

## Database Design Project

### Oracle Baseball League Store Database

#### Project Scenario:

You are a small consulting company specializing in database development. You have just been awarded the contract to develop a data model for a database application system for a small retail store called Oracle Baseball League (OBL).

The Oracle Baseball League store serves the entire surrounding community selling baseball kit. The OBL has two types of customer, there are individuals who purchase items like balls, cleats, gloves, shirts, screen printed t-shirts, and shorts. Additionally customers can represent a team when they purchase uniforms and equipment on behalf of the team.

Teams and individual customers are free to purchase any item from the inventory list, but teams get a discount on the list price depending on the number of players. When a customer places an order we record the order items for that order in our database.

OBL has a team of three sales representatives that officially only call on teams but have been known to handle individual customer complaints.

## Section 6 Lesson 3 Exercise : Data Definition Language

### Use DDL to build and maintain database tables (S6L3 Objective 3)

#### Part 1: Reading information from a script

In this exercise you will use the “obl Sports.ddl” file to consolidate your knowledge of DDL.

Open the “obl Sports.ddl” in a text editor.

1. How many tables have been created using the CREATE TABLE statement?
2. How many columns are created for the price history table?
3. What statement is used to enforce the constraint that the category column of the items table must have a value?
4. What is the name of the foreign key constraint between the customers and customer addresses tables?
5. What are the lowest and highest values that can be stored in the commission\_rate column for the sales\_representatives table?
6. What are the lowest and highest values that can be stored in the price column for the price\_history table?
7. What are the 3 columns that make up the primary key for the price\_history table?

## Part 2 : Updating Constraints

Log-in to APEX and go to the SQL commands environment

### Modifying a column

1. Run the DESCRIBE command on the orders table to view its structure.
2. **Task:** Add a default constraint that will use today's date to assign a value to the odr\_date column of the orders table if no date is provided.
3. Run the DESCRIBE command again to verify the command was successful.

### Adding a check constraint

1. Run the DESCRIBE command on the customers table to view its structure.
2. **Task:** Add a check constraint that will not allow the customers current balance to go below zero.
3. Run the DESCRIBE command again to verify the command was successful.
4. A check constraint is not shown in the results of a describe command.
  - a. Go to the Object Browser
  - b. Select the customers table.
  - c. Click on the CONSTRAINTS tab.
  - d. You will see your constraint here.

### Adding a column

The client has decided that they would like a separate column for the customer's mobile phone number. This is an optional column that will be required to store 11 digits.

1. Run the DESCRIBE command on the customers table to view its structure.
2. **Task:** Add column that will satisfy the clients requirements
3. Run the DESCRIBE command on the customers table to view its structure.

### Dropping a column

The client has decided that they don't need the mobile number column as most customers only provide a single contact number and that is already catered for with the existing phone\_number column.

1. Run the DESCRIBE command on the customers table to view its structure.
2. **Task:** Drop the column that was created to store the mobile phone number.
3. Run the DESCRIBE command on the customers table to view its structure.

## Part 1

1. 10
2. 6
3. NOT NULL
4. ctr\_number
5. lowest : - 99  
highest : 99
6. lowest : - 99999.99  
highest : 99999.99
7. start\_date , start\_time , itm\_number

## Part 2

### Modifying a column :

1.

