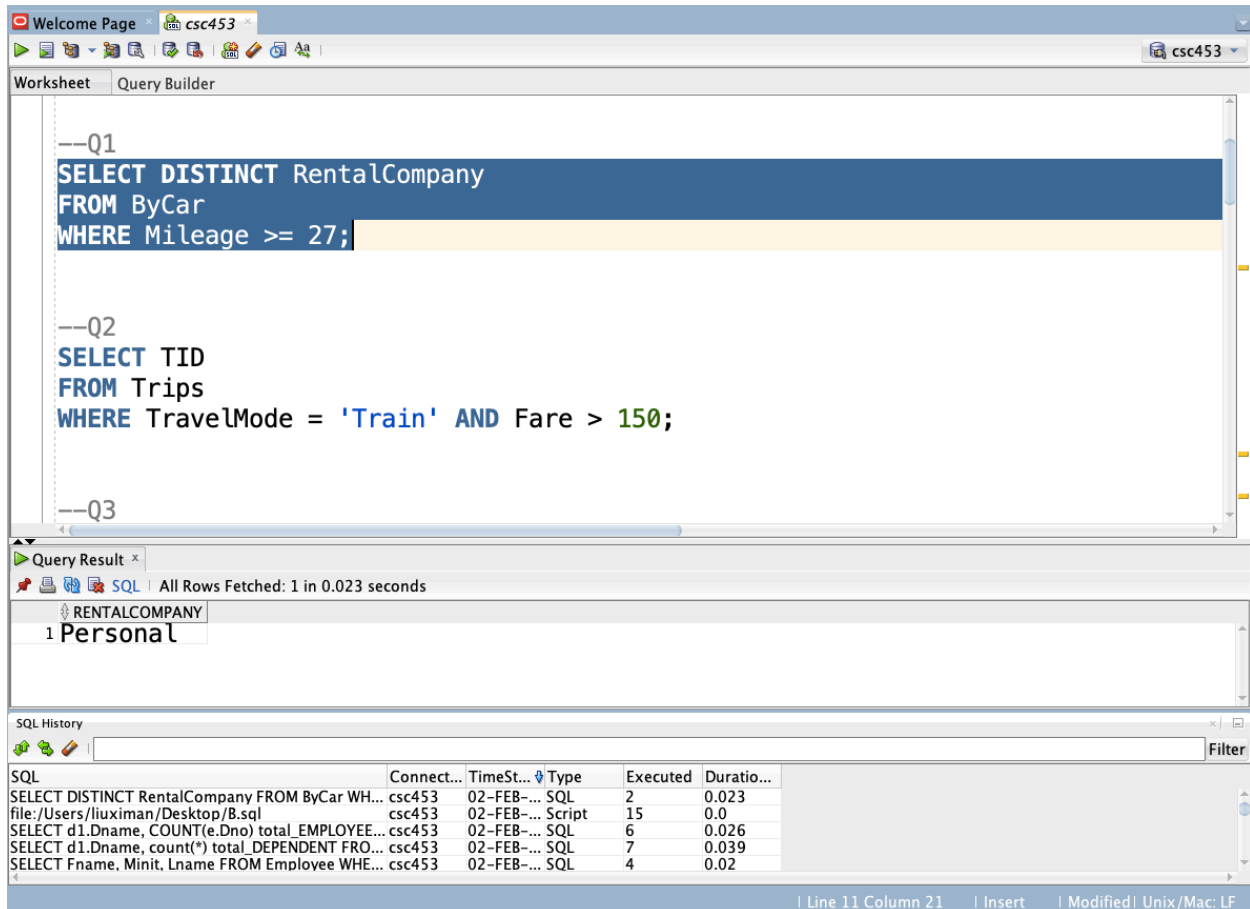


Ximan Liu
CSC 453
HW2
Part A Screenshots

1. List car rental companies which have a mileage of at least 27 miles/gallon.



The screenshot shows a SQL query editor with two queries. Query 1 is selected and highlighted in blue. The query result shows one row with the value 'Personal' under the column 'RENTALCOMPANY'.

```
--Q1
SELECT DISTINCT RentalCompany
FROM ByCar
WHERE Mileage >= 27;

--Q2
SELECT TID
FROM Trips
WHERE TravelMode = 'Train' AND Fare > 150;

--Q3
```

Query Result

All Rows Fetched: 1 in 0.023 seconds

RENTALCOMPANY
1 Personal

SQL History

SQL	Connect...	TimeSt...	Type	Executed	Duratio...
SELECT DISTINCT RentalCompany FROM ByCar WH...	csc453	02-FEB-...	SQL	2	0.023
file:/Users/liuximan/Desktop/B.sql	csc453	02-FEB-...	Script	15	0.0
SELECT d1.Dname, COUNT(e.Dno) total_EMPLOYEE...	csc453	02-FEB-...	SQL	6	0.026
SELECT d1.Dname, count(*) total_DEPENDENT FRO...	csc453	02-FEB-...	SQL	7	0.039
SELECT Fname, Minit, Lname FROM Employee WHE...	csc453	02-FEB-...	SQL	4	0.02

