Q1 INFORMATION_SCHEMA Users

H2 2.1.212 (2022-04-09)

Show Applications

Detailed description: This screenshot shows an H2 Console window running in a Linux desktop environment. The window title is 'H2 Console'. The URL is 'http://172.17.0.1:8082/login.do?sessionid=96bb36e8de8aa81af3e46c3018401b82'. The SQL statement entered is 'SELECT DISTINCT garagecode FROM HR_Q1 UNION SELECT DISTINCT garagecode FROM TR_Q1'. The result shows 8 rows of garage codes: BRUUNS, BUGADEHUSET, KALKVAERKSVEJ, MAGASIN, NORREPORT, SALLING, SCANDCENTER, and SKOLEBAKKEN. The bottom taskbar has icons for various applications like a browser, file manager, terminal, and system tools.

QUERY 2:

A screenshot of an H2 Console window in Google Chrome. The URL is `http://172.17.0.1:8082/login.do?sessionid=96bb36e8de8aa81af3e46c3018401b82`. The left sidebar shows database schemas: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, STREAM, TR_Q1, INFORMATION_SCHEMA, and Users. The main area contains the following SQL statement and its results:

```
SELECT DISTINCT garagecode FROM MS2 WHERE vehiclecount=0;
```

The results are:

GARAGECODE
KALKVAERKSVEJ
NORREPORT
SKOLEBAKKEN

(3 rows, 9 ms)

RESULT STORED IN TR_Q2:

A screenshot of an H2 Console window in Google Chrome. The URL is `http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632`. The left sidebar shows database schemas: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, STREAM, TR_Q1, TR_Q2, INFORMATION_SCHEMA, and Users. The main area contains the following SQL statements:

```
INSERT INTO TR_Q2
SELECT DISTINCT garagecode FROM MS2 WHERE vehiclecount=0;
```

The results are:

```
INSERT INTO TR_Q2
SELECT DISTINCT garagecode FROM MS2 WHERE vehiclecount=0;
Update count: 3
(174 ms)
```

MERGING RESULTS OH HR_Q2 & TR_Q2 (OUTPUT):

The screenshot shows an Android device with a black navigation bar at the bottom containing icons for browser, home, recent apps, and power. Above the navigation bar is a light green status bar showing signal strength, battery level (51%), and time (Apr 23 10:01 PM). The main screen is a web browser window titled "Activities" with the address "Google Chrome". The URL is "http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632". The page content is the H2 Console interface. On the left is a sidebar with database schema information:

- jdbc:h2:~/test
- + HR_Q1
- + HR_Q2
- + HR_Q3
- + HR_Q4
- + MS1
- + MS2
- + STREAM
- + TR_Q1
- + TR_Q2
- + INFORMATION_SCHEMA
- + Users
- H2 2.1.212 (2022-04-09)

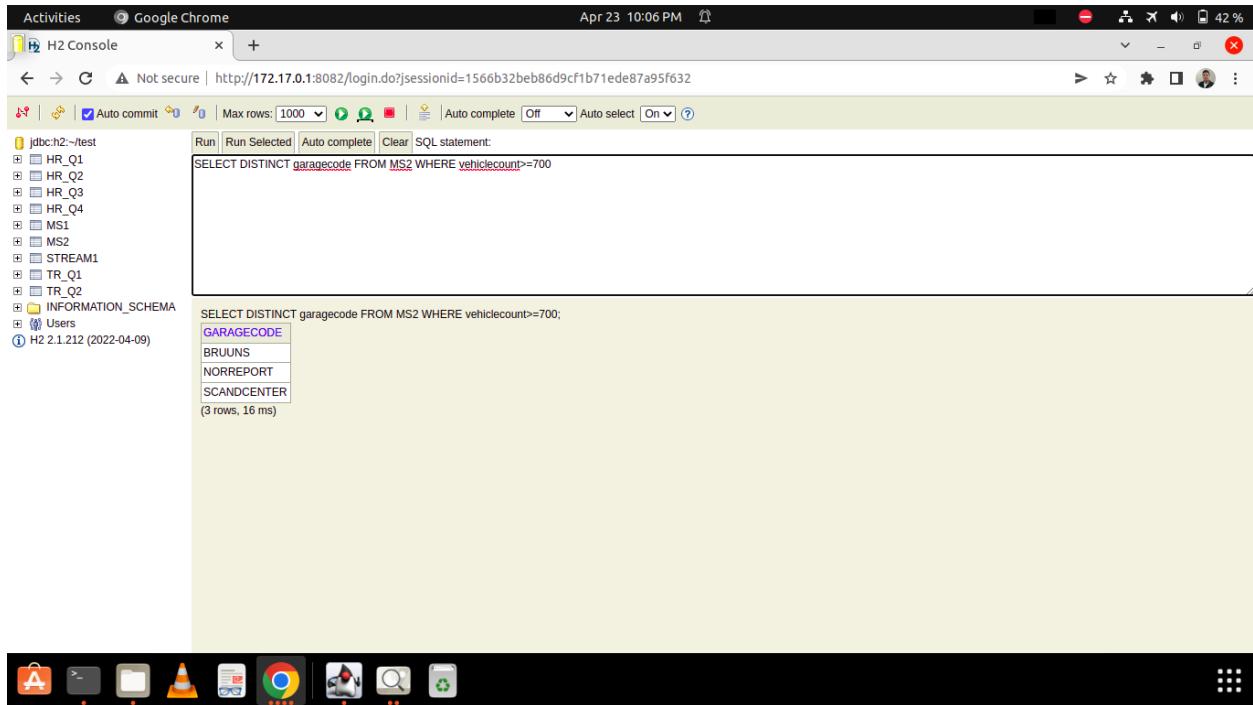
The main area contains a SQL statement and its results:

```
SELECT DISTINCT garagecode FROM HR_Q2 UNION SELECT DISTINCT garagecode FROM TR_Q2;
```

GARAGECODE
BRUUNS
BUGADEHUSET
KALKVAERKSVEJ
NORREPORT
SKOLEBAKKEN

(5 rows, 4 ms)

QUERY 3:



A screenshot of a Google Chrome browser window. The title bar says "Activities" and "Google Chrome". The address bar shows "Not secure | http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632". The main content area displays a SQL query and its results. The query is:

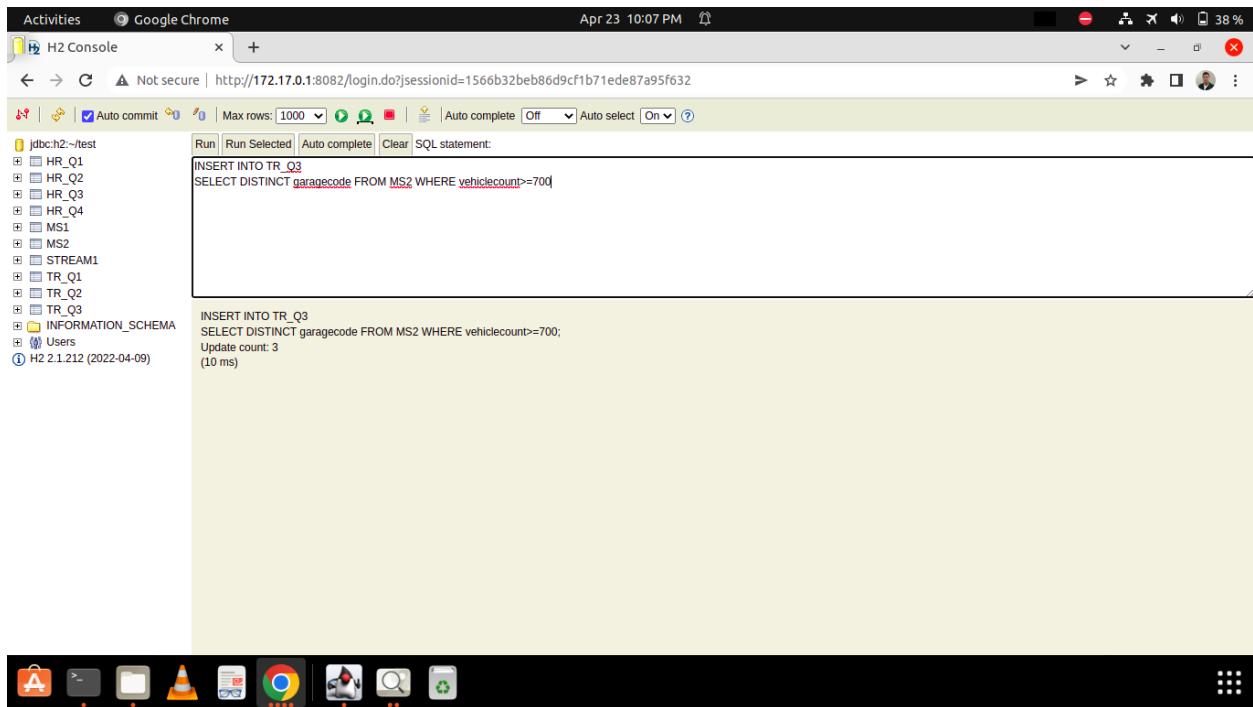
```
SELECT DISTINCT garagecode FROM MS2 WHERE vehiclecount>=700
```

The results show three rows of data:

GARAGECODE
BRUUNS
NORREPORT
SCANDCENTER

(3 rows, 16 ms)

RESULT STORED IN TR_Q3:



A screenshot of a Google Chrome browser window. The title bar says "Activities" and "Google Chrome". The address bar shows "Not secure | http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632". The main content area displays a SQL query and its results. The query is:

```
INSERT INTO TR_Q3  
SELECT DISTINCT garagecode FROM MS2 WHERE vehiclecount>=700
```

The results show one row of data:

Update count:
(10 ms)

MERGING RESULTS OH HR_Q3 & TR_Q3 (OUTPUT):

The screenshot shows an H2 Console window running in Google Chrome. The URL is <http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632>. The window title is "Activities" and the tab title is "Google Chrome". The status bar shows "Apr 23 10:08 PM". The main area displays the following SQL query and its results:

```
SELECT DISTINCT garagecode FROM HR_Q3 UNION SELECT DISTINCT garagecode FROM TR_Q3;
```

The results are shown in a table with one column labeled "GARAGECODE":

GARAGECODE
BRUUNS
NORREPORT
SALLING
SCANDCENTER

(4 rows, 1 ms)

QUERY 4:

The screenshot shows an H2 Console window running in Google Chrome. The URL is <http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632>. The left sidebar lists databases: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, STREAM1, TR_Q1, TR_Q2, TR_Q3, INFORMATION_SCHEMA, and Users. The main area contains the following SQL statement and its results:

```
SELECT DISTINCT garagecode FROM MS2 WHERE vehiclecount>=totalspaces;
```

GARAGECODE
BRUUNS
BUSGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN

(8 rows, 11 ms)

RESULT STORED IN TR_Q4:

The screenshot shows an H2 Console window running in Google Chrome. The URL is <http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632>. The left sidebar lists databases: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main area contains the following SQL statements:

```
INSERT INTO TR_Q4  
SELECT DISTINCT garagecode FROM MS2 WHERE vehiclecount>=totalspaces;
```

```
INSERT INTO TR_Q4  
SELECT DISTINCT garagecode FROM MS2 WHERE vehiclecount>=totalspaces;  
Update count: 8  
(16 ms)
```

MERGING RESULTS OH HR_Q4 & TR_Q4 (OUTPUT):

The screenshot shows an H2 Console window running in Google Chrome. The URL is `http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632`. The window title is "Activities" and the tab title is "Google Chrome". The status bar shows "Apr 23 10:13 PM". The toolbar includes "Auto commit" (checked), "Max rows: 1000", "Run Selected", "Auto complete", "Clear", and "SQL statement". The left sidebar lists databases: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, STREAM, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. A note indicates "H2 2.1.212 (2022-04-09)". The main area contains the following SQL query and its results:

```
SELECT DISTINCT garagecode FROM HR_Q4 UNION SELECT DISTINCT garagecode FROM TR_Q4;
```

GARAGECODE
BRUUNS
BUGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN

(8 rows, 1 ms)

REFRESHING AND UPDATION OF RESULTS IN HISTORY RESULT TABLES

```
INSERT INTO HR_Q1
SELECT DISTINCT garagecode FROM HR_Q1 UNION SELECT DISTINCT garagecode FROM TR_Q1;
```

INSERT INTO HR_Q1
SELECT DISTINCT garagecode FROM HR_Q1 UNION SELECT DISTINCT garagecode FROM TR_Q1;
Update count: 8
(4 ms)

```
INSERT INTO HR_Q2
SELECT DISTINCT garagecode FROM HR_Q2 UNION SELECT DISTINCT garagecode FROM TR_Q2;
```

INSERT INTO HR_Q2
SELECT DISTINCT garagecode FROM HR_Q2 UNION SELECT DISTINCT garagecode FROM TR_Q2;
Update count: 5
(2 ms)

Activities Google Chrome

Apr 23 10:42 PM

H2 Console Not secure | http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632

Auto commit Max rows: 1000 Run Selected Auto complete Clear SQL statement:

```
INSERT INTO HR_Q3
SELECT DISTINCT garagecode FROM HR_Q3 UNION SELECT DISTINCT garagecode FROM TR_Q3;
```

Run Run Selected Auto complete Clear SQL statement:

```
INSERT INTO HR_Q3
SELECT DISTINCT garagecode FROM HR_Q3 UNION SELECT DISTINCT garagecode FROM TR_Q3;
Update count: 4
(3 ms)
```

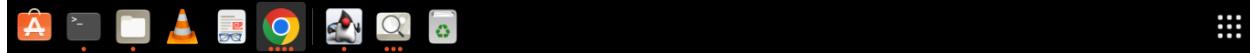
jdbc:h2:~/test

- HR_Q1
- HR_Q2
- HR_Q3
- HR_Q4
- MS1
- MS2
- STREAM1
- TR_Q1
- TR_Q2
- TR_Q3
- TR_Q4

INFORMATION_SCHEMA

Users

H2 2.1.212 (2022-04-09)



Activities Google Chrome

Apr 23 10:42 PM

H2 Console Not secure | http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632

Auto commit Max rows: 1000 Run Selected Auto complete Clear SQL statement:

```
INSERT INTO HR_Q4
SELECT DISTINCT garagecode FROM HR_Q4 UNION SELECT DISTINCT garagecode FROM TR_Q4;
```

Run Run Selected Auto complete Clear SQL statement:

```
INSERT INTO HR_Q4
SELECT DISTINCT garagecode FROM HR_Q4 UNION SELECT DISTINCT garagecode FROM TR_Q4;
Update count: 8
(5 ms)
```

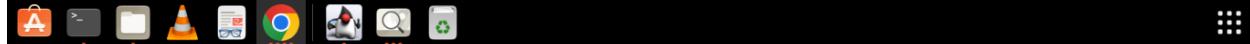
jdbc:h2:~/test

- HR_Q1
- HR_Q2
- HR_Q3
- HR_Q4
- MS1
- MS2
- STREAM1
- TR_Q1
- TR_Q2
- TR_Q3
- TR_Q4

INFORMATION_SCHEMA

Users

H2 2.1.212 (2022-04-09)



NEXT 10K TUPLES (REAL TIME DATA) LOADED: (NOW TOTAL 30K(20H +10N))

The screenshot shows the H2 Console interface running in Google Chrome. The left sidebar lists database objects: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main panel contains a SQL statement window with the following content:

```
CREATE table ms3() as
SELECT * from csvread('/home/mayank/Downloads/stream3.csv',null,'charset=UTF-8 fieldSeparator=,')
Update count: 0
(315 ms)
```

The status bar at the bottom indicates the date and time: April 23 10:44 PM.

QUERY 1:

The screenshot shows the H2 Console interface running in Google Chrome. The left sidebar lists database objects: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main panel contains a SQL statement window with the following content:

```
SELECT DISTINCT (garagecode) FROM MS3;
```

Below the SQL window, the results are displayed in a table:

GARAGECODE
BRUUNS
BUGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN

The status bar at the bottom indicates the date and time: April 23 10:47 PM.