The screenshot shows the Oracle SQL Developer interface. The left pane displays the database schema with tables like AQS\_INTERNET\_AGENT\_PRIVS, AQS\_INTERNET\_AGENTS, AQS\_KEY\_SHARD\_MAP, AQS\_QUEUE\_TABLES, AQS\_QUEUES, AQS\_SCHEDULES, CUSTOMERS, and ORDERS. The ORDERS table is selected, showing its columns: CTR\_NUMBER, EMAIL, FIRST\_NAME, LAST\_NAME, PHONE\_NUMBER, and CURRENT\_BALANCE. The main pane shows the SQL Worksheet with the following SQL script:

```
ALTER TABLE ordered_items ADD CONSTRAINT ordered_item_order_fk FOREIGN KEY ( odr_id )
REFERENCES orders ( id );

ALTER TABLE sales_rep_addresses ADD CONSTRAINT sales_rep_add_sales_rep_fk FOREIGN KEY ( id )
REFERENCES sales_representatives ( id );

ALTER TABLE sales_representatives ADD CONSTRAINT sales_rep_sales_rep_fk FOREIGN KEY ( supervisor_id ) REFERENCES sales_representatives ( id );

CREATE OR REPLACE TRIGGER fntm_orders BEFORE
UPDATE OF ctr_number ON orders
BEGIN
raise_application_error(
-20225,
'Mon Transferable FK constraint on table orders is violated'
);
END;
```

The Script Output pane shows the results of the execution:

Name	Null?	Type
ID	NOT NULL	VARCHAR2(9)
ORD_DATE	NOT NULL	DATE
ORD_TIME	NOT NULL	DATE
NUMBER_OF_UNITS	NOT NULL	NUMBER(2)
CTR_NUMBER	NOT NULL	VARCHAR2(6)

2.

The screenshot shows the Oracle SQL Developer interface. The left pane displays the database schema with tables like AQS\_INTERNET\_AGENT\_PRIVS, AQS\_INTERNET\_AGENTS, AQS\_KEY\_SHARD\_MAP, AQS\_QUEUE\_TABLES, AQS\_QUEUES, AQS\_SCHEDULES, CUSTOMERS, and ORDERS. The ORDERS table is selected, showing its columns: CTR\_NUMBER, EMAIL, FIRST\_NAME, LAST\_NAME, PHONE\_NUMBER, and CURRENT\_BALANCE. The main pane shows the SQL Worksheet with the following SQL script:

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ALTER TABLE ordered_items ADD CONSTRAINT ordered_item_order_fk FOREIGN KEY ( odr_id )
REFERENCES orders ( id );

ALTER TABLE sales_rep_addresses ADD CONSTRAINT sales_rep_add_sales_rep_fk FOREIGN KEY ( id )
REFERENCES sales_representatives ( id );

ALTER TABLE sales_representatives ADD CONSTRAINT sales_rep_sales_rep_fk FOREIGN KEY ( supervisor_id ) REFERENCES sales_representatives ( id );

CREATE OR REPLACE TRIGGER fntm_orders BEFORE
UPDATE OF ctr_number ON orders
BEGIN
raise_application_error(
-20225,
'Mon Transferable FK constraint on table orders is violated'
);
END;
```

The Script Output pane shows the results of the execution:

Name	Null?	Type
ID	NOT NULL	VARCHAR2(9)
ORD_DATE	NOT NULL	DATE
ORD_TIME	NOT NULL	DATE
NUMBER_OF_UNITS	NOT NULL	NUMBER(2)
CTR_NUMBER	NOT NULL	VARCHAR2(6)

Table ORDERS altered.

3.

The screenshot shows the Oracle SQL Developer interface with a SQL script being executed. The script includes several SQL statements to modify the database schema:

```

ALTER TABLE sales_rep_addresses ADD CONSTRAINT sales_rep_add_sales_rep_fk FOREIGN KEY ( id )
REFERENCES sales_representatives ( id );

ALTER TABLE sales_representatives ADD CONSTRAINT sales_rep_sales_rep_fk FOREIGN KEY ( supervisor_id ) REFERENCES sales_representatives ( id );