Line 11 Column 21 | Insert | Modified | Unix/Mac: LF

2. List trip IDs taken on train costing strictly more than \$150.

Welcome Page csc453

Worksheet Query Builder

```
--Q2
SELECT TID
FROM Trips
WHERE TravelMode = 'Train' AND Fare > 150;

--Q3
SELECT TID, Fare
FROM Trips
WHERE TripState = 'Non-US';
```

Query Result x

All Rows Fetched: 5 in 0.013 seconds

	TID
1	4
2	6
3	10
4	12
5	24

SQL History

SQL	Connect...	TimeSt...	Type	Executed	Duration...
SELECT TID FROM Trips WHERE TravelMode = 'Trai...	csc453	02-FEB-...	SQL	2	0.013
SELECT DISTINCT RentalCompany FROM ByCar WH...	csc453	02-FEB-...	SQL	2	0.023
file:/Users/liuximan/Desktop/B.sql	csc453	02-FEB-...	Script	15	0.0
SELECT d1.Dname, COUNT(e.Dno) total_EMPLOYEE...	csc453	02-FEB-...	SQL	6	0.026
SELECT d1.Dname, count(*) total DEPENDENT FRO...	csc453	02-FEB-...	SQL	7	0.039

Line 17 Column 43 | Insert | Modified | Unix/Mac: LF

3. Find trip IDs and their fare that are not taken in the US i.e., 'Non-US' trips.

Welcome Page csc453

Worksheet Query Builder

```
--Q3
SELECT TID, Fare
FROM Trips
WHERE TripState = 'Non-US';

--Q4
SELECT t.TID
FROM BvPlane n, Trips t
```

Query Result x

SQL All Rows Fetched: 8 in 0.025 seconds

	TID	FARE
1	5	2300
2	7	5000
3	10	229
4	11	4500
5	12	258
6	14	138
7	17	3700
8	22	40

SQL History

SQL	Connect...	TimeSt...	Type	Executed	Duratio...
SELECT TID, Fare FROM Trips WHERE TripState = '...	csc453	02-FEB-...	SQL	1	0.025
SELECT TID FROM Trips WHERE TravelMode = 'Trai...	csc453	02-FEB-...	SQL	2	0.013
SELECT DISTINCT RentalCompany FROM ByCar WH...	csc453	02-FEB-...	SQL	2	0.023
SELECT d1.Dname, COUNT(e.Dno) total EMPLOYEE...	csc453	02-FEB-...	SQL	6	0.026
SELECT d1.Dname, count(*) total DEPENDENT FRO...	csc453	02-FEB-...	SQL	7	0.039

Line 23 Column 28 | Insert | Modified | Unix/Mac: LF

- Find the business class plane trip IDs that are greater than \$1000.
- Find any car trip more expensive than a trip taken on a train in the same state or outside the country.

Worksheet Query Builder

```
--Q5
SELECT T1.TID, T1.TripState, T1.TravelMode, T1.Fare
FROM Trips T1
JOIN Trips T2 ON t1.Fare > t2.Fare
WHERE t1.TripState = t2.TripState AND t1.TravelMode = 'Car' AND t2.TravelMode = 'Tra
```

```
--Q6
SELECT c1.TID, c2.TID
FROM ByCar c1
INNER JOIN ByCar c2
ON c1.Mileage = c2.Mileage
AND c1.TID != c2.TID;
```

```
--Q7
```

Query Result x Query Result 1 x

SQL All Rows Fetched: 1 in 0.014 seconds

	TID	TRIPSTATE	TRAVELMODE	FARE
1	15	IL	Car	380

SQL History

SQL	Connect...	TimeSt...	Type	Executed	Duration...
SELECT T1.TID, T1.TripState, T1.TravelMode, T1.F...	csc453	02-FEB-...	SQL	1	0.014
SELECT T1.TID, T1.TripState, T1.TravelMode, T1.F...	csc453	02-FEB-...	SQL	1	0.02

Line 38 Column 1 Insert Modified! Unix/Mac: LF

6. List pairs of distinct trips that have exactly the same value of mileage.

Welcome Page csc453

Worksheet Query Builder

```
--Q6
SELECT c1.TID, c2.TID
FROM ByCar c1
INNER JOIN ByCar c2
ON c1.Mileage = c2.Mileage
AND c1.TID != c2.TID;

--Q7
SELECT tr1.TID, tr2.TID
FROM ByTrain tr1
INNER JOIN ByTrain tr2
```