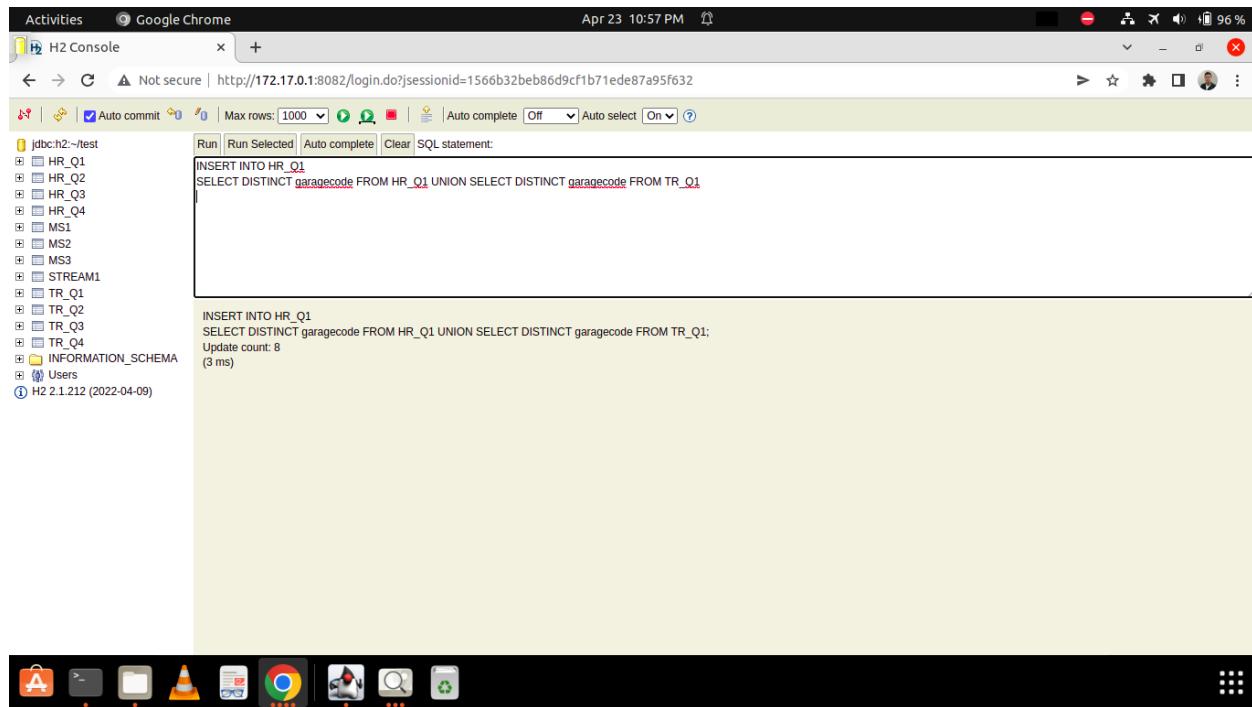
RESULT STORED IN TR_Q1:

```
Activities Google Chrome
H2 Console
Not secure | http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632
Auto commit Max rows: 1000 Run Selected Auto complete Clear SQL statement:
INSERT INTO TR_Q1
SELECT DISTINCT (garagecode) FROM MS3;
Run Selected Auto complete Clear SQL statement:
INSERT INTO TR_Q1
SELECT DISTINCT (garagecode) FROM MS3;
Update count: 8 (13 ms)
INFORMATION_SCHEMA
Users
H 2.1.212 (2022-04-09)
```

MERGING RESULTS OH HR_Q1 & TR_Q1 (OUTPUT):

```
Activities Google Chrome
H2 Console
Not secure | http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632
Auto commit Max rows: 1000 Run Selected Auto complete Clear SQL statement:
SELECT DISTINCT garagecode FROM HR_Q1 UNION SELECT DISTINCT garagecode FROM TR_Q1;
Run Selected Auto complete Clear SQL statement:
SELECT DISTINCT garagecode FROM HR_Q1 UNION SELECT DISTINCT garagecode FROM TR_Q1;
GARAGECODE
BRUUNS
BUGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN
(8 rows, 5 ms)
INFORMATION_SCHEMA
Users
H 2.1.212 (2022-04-09)
```

UPDATION OF RESULTS IN HISTORY RESULT TABLE



Activities Google Chrome April 23 10:57 PM

H2 Console Not secure | http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632

Auto commit Max rows: 1000 Run Selected Auto complete Clear SQL statement:

```
INSERT INTO HR_Q1
SELECT DISTINCT garagocode FROM HR_Q1 UNION SELECT DISTINCT garagocode FROM TR_Q1
```

Run Selected Auto complete Clear SQL statement:

```
INSERT INTO HR_Q1
SELECT DISTINCT garagocode FROM HR_Q1 UNION SELECT DISTINCT garagocode FROM TR_Q1;
Update count: 8
(3 ms)
```

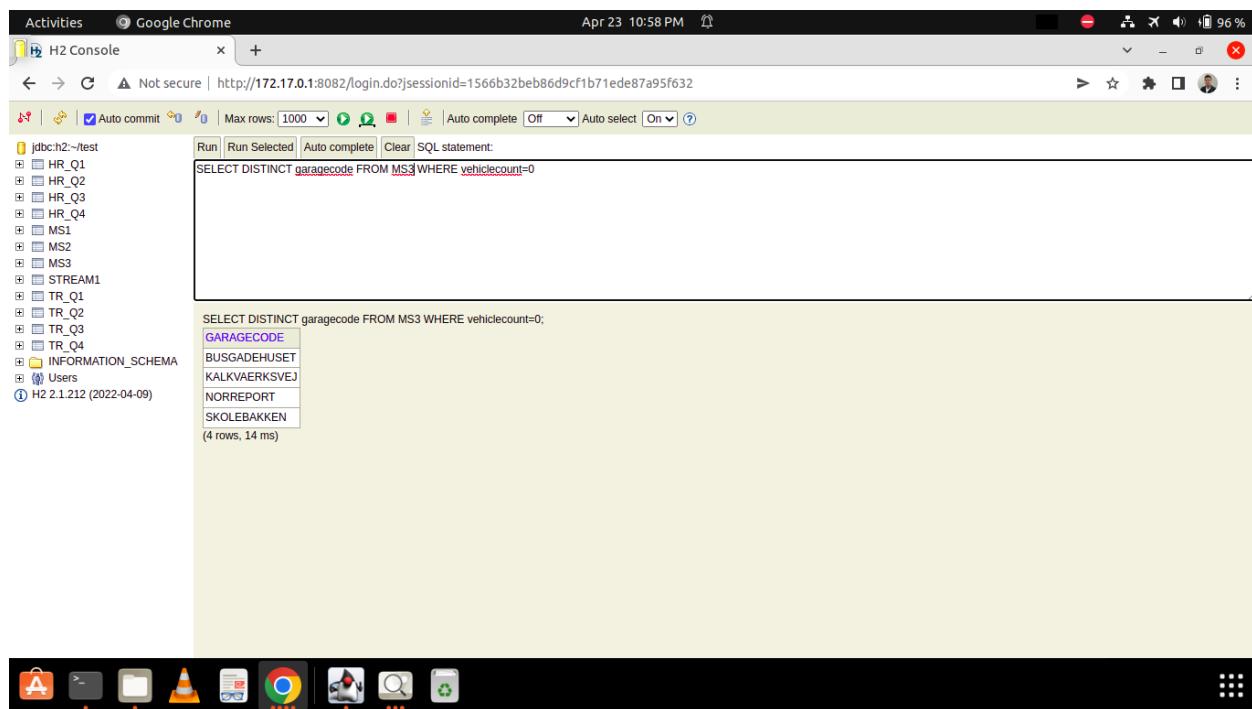
jdbc:h2:~/test

- HR_Q1
- HR_Q2
- HR_Q3
- HR_Q4
- MS1
- MS2
- MS3
- STREAM1
- TR_Q1
- TR_Q2
- TR_Q3
- TR_Q4
- INFORMATION_SCHEMA
- Users

H2 2.1.212 (2022-04-09)

The screenshot shows the H2 Console interface. A SQL statement is being run to insert distinct garage codes from the HR_Q1 and TR_Q1 tables into the HR_Q1 table. The output shows an update count of 8 rows in 3 milliseconds.

QUERY 2:



Activities Google Chrome April 23 10:58 PM

H2 Console Not secure | http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632

Auto commit Max rows: 1000 Run Selected Auto complete Clear SQL statement:

```
SELECT DISTINCT garagocode FROM MS3 WHERE vehiclecount=0;
```

Run Selected Auto complete Clear SQL statement:

```
SELECT DISTINCT garagocode FROM MS3 WHERE vehiclecount=0;
GARAGECODE
BUGADEHUSET
KALKVAERKSVEJ
NORREPORT
SKOLEBAKKEN
(4 rows, 14 ms)
```

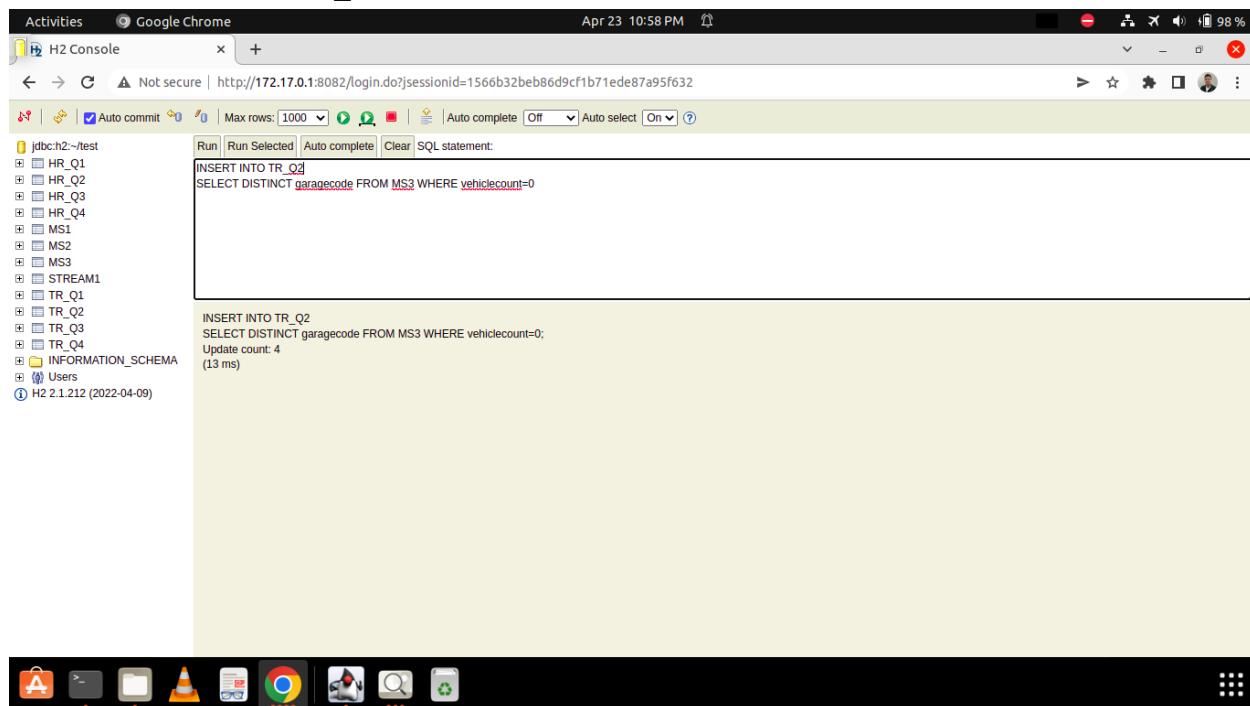
jdbc:h2:~/test

- HR_Q1
- HR_Q2
- HR_Q3
- HR_Q4
- MS1
- MS2
- MS3
- STREAM1
- TR_Q1
- TR_Q2
- TR_Q3
- TR_Q4
- INFORMATION_SCHEMA
- Users

H2 2.1.212 (2022-04-09)

The screenshot shows the H2 Console interface. A SQL statement is being run to select distinct garage codes from the MS3 table where vehiclecount is 0. The results are listed as GARAGECODE, including BUGADEHUSET, KALKVAERKSVEJ, NORREPORT, and SKOLEBAKKEN, with a total of 4 rows returned in 14 milliseconds.

RESULT STORED IN TR_Q2:



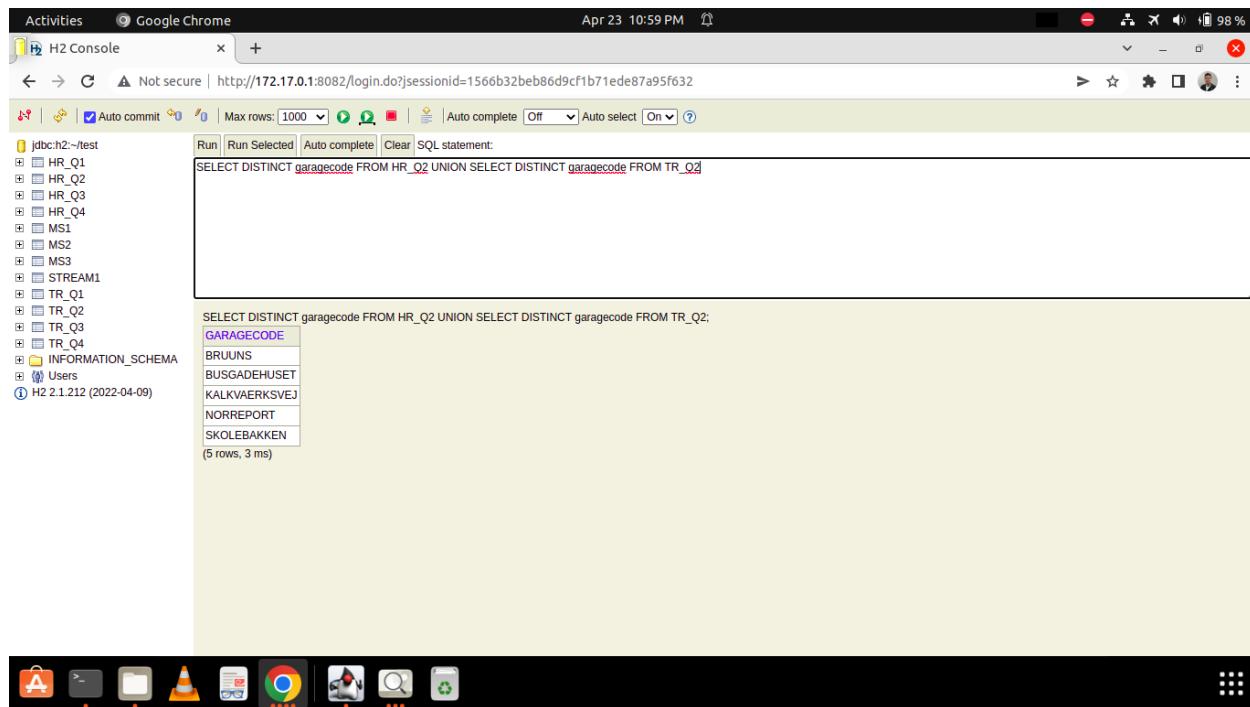
The screenshot shows the H2 Console interface in Google Chrome. The left sidebar lists database schemas: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main panel contains the following SQL code and its execution results:

```
INSERT INTO TR_Q2
SELECT DISTINCT garagocode FROM MS3 WHERE vehiclecount=0
```

Execution results:

```
INSERT INTO TR_Q2
SELECT DISTINCT garagocode FROM MS3 WHERE vehiclecount=0;
Update count: (13 ms)
```

MERGING RESULTS OH HR_Q2 & TR_Q2 (OUTPUT):



The screenshot shows the H2 Console interface in Google Chrome. The left sidebar lists database schemas: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main panel contains the following SQL code and its execution results:

```
SELECT DISTINCT garagocode FROM HR_Q2 UNION SELECT DISTINCT garagocode FROM TR_Q2;
```

Execution results:

GARAGECODE
BRUUNS
BUSGADEHUSET
KALKVAERKSVEJ
NORREPORT
SKOLEBAKEN

(5 rows, 3 ms)

UPDATION OF RESULTS IN HISTORY RESULT TABLE

The screenshot shows the H2 Console interface running in Google Chrome. The URL is <http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632>. The sidebar on the left lists databases: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main area contains the following SQL statement:

```
INSERT INTO HR_Q2
SELECT DISTINCT garagecode FROM HR_Q2 UNION SELECT DISTINCT garagecode FROM TR_Q2;
```

Below the statement, the results are displayed:

```
INSERT INTO HR_Q2
SELECT DISTINCT garagecode FROM HR_Q2 UNION SELECT DISTINCT garagecode FROM TR_Q2;
Update count: 5
(3 ms)
```