CREATE OR REPLACE TRIGGER fntm_orders BEFORE
UPDATE OF ctr_number ON orders
BEGIN
    raise_application_error(
        -20225,
        'Non Transferable FK constraint on table orders is violated'
    );
END;
/

describe orders;
alter table orders
modify (odr_date DATE DEFAULT SYSDATE);
describe orders;

```

The Script Output window shows the following table structure for the **ORDERS** table:

Name	Null?	Type
ID	NOT NULL	VARCHAR2(9)
ODR_DATE	NOT NULL	DATE
ODR_TIME	NOT NULL	DATE
NUMBER_OF_UNITS	NOT NULL	NUMBER(2)
CTR_NUMBER	NOT NULL	VARCHAR2(6)

Adding a check constraint :

1.

The screenshot shows the Oracle SQL Developer interface with a SQL script being executed. The script includes several SQL statements to modify the database schema:

```

ALTER TABLE sales_rep_addresses ADD CONSTRAINT sales_rep_add_sales_rep_fk FOREIGN KEY ( id )
REFERENCES sales_representatives ( id );

ALTER TABLE sales_representatives ADD CONSTRAINT sales_rep_sales_rep_fk FOREIGN KEY ( supervisor_id ) REFERENCES sales_representatives ( id );

CREATE OR REPLACE TRIGGER fntm_orders BEFORE
UPDATE OF ctr_number ON orders
BEGIN
    raise_application_error(
        -20225,
        'Non Transferable FK constraint on table orders is violated'
    );
END;
/

describe orders;
alter table orders
modify (odr_date DATE DEFAULT SYSDATE);
describe orders;

describe customers;

```

The Script Output window shows the following table structure for the **CUSTOMERS** table:

Name	Null?	Type
CTR_NUMBER	NOT NULL	VARCHAR2(6)
EMAIL	NOT NULL	VARCHAR2(50)
FIRST_NAME	NOT NULL	VARCHAR2(20)
LAST_NAME	NOT NULL	VARCHAR2(30)
PHONE_NUMBER	NOT NULL	VARCHAR2(11)
CURRENT_BALANCE	NOT NULL	NUMBER(6,2)
SRE_ID		VARCHAR2(4)
TEM_ID		VARCHAR2(4)
LOYALTY_CARD_NUMBER		VARCHAR2(6)

2.

Oracle SQL Developer: C:\Users\Asus\AppData\Roaming\SQL Developer\DB\_1AB1.sql

File Edit View Navigate Run Source Team Tools Window Help

Connections

Tables (Filtered)

- AQS\_INTERNET\_AGENT\_PRIVS
- AQS\_INTERNET\_AGENTS
- AQS\_KEY\_SHARD\_MAP
- AQS\_QUEUE\_TABLES
- AQS\_QUEUES
- AQS\_SCHEDULES
- CUSTOMERS
  - CTR\_NUMBER
  - EMAIL
  - FIRST\_NAME
  - LAST\_NAME
  - PHONE\_NUMBER
  - CURRENT\_BALANCE
  - SRE\_ID
  - TEM\_ID
  - LOYALTY\_CARD\_NUMBER

Reports

- All Reports
- Analytic View Reports
- Data Dictionary Reports
- Data Modeler Reports
- OLAP Reports
- TimesTen Reports
- User Defined Reports

SQL Worksheet: History

Worksheet Query Builder

0.25999999 seconds

```

ALTER TABLE sales_representatives ADD CONSTRAINT sales_rep_sales_rep_fk FOREIGN KEY ( supervisor_id ) REFERENCES sales_representatives ( id );

CREATE OR REPLACE TRIGGER fntm_orders BEFORE
UPDATE OF ctr_number ON orders
BEGIN
    raise_application_error(
        -20215,
        'Non Transferable FK constraint on table orders is violated'
    );
END;

describe orders;
alter table orders
modify (odr_date DATE DEFAULT SYSDATE);
describe orders;