Query Result x Query Result 1 x

SQL All Rows Fetched: 8 in 0.021 seconds

	TID	TID_1
1	9	1
2	25	1
3	1	9
4	25	9
5	18	15
6	15	18
7	1	25
8	9	25

SQL History

SQL	Connect...	TimeSt...	Type	Executed	Duration...
SELECT c1.TID, c2.TID FROM ByCar c1 INNER JOIN B...	csc453	02-FEB-...	SQL	2	0.021
SELECT T1.TID, T1.TripState, T1.TravelMode, T1.F...	csc453	02-FEB-...	SQL	1	0.014
SELECT T1.TID, T1.TripState, T1.TravelMode, T1.F...	csc453	02-FEB-...	SQL	1	0.02
SELECT T1.TID, T1.TripState, T1.TravelMode, T1.F...	csc453	02-FEB-...	SQL	1	0.023

Line 44 Column 22 Insert Modified Unix/Mac: LF

7. List pairs of distinct train trips that do not have the same speed.

Welcome Page csc453

Worksheet Query Builder

--Q7

```
SELECT tr1.TID, tr2.TID
FROM ByTrain tr1
INNER JOIN ByTrain tr2
ON tr1.TrainSpeed != tr2.TrainSpeed AND tr1.TID != tr2.TID;
```

--Q8

```
SELECT t1.TID, t2.TID
FROM Trips t1, Trips t2
WHERE t1.TripState = t2.TripState AND t1.TravelMode = t2.TravelMode AND t1.TID != t2.TID
```

Query Result x Query Result 1 x Query Result 2 x

SQL | Fetched 50 rows in 0.027 seconds

	TID	TID_1
1	4	6
2	4	10
3	4	12
4	4	14
5	4	22
6	4	24

SQL History

SQL	Connect...	TimeSt...	Type	Executed	Duration...
SELECT tr1.TID, tr2.TID FROM ByTrain tr1 INNER JO...	csc453	02-FEB-...	SQL	2	0.027
SELECT c1.TID, c2.TID FROM ByCar c1 INNER JOIN B...	csc453	02-FEB-...	SQL	2	0.021
SELECT T1.TID, T1.TripState, T1.TravelMode, T1.F...	csc453	02-FEB-...	SQL	1	0.014
SELECT T1.TID, T1.TripState, T1.TravelMode, T1.F...	csc453	02-FEB-...	SQL	1	0.02

| Line 51 Column 60 | Insert | Modified! Unix/Mac: LF

8. Find those pair of trips in the same state with the same mode of travel. List such pairs only once. In other words, given a pair (TID1,TID2) do NOT list (TID2,TID1).

Welcome Page csc453

Worksheet Query Builder

—Q8

```
SELECT t1.TID, t2.TID
FROM Trips t1
INNER JOIN Trips t2
ON t1.TripState = t2.TripState
AND t1.TravelMode = t2.TravelMode
AND t1.TID < t2.TID;
```

Query Result x Query Result 1 x Query Result 2 x

SQL All Rows Fetched: 26 in 0.017 seconds

	TID	TID_1
1	5	7
2	5	11
3	7	11
4	10	12
5	10	14
6	12	14
7	1	15
8	1	16
9	15	16
10	5	17

SQL History

SQL	Connect...	TimeSt...	Type	Executed	Duration...
SELECT t1.TID, t2.TID FROM Trips t1 INNER JOIN Tr...	csc453	02-FEB-...	SQL	1	0.017
SELECT t1.TID, t2.TID FROM Trips t1 INNER JOIN Tr...	csc453	02-FEB-...	SQL	1	0.021
SELECT t1.TID, t2.TID FROM Trips t1, Trips t2 WHE...	csc453	02-FEB-...	SQL	1	0.02
SELECT tr1.TID, tr2.TID FROM RvTrain tr1 INNER JO	csc453	02-FEB-...	SQL	2	0.027

Line 61 Column 21 Insert Modified Unix/Mac: LF

- Find a state in which trips have been taken by all three modes of transportation: train, plane, and car.

Welcome Page csc453

Worksheet Query Builder

```
--Q9
SELECT DISTINCT t1.TripState
FROM Trips t1, Trips t2, Trips t3
WHERE t1.TravelMode = 'Train' AND t2.TravelMode = 'Plane' AND t3.TravelMode = 'Car'
AND t1.TID != t2.TID AND t2.TID != t3.TID AND t1.TID != t3.TID;

--10
--a) the most costly trip
SELECT *
FROM Trips t1
LEFT JOIN Trips t2
ON t2.Fare > t1.Fare AND t2.Fare IS NOT NULL
```