QUERY 3:

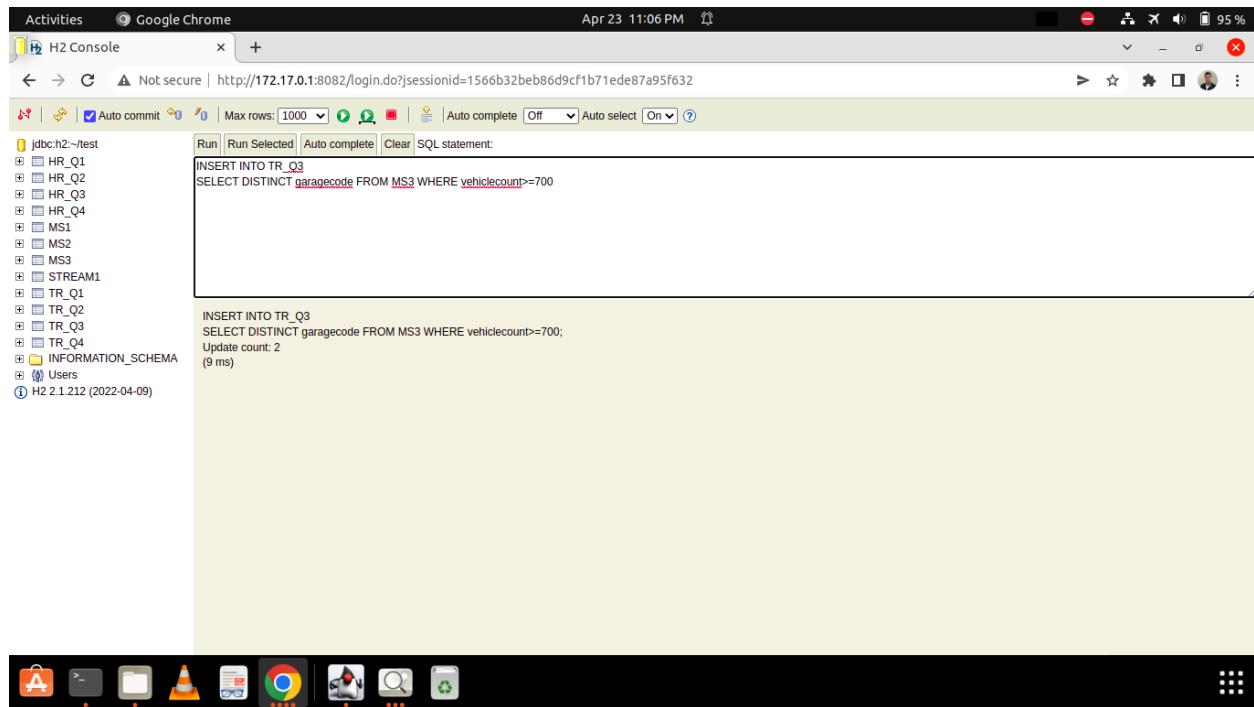
The screenshot shows the H2 Console interface running in Google Chrome. The URL is <http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632>. The sidebar on the left lists databases: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main area contains the following SQL statement:

```
SELECT DISTINCT garagecode FROM MS3 WHERE vehiclecount>=700;
```

Below the statement, the results are displayed:

```
SELECT DISTINCT garagecode FROM MS3 WHERE vehiclecount>=700;
GARAGECODE
BRUUNS
SCANDCENTER
(2 rows, 11 ms)
```

RESULT STORED IN TR_Q3:



The screenshot shows the H2 Console interface. The left sidebar lists databases: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The right panel contains a SQL statement window with the following content:

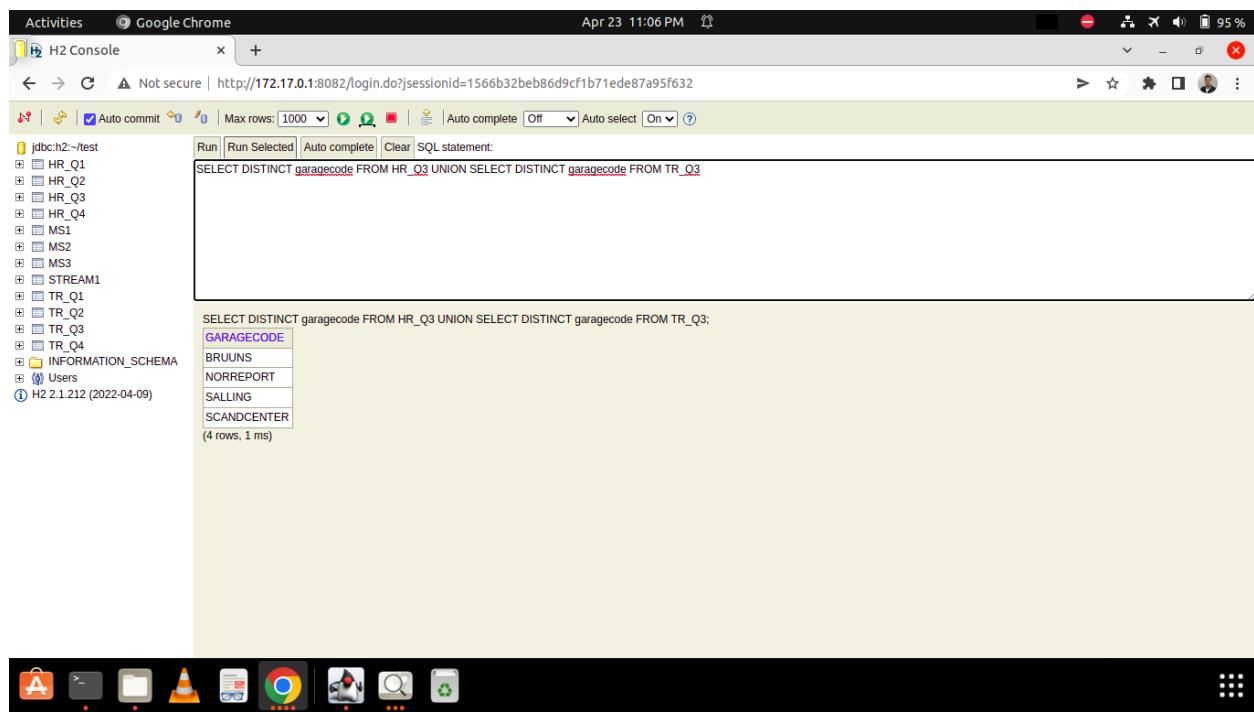
```
INSERT INTO TR_Q3
SELECT DISTINCT garagecode FROM MS3 WHERE vehiclecount>=700
```

Below the statement, the results are displayed:

```
INSERT INTO TR_Q3
SELECT DISTINCT garagecode FROM MS3 WHERE vehiclecount>=700;
Update count: 2
(9 ms)
```

The system status bar at the bottom shows various application icons.

MERGING RESULTS OH HR_Q3 & TR_Q3 (OUTPUT):



The screenshot shows the H2 Console interface. The left sidebar lists databases: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The right panel contains a SQL statement window with the following content:

```
SELECT DISTINCT garagecode FROM HR_Q3 UNION SELECT DISTINCT garagecode FROM TR_Q3;
```

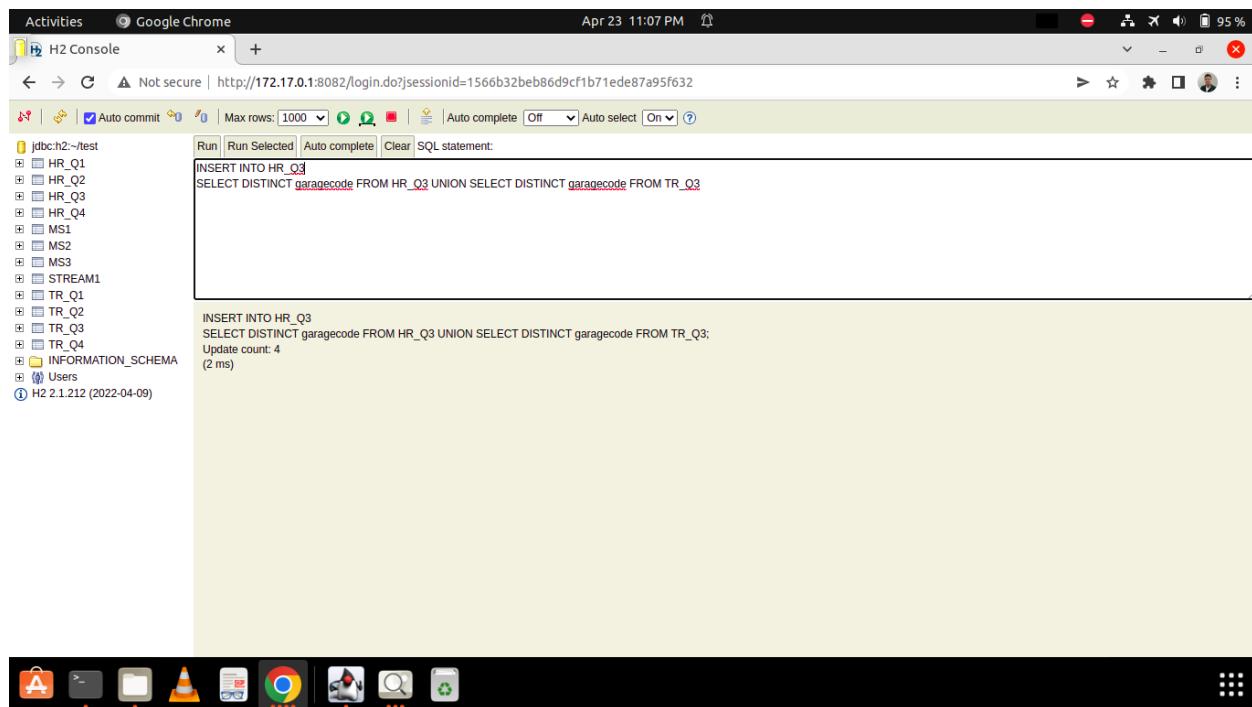
Below the statement, the results are displayed:

GARAGECODE
BRUUNS
NORREPORT
SALLING
SCANDCENTER

(4 rows, 1 ms)

The system status bar at the bottom shows various application icons.

UPDATION OF RESULTS IN HISTORY RESULT TABLE



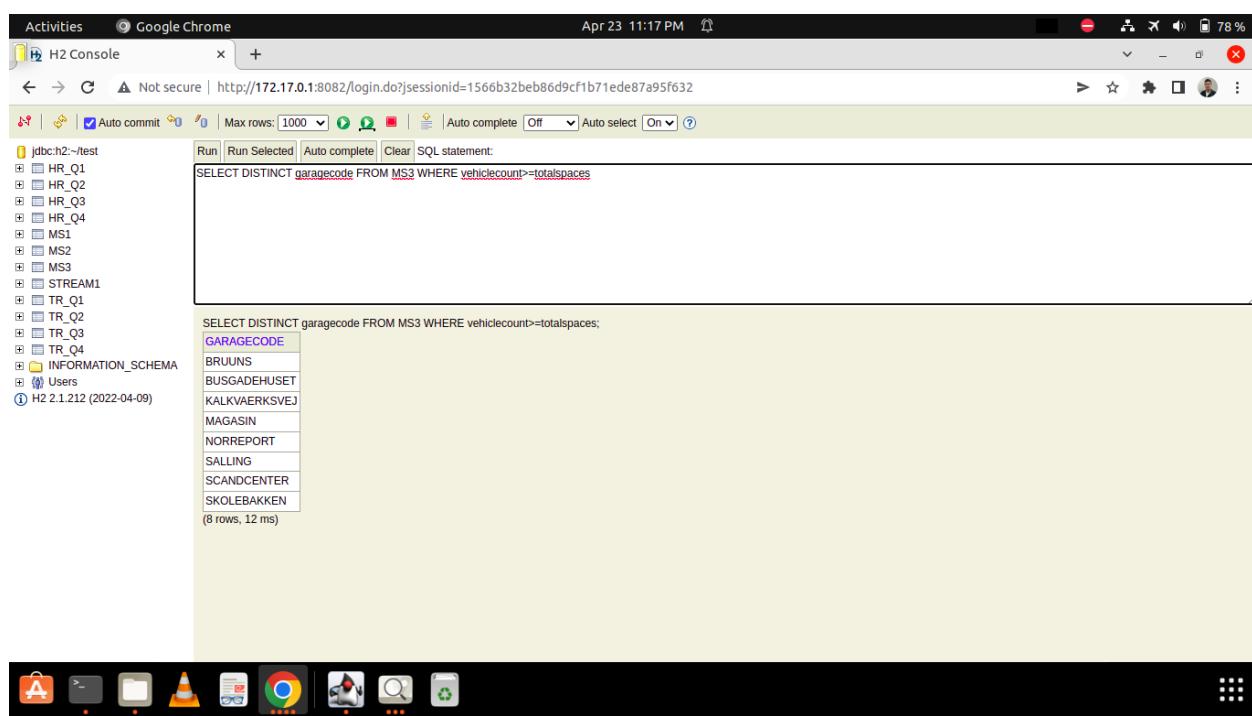
The screenshot shows the H2 Console interface in Google Chrome. The left sidebar lists databases: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main area contains the following SQL statement:

```
INSERT INTO HR_Q3
SELECT DISTINCT garagecode FROM HR_Q3 UNION SELECT DISTINCT garagecode FROM TR_Q3;
```

Below the statement, the results are displayed:

```
INSERT INTO HR_Q3
SELECT DISTINCT garagecode FROM HR_Q3 UNION SELECT DISTINCT garagecode FROM TR_Q3;
Update count: 4
(2 ms)
```

QUERY 4:



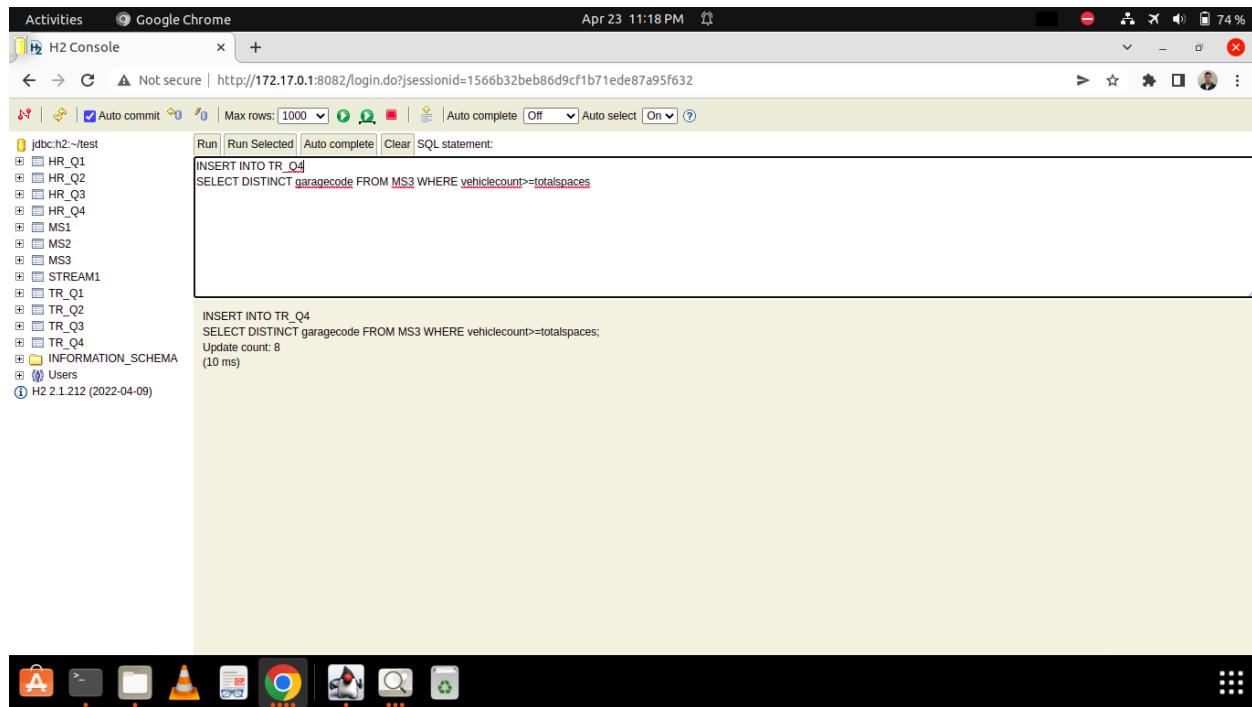
The screenshot shows the H2 Console interface in Google Chrome. The left sidebar lists databases: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main area contains the following SQL statement:

```
SELECT DISTINCT garagecode FROM MS3 WHERE vehiclecount>=totalspaces;
```