describe customers;
alter table customers
add constraint cus_current_balance check (current_balance >= 0);

```

Script Output

Task completed in 0.26 seconds

Column Name	Data Type	Nullable
FIRST_NAME	NOT NULL VARCHAR2(20)	NO
LAST_NAME	NOT NULL VARCHAR2(30)	NO
PHONE_NUMBER	NOT NULL VARCHAR2(11)	NO
CURRENT_BALANCE	NOT NULL NUMBER(6,2)	NO
SRE_ID	VARCHAR2(4)	NO
TEM_ID	VARCHAR2(4)	NO
LOYALTY_CARD_NUMBER	VARCHAR2(6)	NO

Table CUSTOMERS altered.

Click on an identifier with the Control key down to perform "Go to Declaration"

Line 139 Column 65 | Insert | Modified | Windows: C

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3.

Oracle SQL Developer: C:\Users\Asus\AppData\Roaming\SQL Developer\DB\_1AB1.sql

File Edit View Navigate Run Source Team Tools Window Help

Connections

Tables (Filtered)

- AQS\_INTERNET\_AGENT\_PRIVS
- AQS\_INTERNET\_AGENTS
- AQS\_KEY\_SHARD\_MAP
- AQS\_QUEUE\_TABLES
- AQS\_QUEUES
- AQS\_SCHEDULES
- CUSTOMERS
  - CTR\_NUMBER
  - EMAIL
  - FIRST\_NAME
  - LAST\_NAME
  - PHONE\_NUMBER
  - CURRENT\_BALANCE
  - SRE\_ID
  - TEM\_ID
  - LOYALTY\_CARD\_NUMBER

Reports

- All Reports
- Analytic View Reports
- Data Dictionary Reports
- Data Modeler Reports
- OLAP Reports
- TimesTen Reports
- User Defined Reports

SQL Worksheet: History

Worksheet Query Builder

Task completed in 0.03 seconds

```

ALTER TABLE sales_representatives ADD CONSTRAINT sales_rep_sales_rep_fk FOREIGN KEY ( supervisor_id ) REFERENCES sales_representatives ( id );

CREATE OR REPLACE TRIGGER fntm_orders BEFORE
UPDATE OF ctr_number ON orders
BEGIN
    raise_application_error(
        -20215,
        'Non Transferable FK constraint on table orders is violated'
    );
END;

describe orders;
alter table orders
modify (odr_date DATE DEFAULT SYSDATE);
describe orders;