Query Result x Query Result 1 x Query Result 2 x

SQL All Rows Fetched: 1 in 0.02 seconds

TRIPSTATE
IL

SQL History

SQL	Connect...	TimeSt...	Type	Executed	Duration...
SELECT DISTINCT t1.TripState FROM Trips t1, Trips t2, Trips t3 WHERE t1.TravelMode = 'Train' AND t2.TravelMode = 'Plane' AND t3.TravelMode = 'Car' AND t1.TID != t2.TID AND t2.TID != t3.TID AND t1.TID != t3.TID;	csc453	02-FEB-...	SQL	2	0.02
SELECT t1.TID, t2.TID FROM Trips t1 INNER JOIN Trips t2 ON t2.Fare > t1.Fare AND t2.Fare IS NOT NULL	csc453	02-FEB-...	SQL	1	0.017
SELECT t1.TID, t2.TID FROM Trips t1 INNER JOIN Trips t2 ON t2.Fare > t1.Fare AND t2.Fare IS NOT NULL	csc453	02-FEB-...	SQL	1	0.021
SELECT t1.TID, t2.TID FROM Trips t1, Trips t2 WHERE t1.TravelMode = 'Train' AND t2.TravelMode = 'Plane' AND t3.TravelMode = 'Car' AND t1.TID != t2.TID AND t2.TID != t3.TID AND t1.TID != t3.TID;	csc453	02-FEB-...	SQL	1	0.02

Line 70 Column 1 Insert Modified Unix/Mac: LF

10. Find the details of a) the most costly trip, b) the cheapest trip, regardless of the travel mode. Write two separate queries for (a) and (b). **Write both (a) and (b) as a self-join with basic SQL operators (Filter, Project, Rename, Join (cross-join, natural join), Union, Intersect, and Difference). Do not use ALL, ANY, DISTINCT, GROUP BY, HAVING, MAX, MIN, ORDER BY.**

Welcome Page csc453

Worksheet Query Builder

```
--10
--a) the most costly trip
SELECT t1.TID, t1.TripState, t1.TravelMode, t1.Fare
FROM Trips t1
LEFT JOIN Trips t2
ON t2.Fare > t1.Fare AND t2.Fare IS NOT NULL
WHERE t2.Fare IS NULL;
```

```
--b) the cheapest trip
SELECT *
FROM Trips t1
LEFT JOIN Trips t2
```

Query Result x Query Result 1 x Query Result 2 x

SQL | All Rows Fetched: 1 in 0.023 seconds

TID	TRIPSTATE	TRAVELMODE	FARE
1	7	Non-US Plane	5000

SQL History

SQL	Connect...	TimeSt...	Type	Executed	Duration...
SELECT t1.TID, t1.TripState, t1.TravelMode, t1.Fare...	csc453	02-FEB-...	SQL	2	0.023
SELECT * FROM Trips t1 LEFT JOIN Trips t2 ON t2.F...	csc453	02-FEB-...	SQL	1	0.019
SELECT DISTINCT t1.TripState FROM Trips t1, Trip...	csc453	02-FEB-...	SQL	2	0.02
SELECT t1.TID, t2.TID FROM Trips t1 INNER JOIN Tr...	csc453	02-FEB-...	SQL	1	0.017

| Line 78 Column 23 | Insert | Modified | Unix/Mac: LF

Welcome Page csc453

Worksheet Query Builder

```
--a) the most costly trip
SELECT t1.TID, t1.TripState, t1.TravelMode, t1.Fare
FROM Trips t1
LEFT JOIN Trips t2
ON t2.Fare > t1.Fare AND t2.Fare IS NOT NULL
WHERE t2.Fare IS NULL;
```

```
--b) the cheapest trip
SELECT t1.TID, t1.TripState, t1.TravelMode, t1.Fare
FROM Trips t1
LEFT JOIN Trips t2
ON t2.Fare < t1.Fare AND t2.Fare IS NOT NULL
WHERE t2.Fare IS NULL;
```

Query Result x Query Result 1 x Query Result 2 x

SQL | All Rows Fetched: 1 in 0.016 seconds

TID	TRIPSTATE	TRAVELMODE	FARE
1	8	NM Train	13

SQL History

SQL	Connect...	TimeSt...	Type	Executed	Duration...
SELECT t1.TID, t1.TripState, t1.TravelMode, t1.Fare...	csc453	02-FEB-...	SQL	1	0.016
SELECT t2.TID, t2.TripState, t2.TravelMode, t2.Fare...	csc453	02-FEB-...	SQL	1	0.016
SELECT t1.TID, t1.TripState, t1.TravelMode, t1.Fare...	csc453	02-FEB-...	SQL	2	0.023
SELECT * FROM Trips t1 LEFT JOIN Trips t2 ON t2 F...	csc453	02-FEB-...	SQL	1	0.019

| Line 86 Column 23 | Insert | Modified | Unix/Mac: LF