Below the statement, the results are displayed:

```
SELECT DISTINCT garagecode FROM MS3 WHERE vehiclecount>=totalspaces;
GARAGECODE
BRUUNS
BUGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN
(8 rows, 12 ms)
```

RESULT STORED IN TR_Q4:



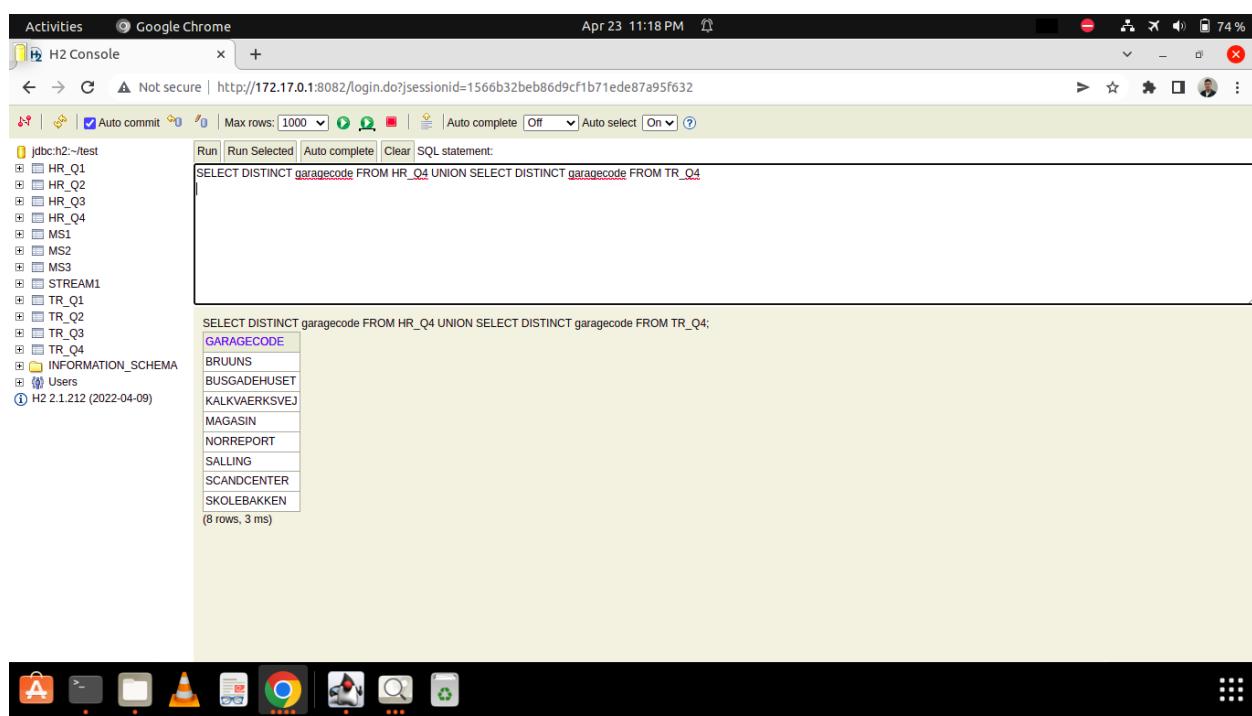
The screenshot shows the H2 Console interface in Google Chrome. The left sidebar lists database schemas: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The right panel contains the SQL statement and its execution results.

```
INSERT INTO TR_Q4
SELECT DISTINCT garagecode FROM MS3 WHERE vehiclecount>=totalspaces;
```

Execution results:

```
INSERT INTO TR_Q4
SELECT DISTINCT garagecode FROM MS3 WHERE vehiclecount>=totalspaces;
Update count: 8
(10 ms)
```

MERGING RESULTS OH HR_Q4 & TR_Q4 (OUTPUT):



The screenshot shows the H2 Console interface in Google Chrome. The left sidebar lists database schemas: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The right panel contains the SQL statement and its execution results.

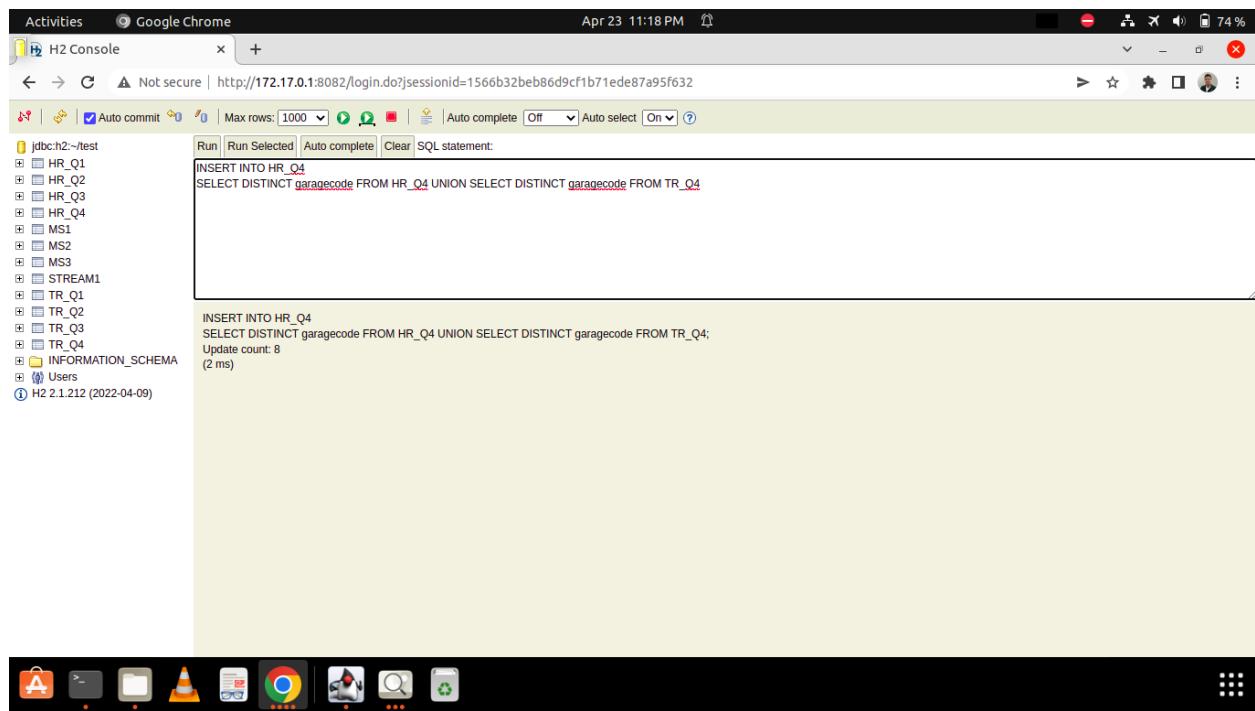
```
SELECT DISTINCT garagecode FROM HR_Q4 UNION SELECT DISTINCT garagecode FROM TR_Q4;
```

Execution results:

GARAGECODE
BRUUNS
BUGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN

(8 rows, 3 ms)

UPDATION OF RESULTS IN HISTORY RESULT TABLE



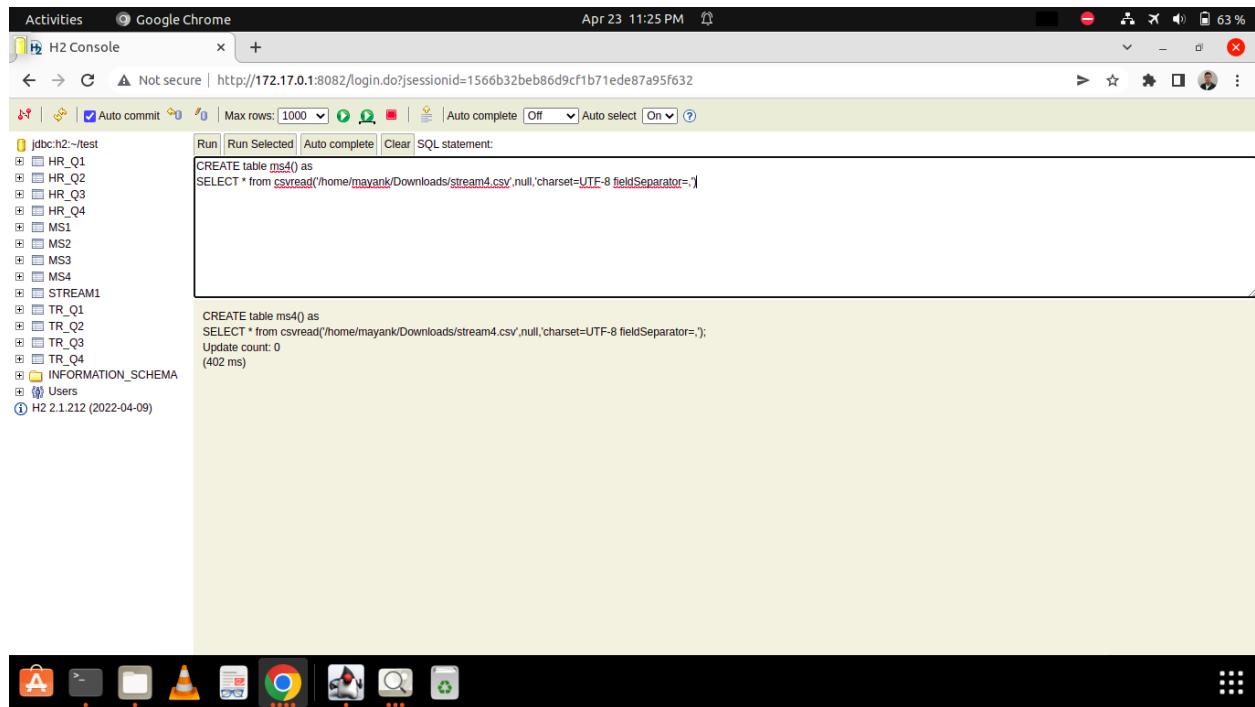
The screenshot shows an H2 Console window running in Google Chrome. The URL is <http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632>. The left sidebar lists database schemas: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main area contains the following SQL code:

```
INSERT INTO HR_Q4
SELECT DISTINCT garagecode FROM HR_Q4 UNION SELECT DISTINCT garagecode FROM TR_Q4;
```

Below the code, the output shows:

```
INSERT INTO HR_Q4
SELECT DISTINCT garagecode FROM HR_Q4 UNION SELECT DISTINCT garagecode FROM TR_Q4;
Update count: 8
(2 ms)
```

NEXT 10K TUPLES (REAL TIME DATA) LOADED: (NOW TOTAL 40K(30H +10N))

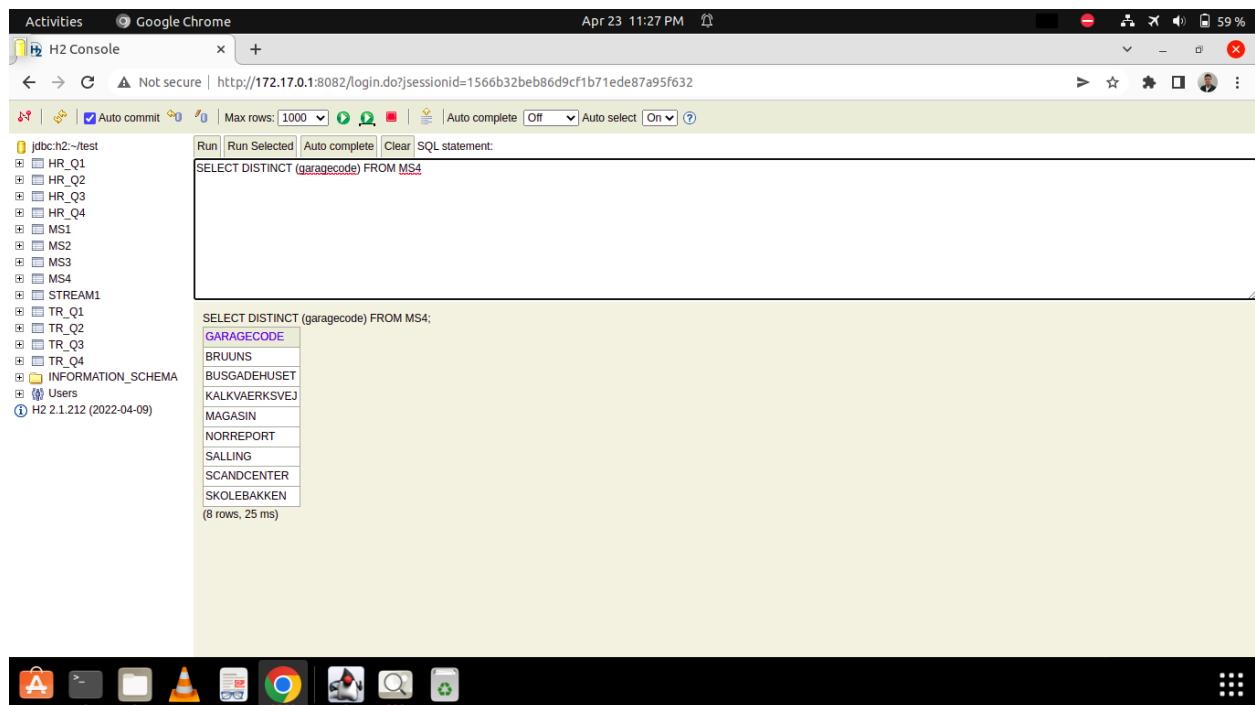


A screenshot of the H2 Console interface. The left sidebar shows a tree view of database objects: jdbc:h2:~/test, HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, MS4, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The right panel contains a SQL statement window with the following content:

```
CREATE table ms4() as
SELECT * from csvread('/home/mayank/Downloads/stream4.csv',null,'charset=UTF-8 fieldSeparator=','');

CREATE table ms4() as
SELECT * from csvread('/home/mayank/Downloads/stream4.csv',null,'charset=UTF-8 fieldSeparator=','');
Update count: 0
(402 ms)
```

QUERY 1:



A screenshot of the H2 Console interface. The left sidebar shows the same tree view of database objects as the previous screenshot. The right panel contains a SQL statement window with the following content:

```
SELECT DISTINCT (garagecode) FROM MS4;
```

Below the SQL window, the results are displayed in a table:

GARAGECODE
BRUUNS
BUGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN

(8 rows, 25 ms)

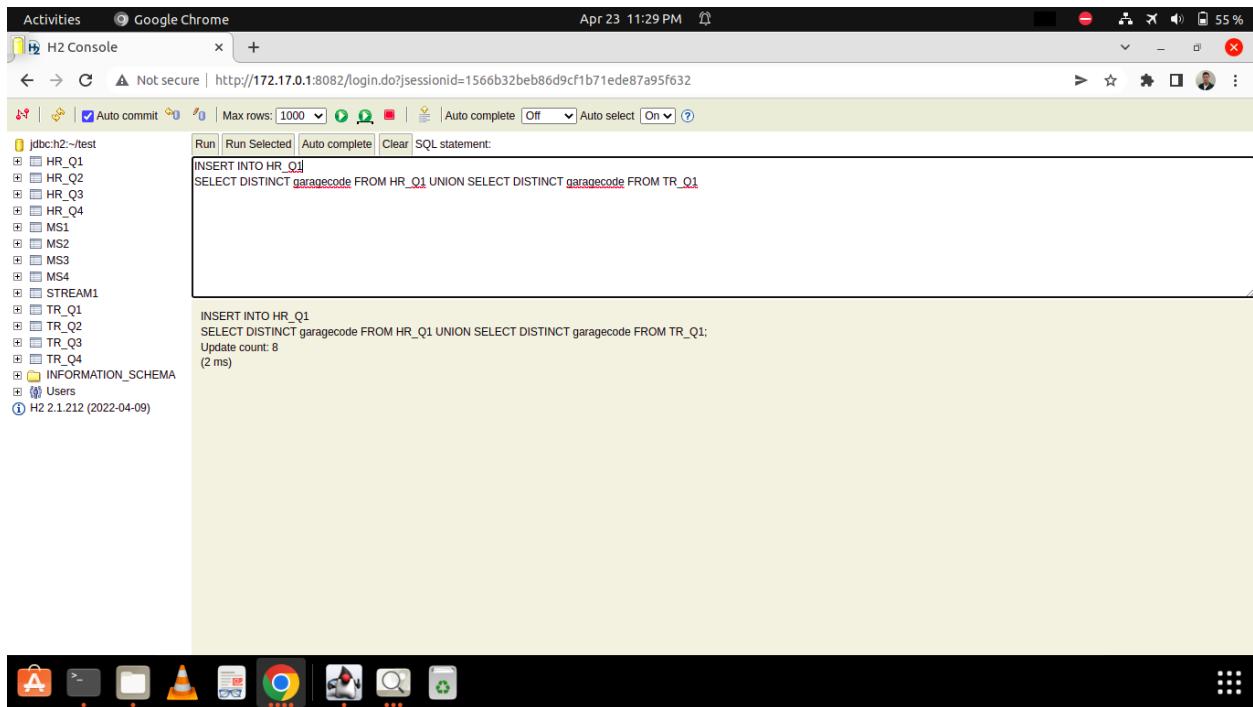
RESULT STORED IN TR_Q1:

A screenshot of the H2 Console interface in Google Chrome. The title bar shows "Activities" and "Google Chrome". The address bar indicates "Not secure | http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632". The left sidebar lists database schemas: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, MS4, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main panel shows the SQL statement: "INSERT INTO TR_Q1 SELECT DISTINCT (garagecode) FROM MS4;". Below the statement, the output shows: "Update count: 8 (12 ms)". The bottom navigation bar includes icons for Home, Back, Forward, Stop, Refresh, and others.