describe customers;
alter table customers
add constraint cus_current_balance check (current_balance >= 0);
describe customers;

```

Script Output

Task completed in 0.03 seconds

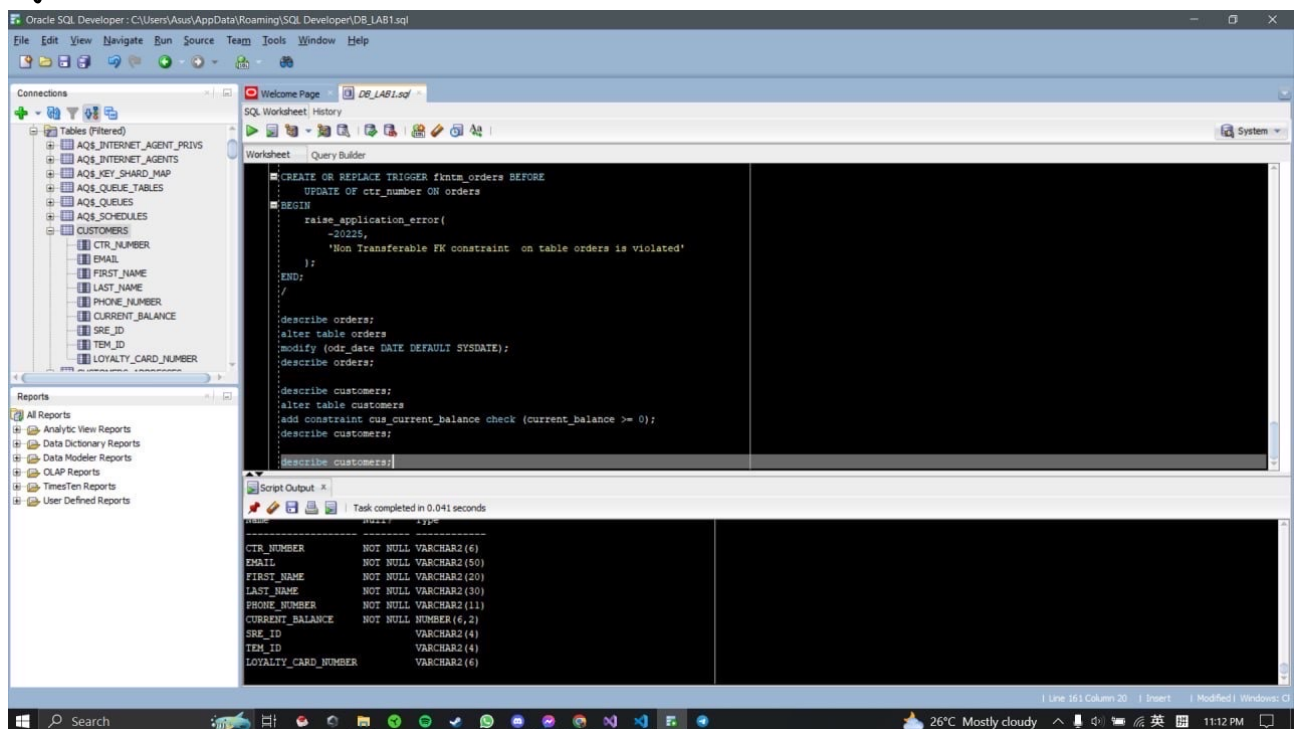
Column Name	Data Type	Nullable
CTR_NUMBER	NOT NULL VARCHAR2(6)	NO
EMAIL	NOT NULL VARCHAR2(50)	NO
FIRST_NAME	NOT NULL VARCHAR2(20)	NO
LAST_NAME	NOT NULL VARCHAR2(30)	NO
PHONE_NUMBER	NOT NULL VARCHAR2(11)	NO
CURRENT_BALANCE	NOT NULL NUMBER(6,2)	NO
SRE_ID	VARCHAR2(4)	NO
TEM_ID	VARCHAR2(4)	NO
LOYALTY_CARD_NUMBER	VARCHAR2(6)	NO

Click on an identifier with the Control key down to perform "Go to Declaration"

Line 139 Column 20 | Insert | Modified | Windows: C

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2.

Oracle SQL Developer: C:\Users\Asus\AppData\Roaming\SQL Developer\DB\_LAB1.sql

File Edit View Navigate Run Source Team Tools Window Help

Connections

Tables (Filtered)

- AQS\_INTERNET\_AGENT\_PRIVS
- AQS\_INTERNET\_AGENTS
- AQS\_KEY\_SHARD\_MAP
- AQS\_QUEUE\_TABLES
- AQS\_QUEUES
- AQS\_SCHEDULES
- CUSTOMERS
  - CTR\_NUMBER
  - EMAIL
  - FIRST\_NAME
  - LAST\_NAME
  - PHONE\_NUMBER
  - CURRENT\_BALANCE
  - SRE\_ID
  - TEM\_ID
  - LOYALTY\_CARD\_NUMBER

Reports

- All Reports
- Analytic View Reports
- Data Dictionary Reports
- Data Modeler Reports
- OLAP Reports
- TimesTen Reports
- User Defined Reports

SQL Worksheet: History

0.2860001 seconds

Worksheet Query Builder

```

raise_application_error(
  -20225,
  'Non Transferable FK constraint on table orders is violated'
);
END;
/

describe orders;
alter table orders
modify (odr_date DATE DEFAULT SYSDATE);
describe orders;

describe customers;
alter table customers
add constraint cus_current_balance check (current_balance >= 0);
describe customers;

describe customers;
alter table customers
add mobile_phone_number number(11);

```

Script Output

Task completed in 0.286 seconds

