

## 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.

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Section : 02

Database Lab 1

## 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?

#### Answer Part 1

- |                               |   |
|-------------------------------|---|
| 1) 10                         | 6) lowest: -99999.99<br>highest: 99999.99 |
| 2) 6                          |   |
| 3) NOT NULL                   | 7) start_date, start_time,<br>itm_number  |
| 4) cfr_number                 |   |
| 5) lowest: -99<br>highest: 99 |   |

## 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 todays 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.

## Answer Part 2

### Modifying a Column

1)

The screenshot shows the Oracle SQL Developer interface. The left sidebar displays the database schema with tables like AQ\$\_INTERNET\_AGENT\_PRIVS, AQ\$\_INTERNET\_AGENTS, AQ\$\_KEY\_SHARD\_MAP, AQ\$\_QUEUE\_TABLES, AQ\$\_QUEUES, AQ\$\_SCHEDULES, and CUSTOMERS. The CUSTOMERS table is expanded to show columns: CTR\_NUMBER, EMAIL, FIRST\_NAME, LAST\_NAME, PHONE\_NUMBER, and CURRENT\_BALANCE. The central workspace contains a script named DB\_LAB1.sql:

```
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 fkntm_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;
```

The Script Output pane shows the results of the script execution:

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)

Task completed in 0.037 seconds.

2)

The screenshot shows the Oracle SQL Developer interface, similar to the first one. The CUSTOMERS table is selected. The central workspace contains the same script as in step 1, but the last line is modified:

```
ALTER TABLE orders ALTER COLUMN odr_date SET DEFAULT SYSDATE;
```

The Script Output pane shows the results of the script execution:

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)

Table ORDERS altered.

3)

```

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 fkntm_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;

Table ORDERS altered.

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

4)

```

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 fkntm_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;

Table CUSTOMERS altered.

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)
SME_ID        VARCHAR2(4)
TRM_ID        VARCHAR2(4)
LOYALTY_CARD_NUMBER VARCHAR2(6)

```

2)

```

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

CREATE OR REPLACE TRIGGER fkntm_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;
alter table customers
add constraint cus_current_balance check (current_balance >= 0);

Table CUSTOMERS altered.

```

Script Output | Task completed in 0.26 seconds

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

3)

```

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

CREATE OR REPLACE TRIGGER fkntm_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;
alter table customers
add constraint cus_current_balance check (current_balance >= 0);
describe customers;

Table CUSTOMERS altered.

```

Script Output | Task completed in 0.03 seconds

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)
ITEM_ID		VARCHAR2(4)
LOYALTY_CARD_NUMBER		VARCHAR2(6)

4)

Oracle SQL Developer : Table SYSTEM.CUSTOMERS@System

File Edit View Navigate Run Team Tools Window Help

Actions... Welcome Page DB\_LAB1.sql CUSTOMERS

Connections Tables (Filtered)

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

Columns

Refresh: 0 | COLUMN\_... | COLUMN\_...

CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_CONSTRAINT_NAME	DELETE_RULE	STATUS	DEFERRABLE	VALIDATED
1 CTR_EMAIL_UK	Unique	(null)	(null)	(null)	(null)	NO ACTION	ENABLED	NOT DEFERRABLE	VALIDATED USE
2 CTR_LCN_UK	Unique	(null)	(null)	(null)	(null)	NO ACTION	ENABLED	NOT DEFERRABLE	VALIDATED USE
3 CUSTOMER_PK	Primary_Key	(null)	(null)	(null)	(null)	NO ACTION	ENABLED	NOT DEFERRABLE	VALIDATED USE
4 CUSTOMER_SALES REP_FK	Foreign_Key	(null)	SYSTEM	SALES_REPRESENTATIVES	SALES_REPRESENTATIVE_PK	NO ACTION	ENABLED	NOT DEFERRABLE	VALIDATED USE
5 CUSTOMER_TEAM_FK	Foreign_Key	(null)	SYSTEM	TEAMS	TEAM_PK	NO ACTION	ENABLED	NOT DEFERRABLE	VALIDATED USE
6 CUS_CURRENT_BALANCE	Check	current_balance >= 0	(null)	(null)	(null)	NO ACTION	ENABLED	NOT DEFERRABLE	VALIDATED USE
7 SYS_C008254	Check	"CTR_NUMBER" IS NOT NULL	(null)	(null)	(null)	NO ACTION	ENABLED	NOT DEFERRABLE	VALIDATED GEN
8 SYS_C008255	Check	"EMAIL" IS NOT NULL	(null)	(null)	(null)	NO ACTION	ENABLED	NOT DEFERRABLE	VALIDATED GEN
9 SYS_C008256	Check	"FIRST_NAME" IS NOT NULL	(null)	(null)	(null)	NO ACTION	ENABLED	NOT DEFERRABLE	VALIDATED GEN
10 SYS_C008257	Check	"LAST_NAME" IS NOT NULL	(null)	(null)	(null)	NO ACTION	ENABLED	NOT DEFERRABLE	VALIDATED GEN
11 SYS_C008258	Check	"PHONE_NUMBER" IS NOT NULL	(null)	(null)	(null)	NO ACTION	ENABLED	NOT DEFERRABLE	VALIDATED GEN
12 SYS_C008259	Check	"CURRENT_BALANCE" IS NOT NULL	(null)	(null)	(null)	NO ACTION	ENABLED	NOT DEFERRABLE	VALIDATED GEN

System | SYSTEM | CUSTOMERS

## Adding a column

1)

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

File Edit View Navigate Run Source Team Tools Window Help

Actions... Welcome Page DB\_LAB1.sql

Connections Tables (Filtered)

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

Worksheet Query Builder