MERGING RESULTS OF HR_Q1 & TR_Q1 (OUTPUT):

A screenshot of the H2 Console interface in Google Chrome. The title bar shows "Activities" and "Google Chrome". The address bar indicates "Not secure | http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632". The left sidebar lists database schemas: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, MS4, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main panel shows the SQL statement: "SELECT DISTINCT garagecode FROM HR_Q1 UNION SELECT DISTINCT garagecode FROM TR_Q1;". Below the statement, the output shows: "SELECT DISTINCT garagecode FROM HR_Q1 UNION SELECT DISTINCT garagecode FROM TR_Q1;". A table titled "GARAGECODE" lists the results: BRUUNS, BUGADEHUSET, KALKVAERKSVEJ, MAGASIN, NORREPORT, SALLING, SCANDCENTER, and SKOLEBAKKEN. The note "(8 rows, 2 ms)" is shown at the bottom. The bottom navigation bar includes icons for Home, Back, Forward, Stop, Refresh, and others.

UPDATION OF RESULTS IN HISTORY RESULT TABLE



The screenshot shows the H2 Console interface in Google Chrome. The left sidebar lists database schemas: HR, TR, MS, and STREAM. The main area contains the following SQL code:

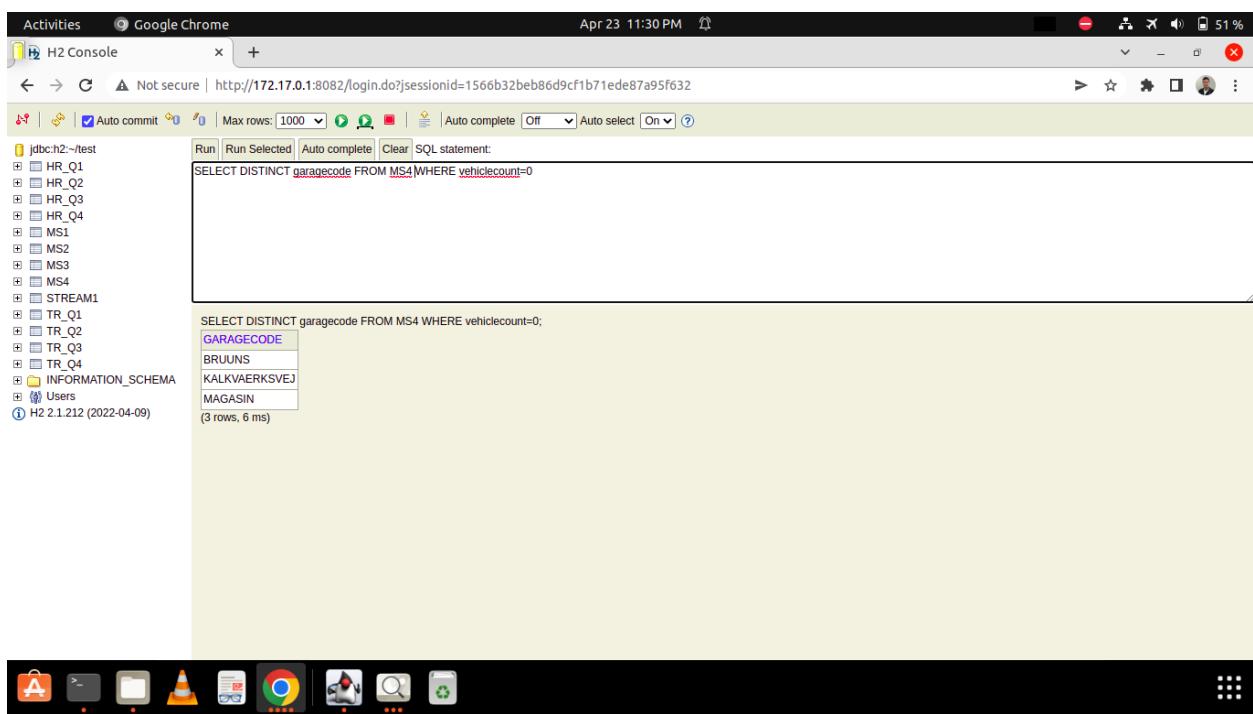
```
INSERT INTO HR_Q1
SELECT DISTINCT garagecode FROM HR_Q1 UNION SELECT DISTINCT garagecode FROM TR_Q1;
```

Below the code, the results are displayed:

```
INSERT INTO HR_Q1
SELECT DISTINCT garagecode FROM HR_Q1 UNION SELECT DISTINCT garagecode FROM TR_Q1;
Update count: 8
(2 ms)
```

The status bar at the bottom indicates "55 %".

QUERY 2:



The screenshot shows the H2 Console interface in Google Chrome. The left sidebar lists database schemas: HR, TR, MS, and STREAM. The main area contains the following SQL code:

```
SELECT DISTINCT garagecode FROM MS4 WHERE vehiclecount=0;
```

Below the code, the results are displayed:

GARAGECODE
BRUUNS
KALKVAERKSVEJ
MAGASIN

Below the table, the results are summarized:

```
SELECT DISTINCT garagecode FROM MS4 WHERE vehiclecount=0;
(3 rows, 6 ms)
```

The status bar at the bottom indicates "51 %".

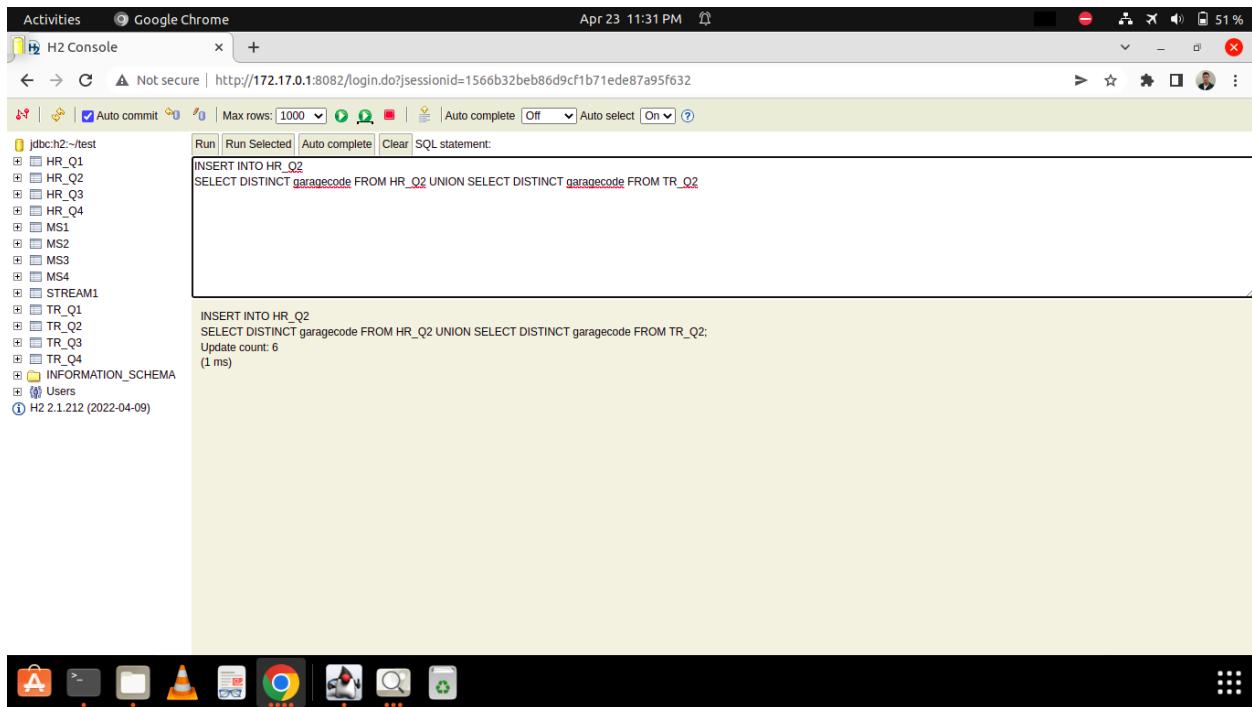
RESULT STORED IN TR_Q2:

```
INSERT INTO TR_Q2
SELECT DISTINCT garagecode FROM MS4 WHERE vehiclecount=0;
Update count: 3
(1.3 ms)
```

MERGING RESULTS OH HR_Q2 & TR_Q2 (OUTPUT):

```
SELECT DISTINCT garagecode FROM HR_Q2 UNION SELECT DISTINCT garagecode FROM TR_Q2;
GARAGECODE
BRUUNS
BUGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SKOLEBAKKEN
(6 rows, 1 ms)
```

UPDATION OF RESULTS IN HISTORY RESULT TABLE



The screenshot shows the H2 Console interface in Google Chrome. The left sidebar displays the database schema with tables like HR_Q1 through HR_Q4, MS1 through MS4, STREAM1, TR_Q1 through TR_Q4, INFORMATION_SCHEMA, and Users. The main panel shows the following SQL statement:

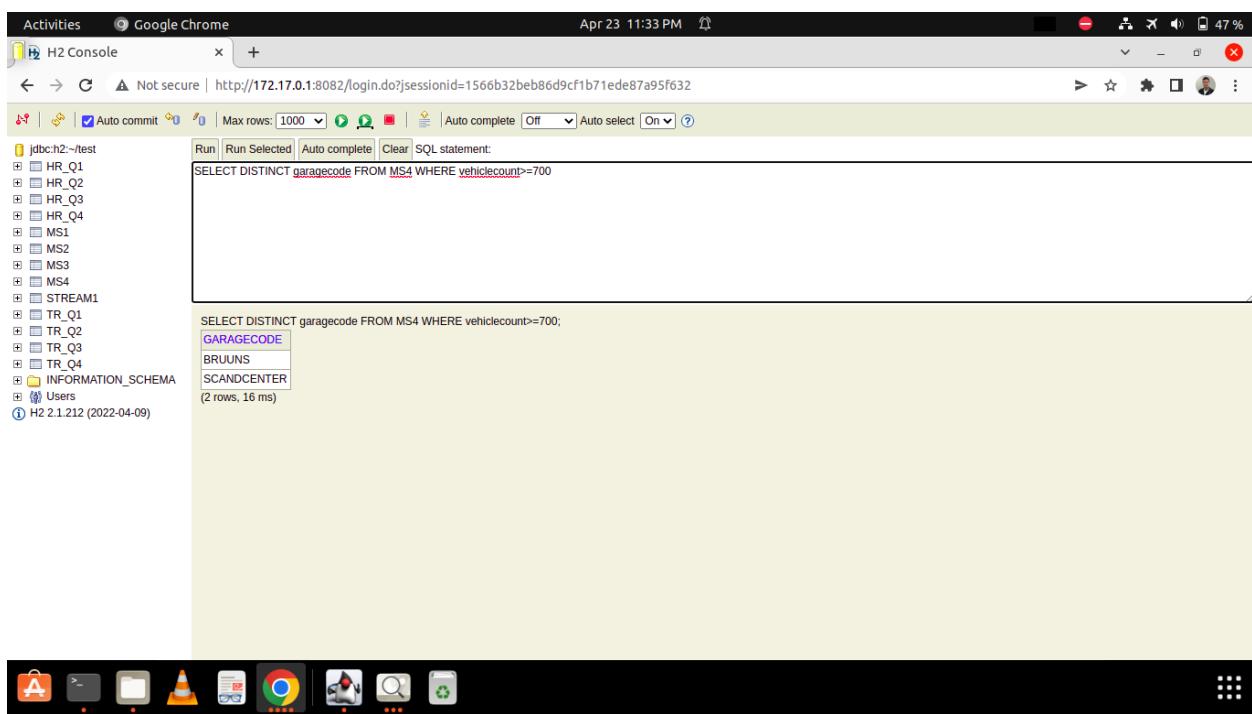
```
INSERT INTO HR_Q2
SELECT DISTINCT garagecode FROM HR_Q2 UNION SELECT DISTINCT garagecode FROM TR_Q2;
```

Below the statement, the results are displayed:

```
Update count: 6
(1 ms)
```

The bottom of the screen shows the Unity desktop environment with various application icons.

QUERY 3:



The screenshot shows the H2 Console interface in Google Chrome. The left sidebar displays the database schema. The main panel shows the following SQL statement:

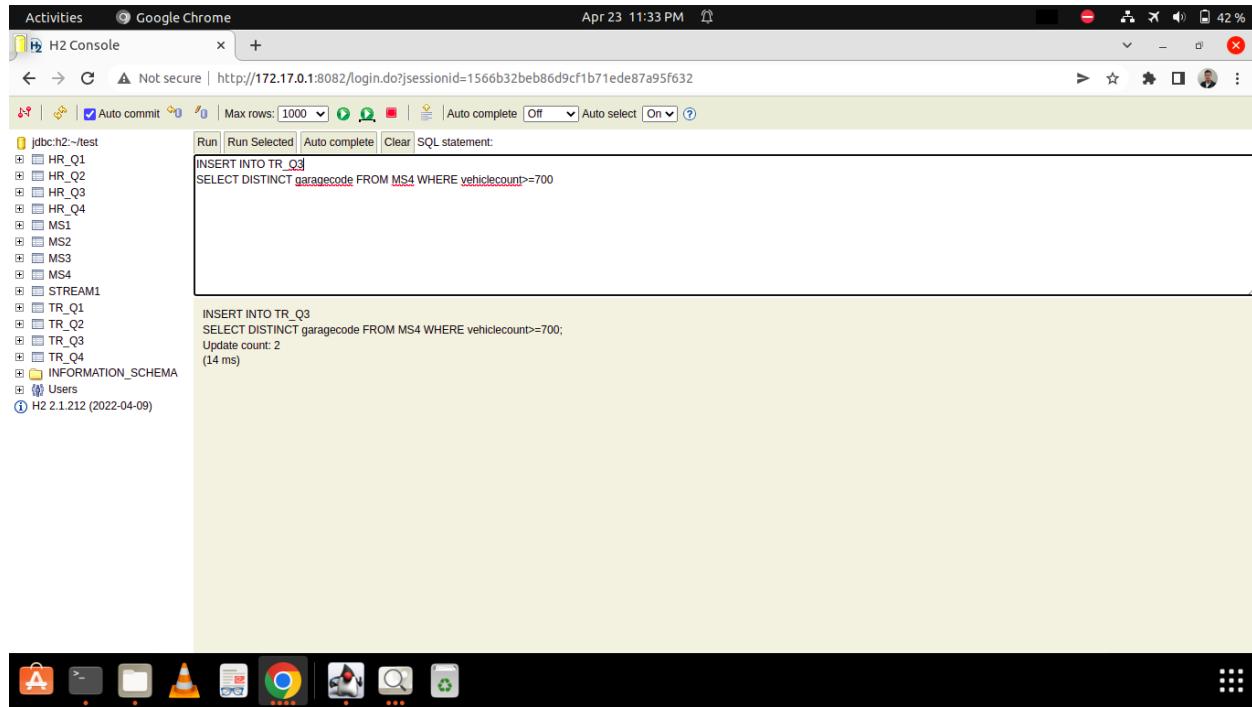
```
SELECT DISTINCT garagecode FROM MS4 WHERE vehiclecount>=700
```

Below the statement, the results are displayed:

```
GARAGECODE
BRUUNS
SCANDCENTER
(2 rows, 16 ms)
```

The bottom of the screen shows the Unity desktop environment with various application icons.