```

raise_application_error(
  -20225,
  'Non Transferable FK constraint on table orders is violated'
);
END;
/

describe orders;
alter table orders
modify (odr_date DATE DEFAULT SYSDATE);
describe orders;

describe customers;
alter table customers
add constraint cus_current_balance check (current_balance >= 0);
describe customers;

describe customers;
alter table customers
add mobile_phone_number number(11);

```

Table CUSTOMERS altered.

Line: 163 Column: 26 Insert Modified Windows: C

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3.

Oracle SQL Developer: C:\Users\Asus\AppData\Roaming\SQL Developer\DB\_LAB1.sql

File Edit View Navigate Run Source Team Tools Window Help

Connections

Tables (Filtered)

- AQS\_INTERNET\_AGENT\_PRIVS
- AQS\_INTERNET\_AGENTS
- AQS\_KEY\_SHARD\_MAP
- AQS\_QUEUE\_TABLES
- AQS\_QUEUES
- AQS\_SCHEDULES
- CUSTOMERS
  - CTR\_NUMBER
  - EMAIL
  - FIRST\_NAME
  - LAST\_NAME
  - PHONE\_NUMBER
  - CURRENT\_BALANCE
  - SRE\_ID
  - TEM\_ID
  - LOYALTY\_CARD\_NUMBER

Reports

- All Reports
- Analytic View Reports
- Data Dictionary Reports
- Data Modeler Reports
- OLAP Reports
- TimesTen Reports
- User Defined Reports

SQL Worksheet: History

0.033 seconds

Worksheet Query Builder

```

raise_application_error(
  -20225,
  'Non Transferable FK constraint on table orders is violated'
);
END;
/

describe orders;
alter table orders
modify (odr_date DATE DEFAULT SYSDATE);
describe orders;

describe customers;
alter table customers
add constraint cus_current_balance check (current_balance >= 0);
describe customers;

describe customers;
alter table customers
add mobile_phone_number number(11);
describe customers;

```

Script Output

Task completed in 0.033 seconds

```

CTR_NUMBER      NOT NULL VARCHAR2(6)
EMAIL           NOT NULL VARCHAR2(50)
FIRST_NAME      NOT NULL VARCHAR2(20)
LAST_NAME       NOT NULL VARCHAR2(30)
PHONE_NUMBER    NOT NULL VARCHAR2(11)
CURRENT_BALANCE NOT NULL NUMBER(6,2)
SRE_ID          VARCHAR2(4)
TEM_ID          VARCHAR2(4)
LOYALTY_CARD_NUMBER VARCHAR2(6)
MOBILE_PHONE_NUMBER NUMBER(11)

```

Line: 164 Column: 26 Insert Modified Windows: C

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Dropping a column :

1.

The screenshot shows the Oracle SQL Developer interface. On the left, the 'Tables (Filtered)' pane lists the 'CUSTOMERS' table with its columns: CTR\_NUMBER, EMAIL, FIRST\_NAME, LAST\_NAME, PHONE\_NUMBER, CURRENT\_BALANCE, SRE\_ID, TEM\_ID, LOYALTY\_CARD\_NUMBER, and MOBILE\_PHONE\_NUMBER. The main workspace displays a SQL script with the following content:

```
/*Mon Transferable FK constraint on table orders is violated*/
END;
/

describe orders;
alter table orders
modify (odr_date DATE DEFAULT SYSDATE);
describe orders;

describe customers;
alter table customers
add constraint cus_current_balance check (current_balance >= 0);
describe customers;

describe customers;
alter table customers
add mobile_phone_number number(11);
describe customers;