```

CREATE OR REPLACE TRIGGER fknmt_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;
alter table customers
add constraint cus_current_balance check (current_balance >= 0);
describe customers;

describe customers;

```

Script Output

Task completed in 0.041 seconds

Column	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)
ITEM_ID	VARCHAR2(4)
LOYALTY_CARD_NUMBER	VARCHAR2(6)

Line 161 Column 20 | Insert | Modified | Windows: C

2)

```

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;
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 X

```

ALTER TABLE CUSTOMERS
ADD MOBILE_PHONE_NUMBER NUMBER(11);

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)
ITEM_ID         VARCHAR2(4)
LOYALTY_CARD_NUMBER VARCHAR2(6)

Table CUSTOMERS altered.

```

3)

```

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;
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 X

```

ALTER TABLE CUSTOMERS
ADD MOBILE_PHONE_NUMBER NUMBER(11);

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

Table CUSTOMERS altered.

```

# Dropping a column

1)

The screenshot shows the Oracle SQL Developer interface. The 'Connections' pane on the left lists several schema objects under 'Tables (Filtered)'. The 'CUSTOMERS' table is selected. The 'Worksheet' pane contains the following SQL script:

```
'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;

describe customers;
```

The 'Script Output' pane at the bottom shows the results of the alter table command, listing the columns of the CUSTOMERS table:

Column Name	datatype
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)
ITEM_ID	VARCHAR2(4)
LOYALTY_CARD_NUMBER	VARCHAR2(6)
MOBILE_PHONE_NUMBER	NUMBER(11)

2)

The screenshot shows the Oracle SQL Developer interface. The 'Connections' pane on the left lists several schema objects under 'Tables (Filtered)'. The 'CUSTOMERS' table is selected. The 'Worksheet' pane contains the following SQL script:

```
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;
alter table customers
drop (MOBILE_PHONE_NUMBER);
```

The 'Script Output' pane at the bottom shows the results of the alter table command, listing the columns of the CUSTOMERS table and confirming the table was altered:

Column Name	datatype
LAST_NAME	NOT NULL VARCHAR2(30)
PHONE_NUMBER	NOT NULL VARCHAR2(11)
CURRENT_BALANCE	NOT NULL NUMBER(6,2)
SRE_ID	VARCHAR2(4)
ITEM_ID	VARCHAR2(4)
LOYALTY_CARD_NUMBER	VARCHAR2(6)
MOBILE_PHONE_NUMBER	NUMBER(11)

Table CUSTOMERS altered.

3)