RESULT STORED IN TR_Q3:



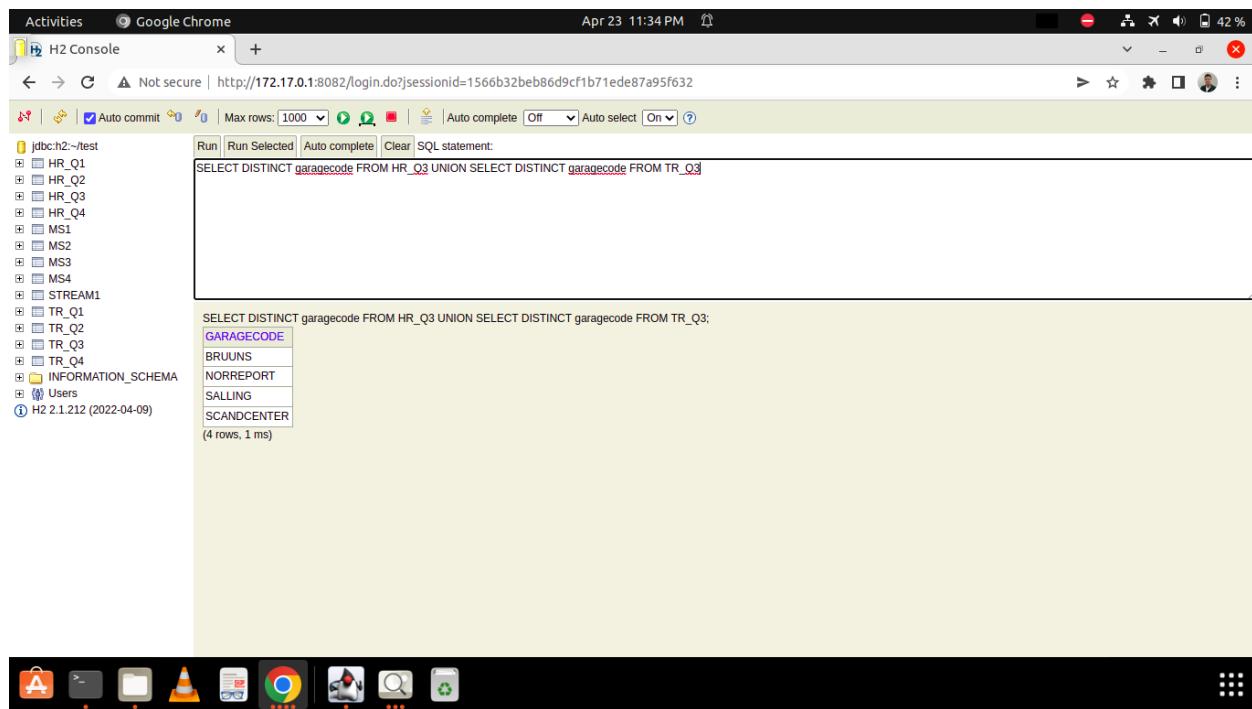
The screenshot shows the H2 Console interface in Google Chrome. The left sidebar lists database schemas: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, MS4, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main panel contains the following SQL statements:

```
INSERT INTO TR_Q3
SELECT DISTINCT garagecode FROM MS4 WHERE vehiclecount>=700
```

Below the statement, the output is shown:

```
INSERT INTO TR_Q3
SELECT DISTINCT garagecode FROM MS4 WHERE vehiclecount>=700;
Update count: 2
(1.4 ms)
```

MERGING RESULTS OH HR_Q3 & TR_Q3 (OUTPUT):



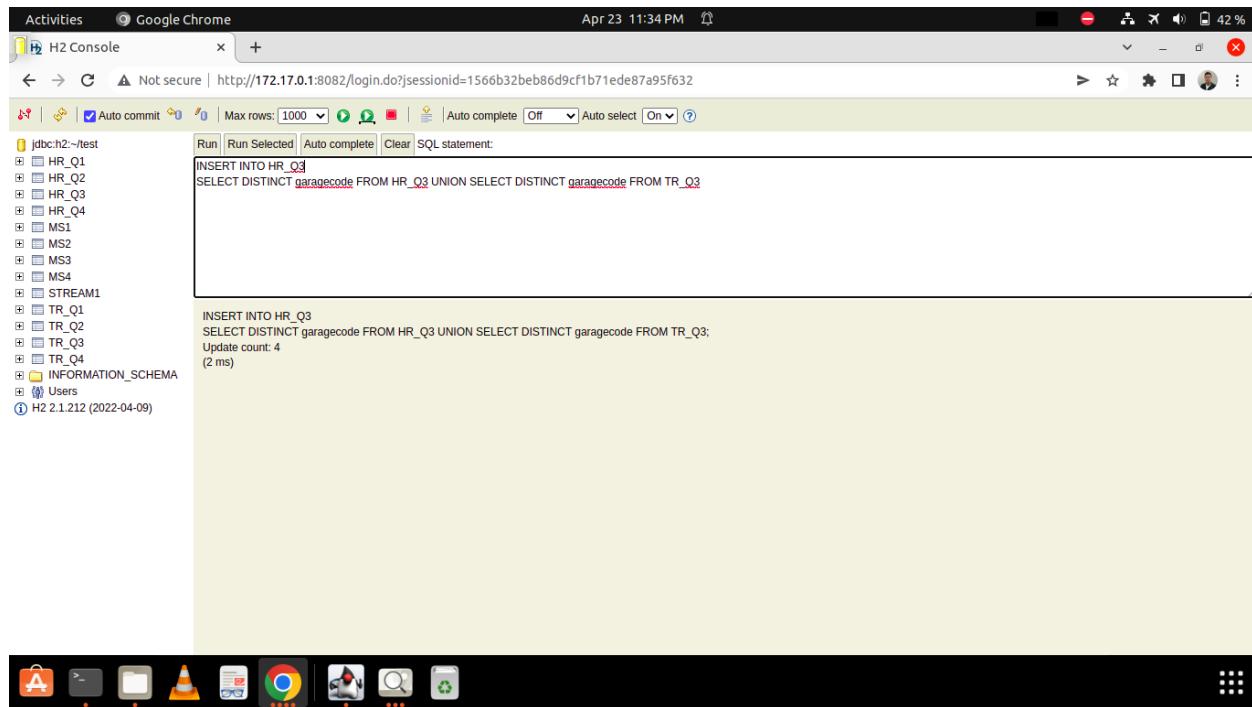
The screenshot shows the H2 Console interface in Google Chrome. The left sidebar lists database schemas: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, MS4, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main panel contains the following SQL statement:

```
SELECT DISTINCT garagecode FROM HR_Q3 UNION SELECT DISTINCT garagecode FROM TR_Q3;
```

Below the statement, the output is shown:

```
SELECT DISTINCT garagecode FROM HR_Q3 UNION SELECT DISTINCT garagecode FROM TR_Q3;
GARAGECODE
BRUUNS
NORREPORT
SALLING
SCANDCENTER
(4 rows, 1 ms)
```

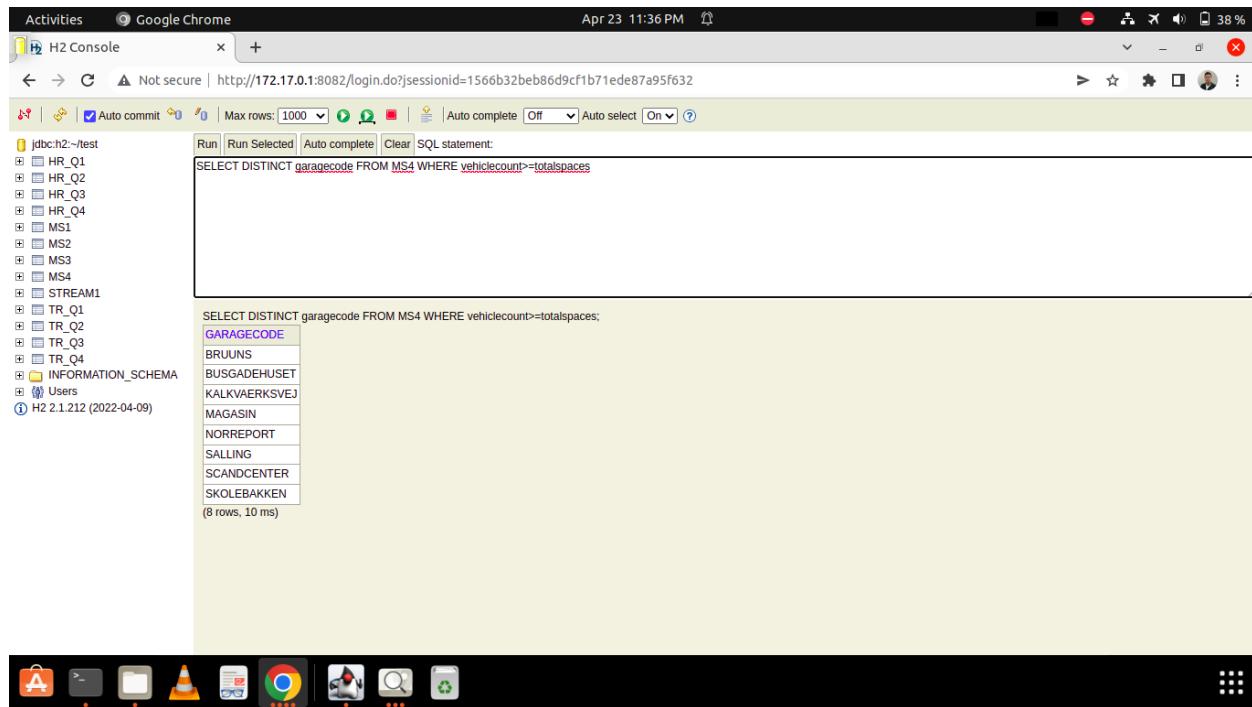
UPDATION OF RESULTS IN HISTORY RESULT TABLE



```
Activities Google Chrome
H2 Console
Not secure | http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632
Auto commit Max rows: 1000 Run Selected Auto complete Clear SQL statement:
INSERT INTO HR_Q3
SELECT DISTINCT garagecode FROM HR_Q3 UNION SELECT DISTINCT garagecode FROM TR_Q3;
Auto complete Off Auto select On ?
```

INSERT INTO HR_Q3
SELECT DISTINCT garagecode FROM HR_Q3 UNION SELECT DISTINCT garagecode FROM TR_Q3;
Update count: 4
(2 ms)

QUERY 4:



```
Activities Google Chrome
H2 Console
Not secure | http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632
Auto commit Max rows: 1000 Run Selected Auto complete Clear SQL statement:
SELECT DISTINCT garagecode FROM MS4 WHERE vehiclecount>totalspaces;
```

GARAGECODE

BRUUNS
BUGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN

(8 rows, 10 ms)

RESULT STORED IN TR_Q4:

The screenshot shows the H2 Console interface in Google Chrome. The left sidebar lists databases and tables: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, MS4, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main panel contains the SQL statement:

```
INSERT INTO TR_Q4
SELECT DISTINCT garagocode FROM MS4 WHERE vehiclecount>=totalspaces;
```

Below the statement, the results are displayed:

```
INSERT INTO TR_Q4
SELECT DISTINCT garagocode FROM MS4 WHERE vehiclecount>=totalspaces;
Update count: 88 ms
```

The status bar at the bottom shows various application icons.

MERGING RESULTS OH HR_Q4 & TR_Q4 (OUTPUT):

The screenshot shows the H2 Console interface in Google Chrome. The left sidebar lists databases and tables: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, MS4, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main panel contains the SQL statement:

```
SELECT DISTINCT garagocode FROM HR_Q4 UNION SELECT DISTINCT garagocode FROM TR_Q4;
```

Below the statement, the results are displayed:

```
SELECT DISTINCT garagocode FROM HR_Q4 UNION SELECT DISTINCT garagocode FROM TR_Q4;
GARAGECODE
BRUUNS
BUSGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN
(8 rows, 3 ms)
```

The status bar at the bottom shows various application icons.

UPDATION OF RESULTS IN HISTORY RESULT TABLE

The screenshot shows an H2 Console window running in Google Chrome. The URL is <http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632>. The window title is "Activities" and the tab title is "H2 Console". The status bar shows "Apr 23 11:37 PM". The left sidebar lists database schemas: jdbc:h2:~/test, INFORMATION_SCHEMA, and Users. The main area contains the following SQL code:

```
INSERT INTO HR_Q4
SELECT DISTINCT garagecode FROM HR_Q4 UNION SELECT DISTINCT garagecode FROM TR_Q4;
Update count: 8
(35 ms)
```

The toolbar at the top includes icons for back, forward, search, and refresh.

NEXT 10K TUPLES (REAL TIME DATA) LOADED: (NOW TOTAL 50K(40H +10N))

A screenshot of the H2 Console interface. The left sidebar shows a tree view of database objects including HR_Q1 through HR_Q4, MS1 through MS5, STREAM1, and various temporary tables like TR_Q1 through TR_Q4. The main panel contains a SQL statement window with the following content:

```
CREATE table ms5() as
SELECT * from csvread('/home/mayank/Downloads/stream1.csv',null,'charset=UTF-8 fieldSeparator=','')
```

Below the statement, the console displays the results of the query:

```
CREATE table ms5() as
SELECT * from csvread('/home/mayank/Downloads/stream1.csv',null,'charset=UTF-8 fieldSeparator=','');
Update count: 0
(134 ms)
```

The bottom of the screen shows a dock with various application icons.