describe customers;
```

The 'Script Output' pane at the bottom shows the results of the 'describe customers;' command:

Column Name	Data Type	Nullable	Length
CTR_NUMBER	NUMBER	NOT NULL	6
EMAIL	VARCHAR2	NOT NULL	50
FIRST_NAME	VARCHAR2	NOT NULL	20
LAST_NAME	VARCHAR2	NOT NULL	30
PHONE_NUMBER	NUMBER	NOT NULL	11
CURRENT_BALANCE	NUMBER	NOT NULL	6,2
SRE_ID	VARCHAR2	NOT NULL	4
TEM_ID	VARCHAR2	NOT NULL	4
LOYALTY_CARD_NUMBER	VARCHAR2	NOT NULL	6
MOBILE_PHONE_NUMBER	NUMBER	NOT NULL	11

2.

The screenshot shows the Oracle SQL Developer interface after the 'MOBILE\_PHONE\_NUMBER' column has been dropped. The 'Tables (Filtered)' pane still lists the 'CUSTOMERS' table. The main workspace displays the same SQL script as in the first screenshot, but with the 'drop (mobile\_phone\_number);' command added at the end. The 'Script Output' pane shows the results of the 'describe customers;' command after the drop:

Column Name	Data Type	Nullable	Length
LAST_NAME	VARCHAR2	NOT NULL	30
PHONE_NUMBER	NUMBER	NOT NULL	11
CURRENT_BALANCE	NUMBER	NOT NULL	6,2
SRE_ID	VARCHAR2	NOT NULL	4
TEM_ID	VARCHAR2	NOT NULL	4
LOYALTY_CARD_NUMBER	VARCHAR2	NOT NULL	6
MOBILE_PHONE_NUMBER	NUMBER	NOT NULL	11

Below the table, the output states: 'Table CUSTOMERS altered.'

3.

Oracle SQL Developer: C:\Users\Asus\AppData\Roaming\SQL Developer\DB\_LAB1.sql

File Edit View Navigate Run Source Team Tools Window Help

Connections

Tables (Filtered)

- [-] AQ\$\_INTERNET\_AGENT\_PRIVS
- [-] AQ\$\_INTERNET\_AGENTS
- [-] AQ\$\_KEY\_SHARD\_MAP
- [-] AQ\$\_QUEUE\_TABLES
- [-] AQ\$\_QUEUES
- [-] AQ\$\_SCHEDULES
- [-] CUSTOMERS
  - CTR\_NUMBER
  - EMAIL
  - FIRST\_NAME
  - LAST\_NAME
  - PHONE\_NUMBER
  - CURRENT\_BALANCE
  - SRE\_ID
  - TEM\_ID
  - LOYALTY\_CARD\_NUMBER

Reports

- [-] All Reports
- [-] Analytic View Reports
- [-] Data Dictionary Reports
- [-] Data Modeler Reports
- [-] OLAP Reports
- [-] TimesTen Reports
- [-] User Defined Reports

SQL Worksheet: History

Worksheet Query Builder

```
--  
--  
describe orders;  
alter table orders  
modify (odr_date DATE DEFAULT SYSDATE);  
describe orders;  
  
describe customers;  
alter table customers  
add constraint cus_current_balance check (current_balance >= 0);  
describe customers;  
  
describe customers;  
alter table customers  
add mobile_phone_number number(11);  
describe customers;  
  
describe customers;  
alter table customers  
drop (MOBILE_PHONE_NUMBER);  
describe customers;
```

Script Output

Task completed in 0.029 seconds

NAME	TYPE
CTR_NUMBER	NOT NULL VARCHAR2(6)
EMAIL	NOT NULL VARCHAR2(50)
FIRST_NAME	NOT NULL VARCHAR2(20)
LAST_NAME	NOT NULL VARCHAR2(30)
PHONE_NUMBER	NOT NULL VARCHAR2(11)
CURRENT_BALANCE	NOT NULL NUMBER(6,2)
SRE_ID	VARCHAR2(4)
TEM_ID	VARCHAR2(4)
LOYALTY_CARD_NUMBER	VARCHAR2(6)

Unit: 169 Column: 20 | Insert | Modified | Windows: C

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