QUERY 1:

A screenshot of the H2 Console interface. The left sidebar shows a tree view of database objects including HR_Q1 through HR_Q4, MS1 through MS5, STREAM1, and various temporary tables like TR_Q1 through TR_Q4. The main panel contains a SQL statement window with the following content:

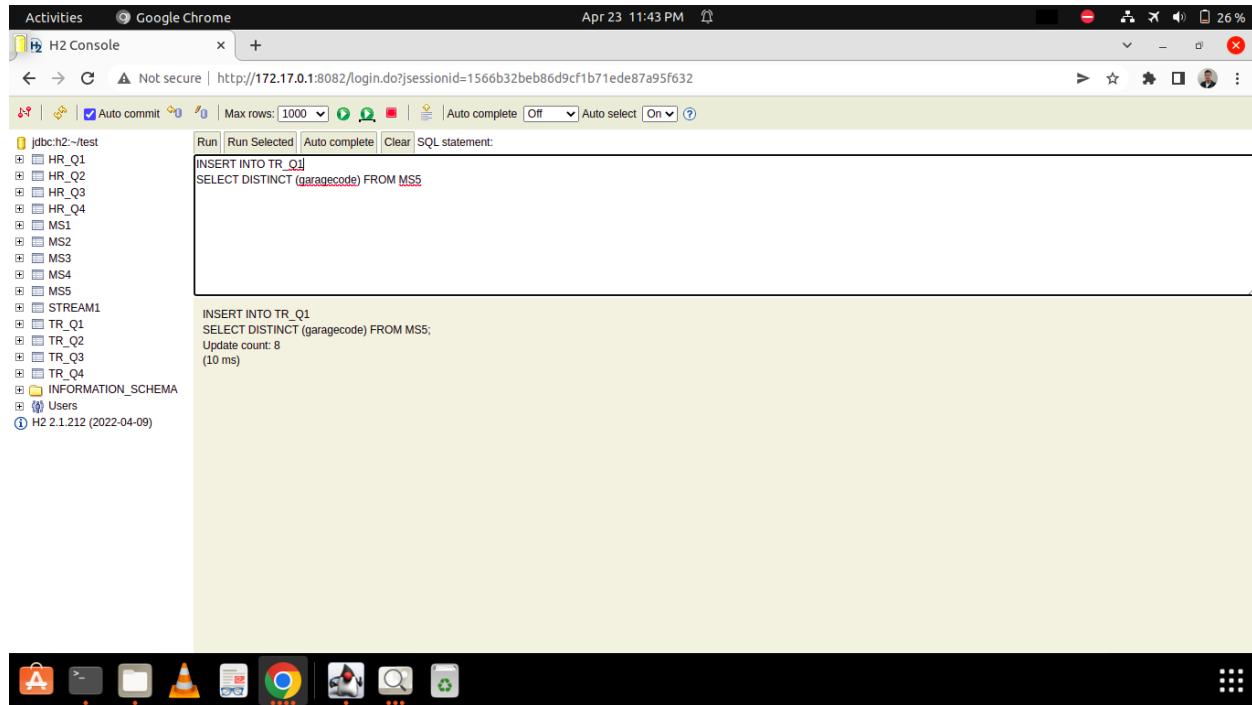
```
SELECT DISTINCT (garagecode) FROM MS5;
```

Below the statement, the console displays the results of the query:

```
SELECT DISTINCT (garagecode) FROM MS5;
GARAGECODE
BRUUNS
BUGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN
(8 rows, 10 ms)
```

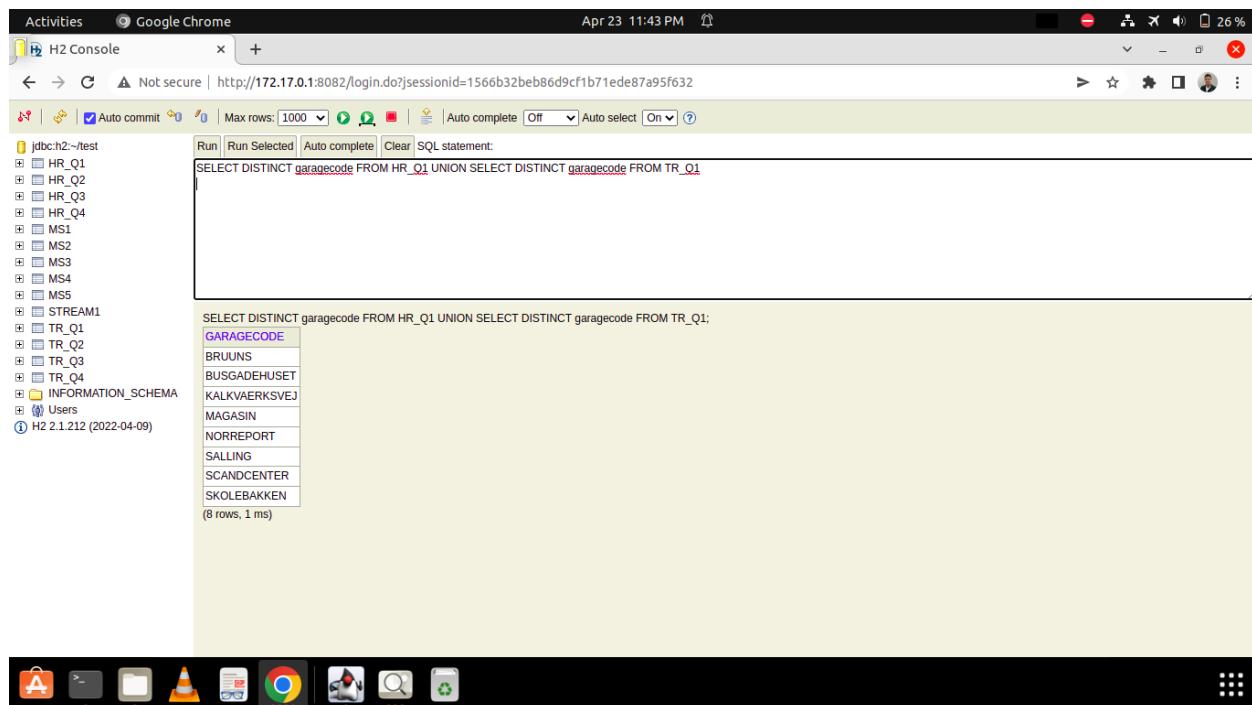
The bottom of the screen shows a dock with various application icons.

RESULT STORED IN TR_Q1:



```
INSERT INTO TR_Q1
SELECT DISTINCT (garagecode) FROM MSS;
Update count: 8
(10 ms)
```

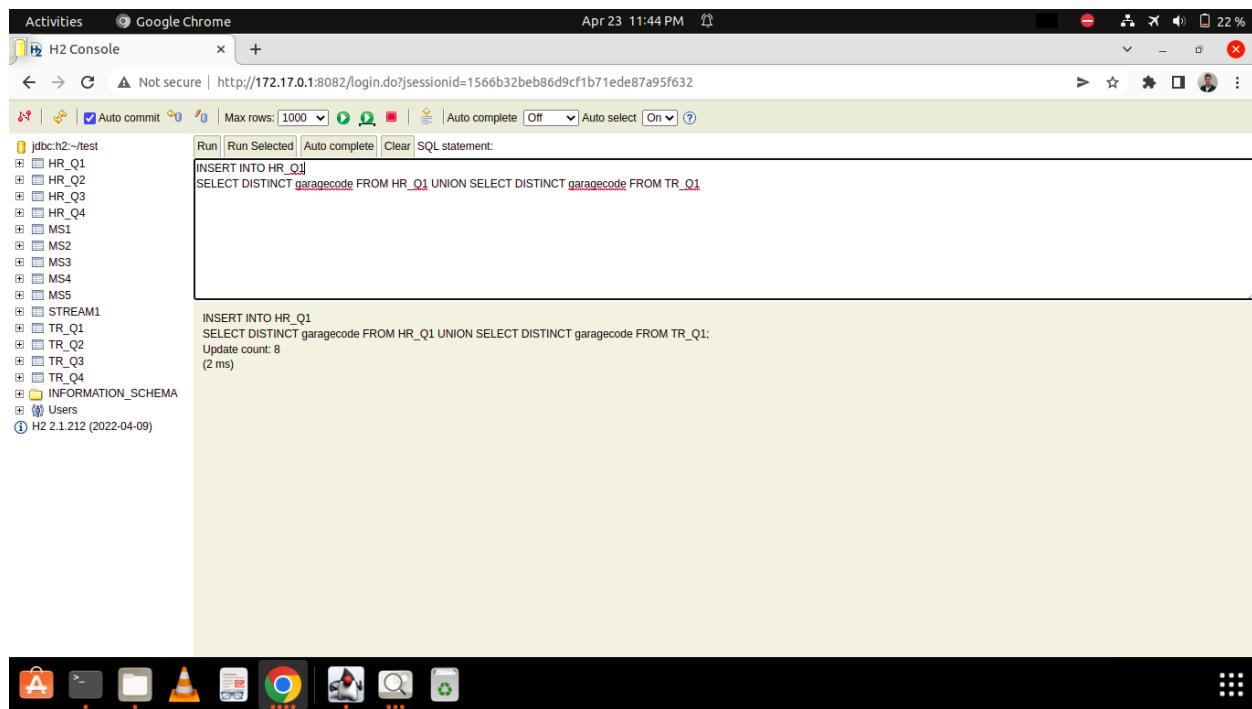
MERGING RESULTS OH HR_Q1 & TR_Q1 (OUTPUT):



GARAGECODE
BRUUNS
BUGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN

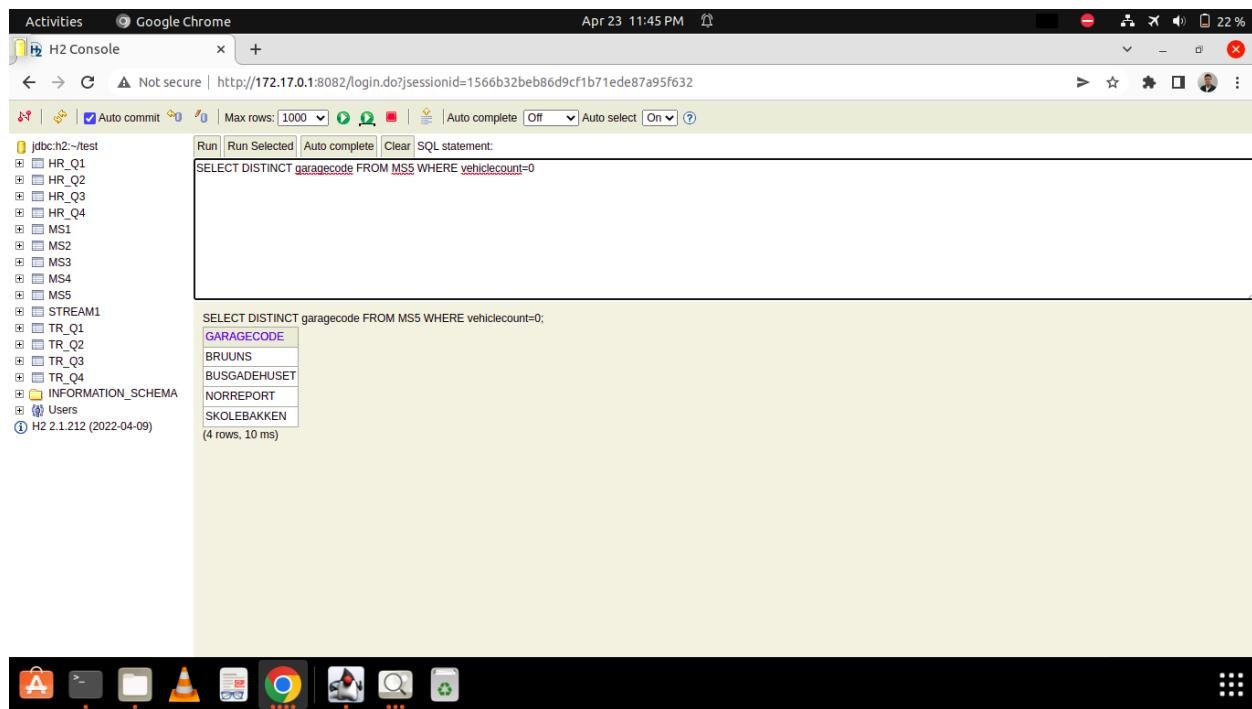
```
SELECT DISTINCT garagecode FROM HR_Q1 UNION SELECT DISTINCT garagecode FROM TR_Q1;
GARAGECODE
BRUUNS
BUGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN
(8 rows, 1 ms)
```

UPDATION OF RESULTS IN HISTORY RESULT TABLE



```
INSERT INTO HR_Q1
SELECT DISTINCT garagecode FROM HR_Q1 UNION SELECT DISTINCT garagecode FROM TR_Q1;
Update count: 8
(2 ms)
```

QUERY 2:



GARAGECODE
BRUUNS
BUGADEHUSET
NORREPORT
SKOLEBAKKEN

(4 rows, 10 ms)

RESULT STORED IN TR_Q2:

```
Activities Google Chrome
H2 Console
Not secure | http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632
Auto commit Max rows: 1000 Run Run Selected Auto complete Clear SQL statement:
INSERT INTO TR_Q2
SELECT DISTINCT garagocode FROM MS5 WHERE vehiclecount=0

INSERT INTO TR_Q2
SELECT DISTINCT garagocode FROM MS5 WHERE vehiclecount=0;
Update count: 4
(12 ms)

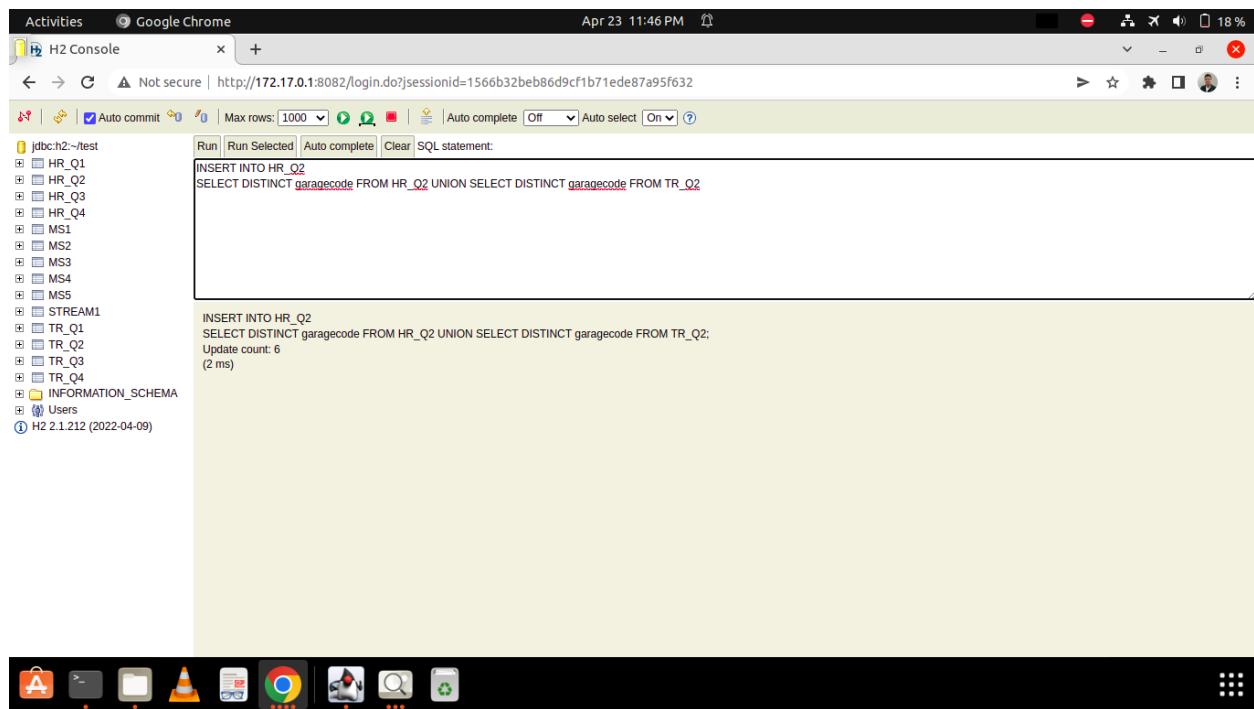
Run Run Selected Auto complete Clear SQL statement:
SELECT DISTINCT garagocode FROM MS5 WHERE vehiclecount=0;
Update count: 4
(12 ms)
```

MERGING RESULTS OH HR_Q2 & TR_Q2 (OUTPUT):

```
Activities Google Chrome
H2 Console
Not secure | http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632
Auto commit Max rows: 1000 Run Run Selected Auto complete Clear SQL statement:
SELECT DISTINCT garagocode FROM HR_Q2 UNION SELECT DISTINCT garagocode FROM TR_Q2;

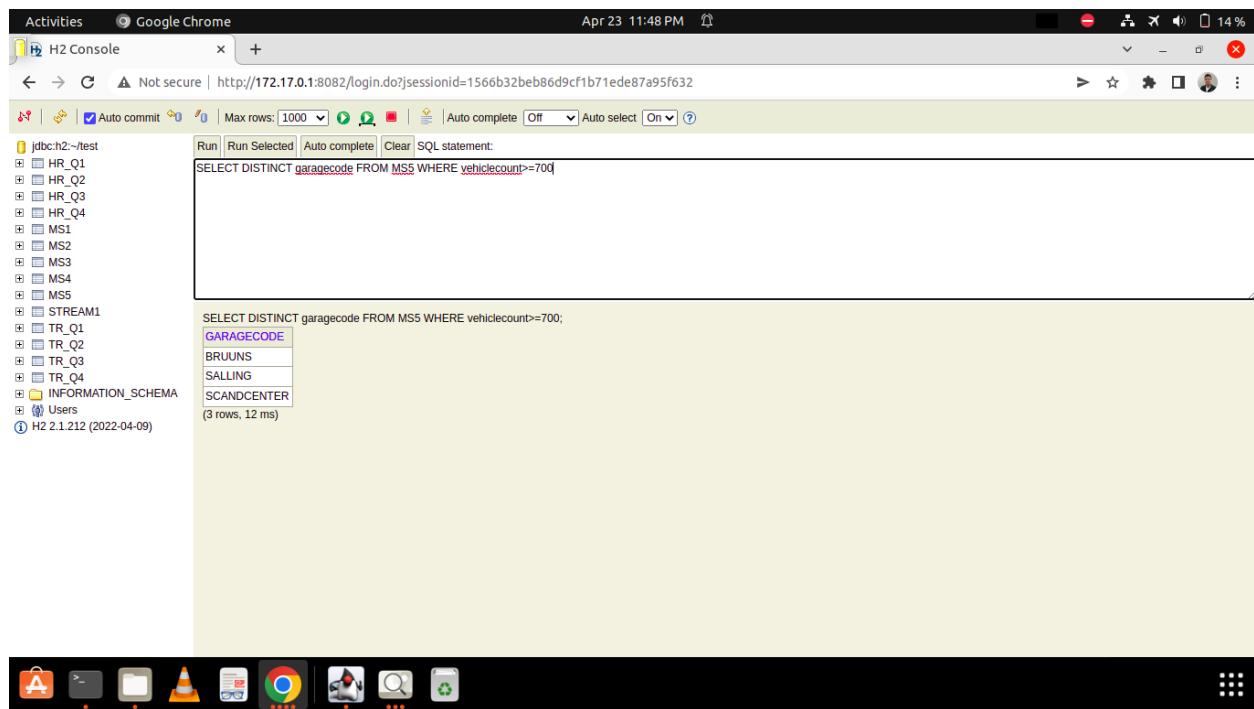
SELECT DISTINCT garagocode FROM HR_Q2 UNION SELECT DISTINCT garagocode FROM TR_Q2;
GARAGECODE
BRUUNS
BUGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SKOLEBAKKEN
(6 rows, 1 ms)
```

UPDATION OF RESULTS IN HISTORY RESULT TABLE



```
INSERT INTO HR_Q2
SELECT DISTINCT garagecode FROM HR_Q2 UNION SELECT DISTINCT garagecode FROM TR_Q2;
Update count: 6
(2 ms)
```

QUERY 3:



GARAGECODE
BRUUNS
SALLING
SCANDCENTER

(3 rows, 12 ms)

RESULT STORED IN TR_Q3:

The screenshot shows the H2 Console interface in Google Chrome. The left sidebar lists database schemas: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, MS4, MS5, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main panel displays the following SQL statement and its execution results:

```
INSERT INTO TR_Q3
SELECT DISTINCT garagecode FROM MS5 WHERE vehiclecount>=700
```

Execution results:

```
INSERT INTO TR_Q3
SELECT DISTINCT garagecode FROM MS5 WHERE vehiclecount>=700;
Update count: 3
(9 ms)
```

MERGING RESULTS OH HR_Q3 & TR_Q3 (OUTPUT):

The screenshot shows the H2 Console interface in Google Chrome. The left sidebar lists database schemas: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, MS4, MS5, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main panel displays the following SQL statement and its execution results:

```
SELECT DISTINCT garagecode FROM HR_Q3 UNION SELECT DISTINCT garagecode FROM TR_Q3;
```

Execution results:

GARAGECODE
BRUUNS
NORREPORT
SALLING
SCANDCENTER

(4 rows, 1 ms)

UPDATION OF RESULTS IN HISTORY RESULT TABLE

The screenshot shows the H2 Console interface running in Google Chrome. The URL is `http://172.17.0.1:8082/login.do?jsessionid=1566b32beb86d9cf1b71ede87a95f632`. The left sidebar lists database schemas: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, MS4, MS5, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main area shows a SQL statement being run:

```
INSERT INTO HR_Q3
SELECT DISTINCT garagecode FROM HR_Q3 UNION SELECT DISTINCT garagecode FROM TR_Q3
```

The result of the query is displayed below:

```
INSERT INTO HR_Q3
SELECT DISTINCT garagecode FROM HR_Q3 UNION SELECT DISTINCT garagecode FROM TR_Q3;
Update count: 4
(3 ms)
```

QUERY 4:

Activities Google Chrome April 23 11:57 PM

H2 Console Not secure | http://172.17.0.1:8082/login.do?jsessionid=1566b32beb86d9cf1b71ede87a95f632

Auto commit Max rows: 1000 Auto complete Off Auto select On

jdbc:h2:~/test

HR_Q1 HR_Q2 HR_Q3 HR_Q4 MS1 MS2 MS3 MS4 MS5 STREAM1 TR_Q1 TR_Q2 TR_Q3 TR_Q4 INFORMATION_SCHEMA Users H2 2.1.212 (2022-04-09)

Run Run Selected Auto complete Clear SQL statement:

```
SELECT DISTINCT garagecode FROM MS5 WHERE vehiclecount>totalspaces
```

SELECT DISTINCT garagecode FROM MS5 WHERE vehiclecount>totalspaces:

GARAGECODE
BRIJUNS
BUSGADEHUSET
KALKVAERKSVEJ
MAGASIN
SALLING
SCANDCENTER

(6 rows, 13 ms)

RESULT STORED IN TR_Q4:

The screenshot shows the H2 Console interface running in Google Chrome. The URL is `http://172.17.0.1:8082/login.do?jsessionid=1566b32beb86d9cf1b71ede87a95f632`. The left sidebar lists database schemas: HR (~test), MS1, MS2, MS3, MS4, MS5, STREAM1, TR (~Q1), and INFORMATION_SCHEMA. The main area contains a SQL editor with the following code:

```
INSERT INTO TR_Q4
SELECT DISTINCT garagocode FROM MS5 WHERE vehiclecount>totalspaces
```

Below the editor, the results of the execution are shown:

```
INSERT INTO TR_Q4
SELECT DISTINCT garagocode FROM MS5 WHERE vehiclecount>totalspaces;
Update count: 6
(12 ms)
```

MERGING RESULTS OH HR_Q4 & TR_Q4 (OUTPUT):

Activities Google Chrome Apr 23 11:57 PM

H2 Console Not secure | http://172.17.0.1:8082/login.do?jsessionid=1566b32beb86d9cf1b71ede87a95f632

Auto commit Max rows: 1000 Auto complete Off Auto select On

jdbch2:~/test

HR_Q1 HR_Q2 HR_Q3 HR_Q4 MS1 MS2 MS3 MS4 MS5 STREAM1 TR_Q1 TR_Q2 TR_Q3 TR_Q4 INFORMATION_SCHEMA Users H2 2.1.212 (2022-04-09)

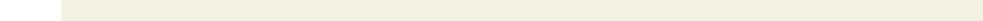
Run Run Selected Auto complete Clear SQL statement:

SELECT DISTINCT garagecode FROM HR_Q4 UNION SELECT DISTINCT garagecode FROM TR_Q4;

SELECT DISTINCT garagecode FROM HR_Q4 UNION SELECT DISTINCT garagecode FROM TR_Q4;

GARAGECODE
BRUUNS
BUSGADEHUSET
KALKVAERKSVEJ
MAGASIN
NORREPORT
SALLING
SCANDCENTER
SKOLEBAKKEN

(8 rows, 1 ms)



UPDATION OF RESULTS IN HISTORY RESULT TABLE

The screenshot shows an H2 Console window in Google Chrome. The left sidebar lists database schemas: HR_Q1, HR_Q2, HR_Q3, HR_Q4, MS1, MS2, MS3, MS4, MS5, STREAM1, TR_Q1, TR_Q2, TR_Q3, TR_Q4, INFORMATION_SCHEMA, and Users. The main panel contains a SQL statement:

```
INSERT INTO HR_Q4
SELECT DISTINCT garagecode FROM HR_Q4 UNION SELECT DISTINCT garagecode FROM TR_Q4;
```

Below the statement, the output shows:

```
Update count: 8  
(2 ms)
```

The browser's address bar shows the URL: `http://172.17.0.1:8082/login.do?sessionid=1566b32beb86d9cf1b71ede87a95f632`. The status bar at the bottom indicates the date and time: April 23 11:58 PM.

DATASET:

- Dataset - Parking Data Stream, Aarhus, Denmark

<http://iot.ee.surrey.ac.uk:8080/datasets.html>

- Table=1
- Schema =(vehicle count, update time, id , garage code,total spaces, stream time)
- Data set size = 55,000 tuples (3.6 MB)

EVALUATION PARAMETERS

- A set of 4 queries is run on the Parking dataset and the evaluation of our technique is on the basis of the following parameters.
 - Query Execution Time (QET)

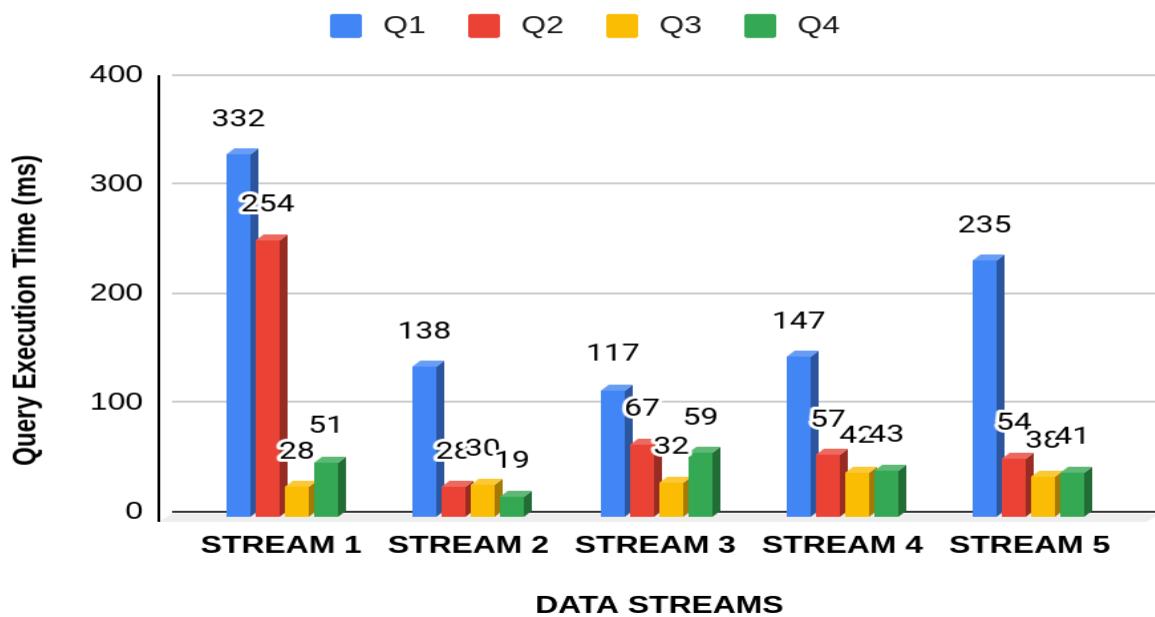
- Data Storing Time (DST)
- Query Response Time (QRT)

EXPERIMENT COMPLETION DATE: 24 April 2022

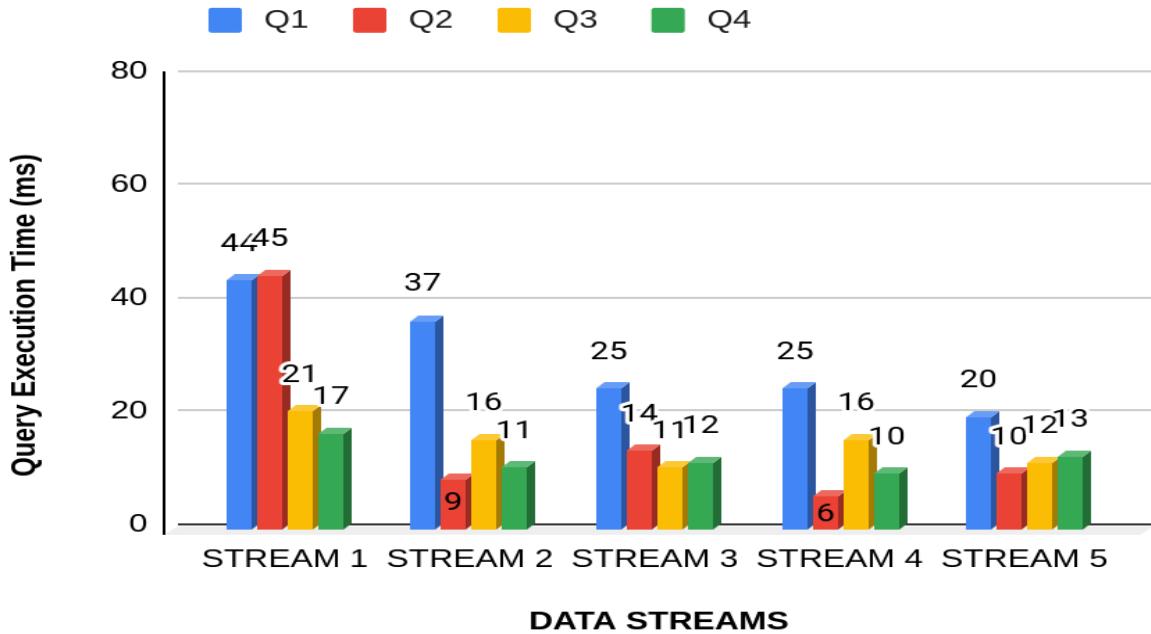
EXPERIMENT RUNS : 20 April-24 April

Graphs with Analysis

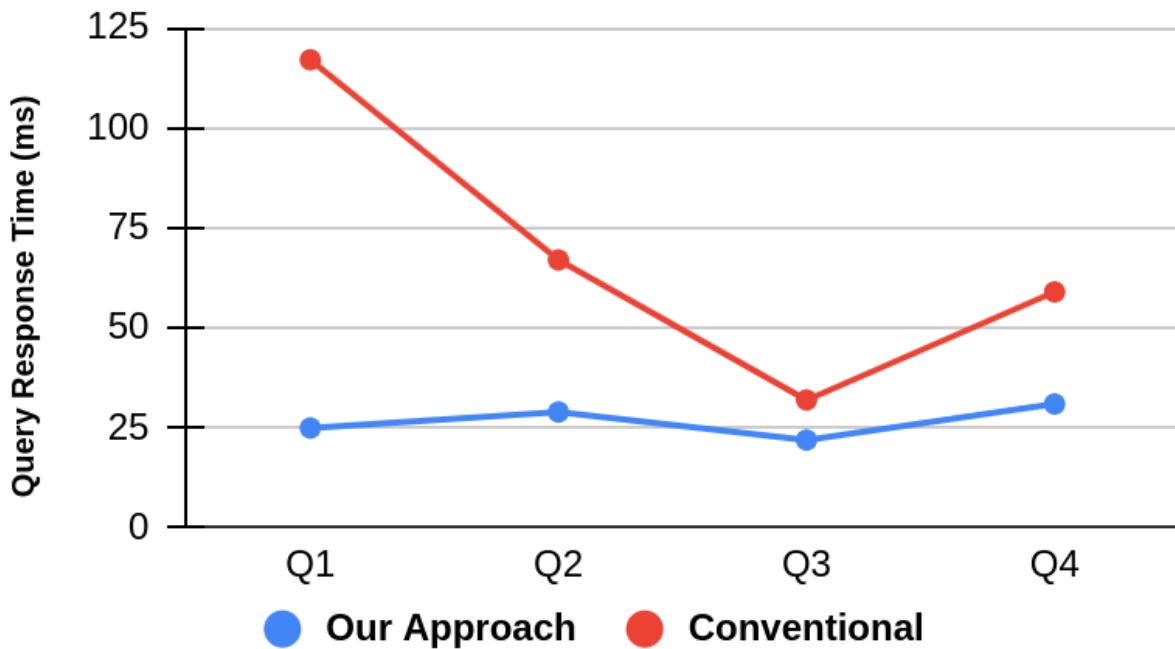
Conventional Approach



Our Implementation



Conventional vs. Our Approach (Stream 3)



From the above histograms, we can see that our implementation takes less time than the conventional method. To show it more clearly, we have used the line graph for one stream called STREAM-3 to showcase our results.

ANALYSIS

The Query Execution Time in our approach is considerably lower than that of the Conventional Method which was the actual bottleneck of the problem.

We were able to successfully reduce the overall Query Response Time thereby showing an upperhand of our method over the conventional one.

CONCLUSION

From our experiment, we can see that there is a substantial decrease in the QET of queries which can be witnessed in our technique as our method reduces the dataset on which the query is running.

Our approach gives better results of the query response time on datastreams when compared with the conventional approach.

REFERENCES

- <https://www.h2database.com/html/main.html>
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- <https://www.h2database.com/html/tutorial.html>
- <https://www.h2database.com/html/commands.html>
- https://www.researchgate.net/publication/329736601_Query_Processing_for_Streaming_RDF_Data
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