CUSTOMER LOYALTY MANAGEMENT DATABASE

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Table of Contents

1.Executive Summary

1.1 Background

Marketing strategies have evolved drastically over the years, beginning from the earliest forms of marketing which was individual advertising of products where merchants used to setup their products and engage people passing by hoping to make a sale. The medium for dissemination of information changed from town criers to newspapers, which were then replaced by radio and Television. Since then, the rapid development of Internet and Software, has entirely changed the way merchants interact with their customers and vice versa. Through the internet companies can now market their products and services to the entire world. Information Technology has significantly improved the scope and quality of advertising and information exchange.

Companies right now do not need to care about the reach and exposure of their marketing campaigns as it is already addressed by worldwide marketing capabilities through the internet. So, they have now started focusing on what is called proximity marketing. So how did proximity marketing come into the marketing mix?

Conversion rate is a measurement of how many times a marketing medium is viewed by potential customers versus how many of those views resulted in the completion of a goal. With conversion rate companies can now gauge the effectiveness of each specific marketing campaign. It has been found that there is a higher conversion rate near brick and mortar locations and with geo targeting, companies can reach local customers through online media and get them to store. In a way marketing has gone full circle from individual to local, to world and now a focus back down to individual engagement is taking place.

1.2 Problem

Loyalty programs are at the heart of many merchants' customer engagement strategies. Supported by advanced mobile technologies and services, a loyalty program can build a sense of affinity between consumers and brands and merchants, leading to greater customer retention, interaction and sales.

The reach of loyalty programs for small and medium business is very less or indeed negligible due to the technology hurdles and high operating costs. Over 80% of the big business which are using the loyalty programs are using them in the form of credit cards or special punch cards. As the world is moving towards digital and mobile-first payments, the nature and scope of loyalty programs are to be shifted from cards

to mobile app. It is very difficult to carry different cards for different loyalty program, instead a simple mobile app can do the job

As individual consumers interact with many different merchants and brands, it becomes very difficult for the consumers to organize many loyalty cards. Consumers need a straight forward and consistent approach to interacting, organizing and experiencing their loyalty programs.

1.3 Solution

A simple cloud based web and mobile application which helps small and medium business to get into the loyalty program, big business to convert the traditional cards based to mobile app and consumers for a straight forward, consistent interaction with their different loyalty programs

So, we created a database which maintains customer`s loyalty data for multiple vendors. The database will support the users with data of multiple vendors and their outlets. Similarly, the vendors will be provided with the data of their customer, their check in timings and correspondingly the day of the week, customer outstanding summary which allows them to assess their customer`s loyalty and to track the sales and loyalty of their outlets in different proximities and deploy beacons at an area where proximity marketing is required. These beacons need the user to be logged in and the vendor setting up a Bluetooth enabled mobile device at a spot within the range of the beacon and passing information in the form of text, images or video via the respective mobile app.

The following are the different types of data stored in the proposed Database

- Vendors – Details like name, type, image, check-in points, website etc.
- Outlets – Details of outlets of each vendor like address, contact etc.
- Customers – Details like name, date of birth, gender, email, phone etc.
- Transactions – Details of customer`s visits at different outlet`s
- Campaigns – Details of all vendor`s ad campaigns.

2. Logical Design

This section explains the entity relationship with the entity relationship diagram and the decomposition of the database with functional decomposition diagram.

2.1 Entity relationship Diagram: The following figure(fig.1) depicts the complete schema of vendor loyalty application.

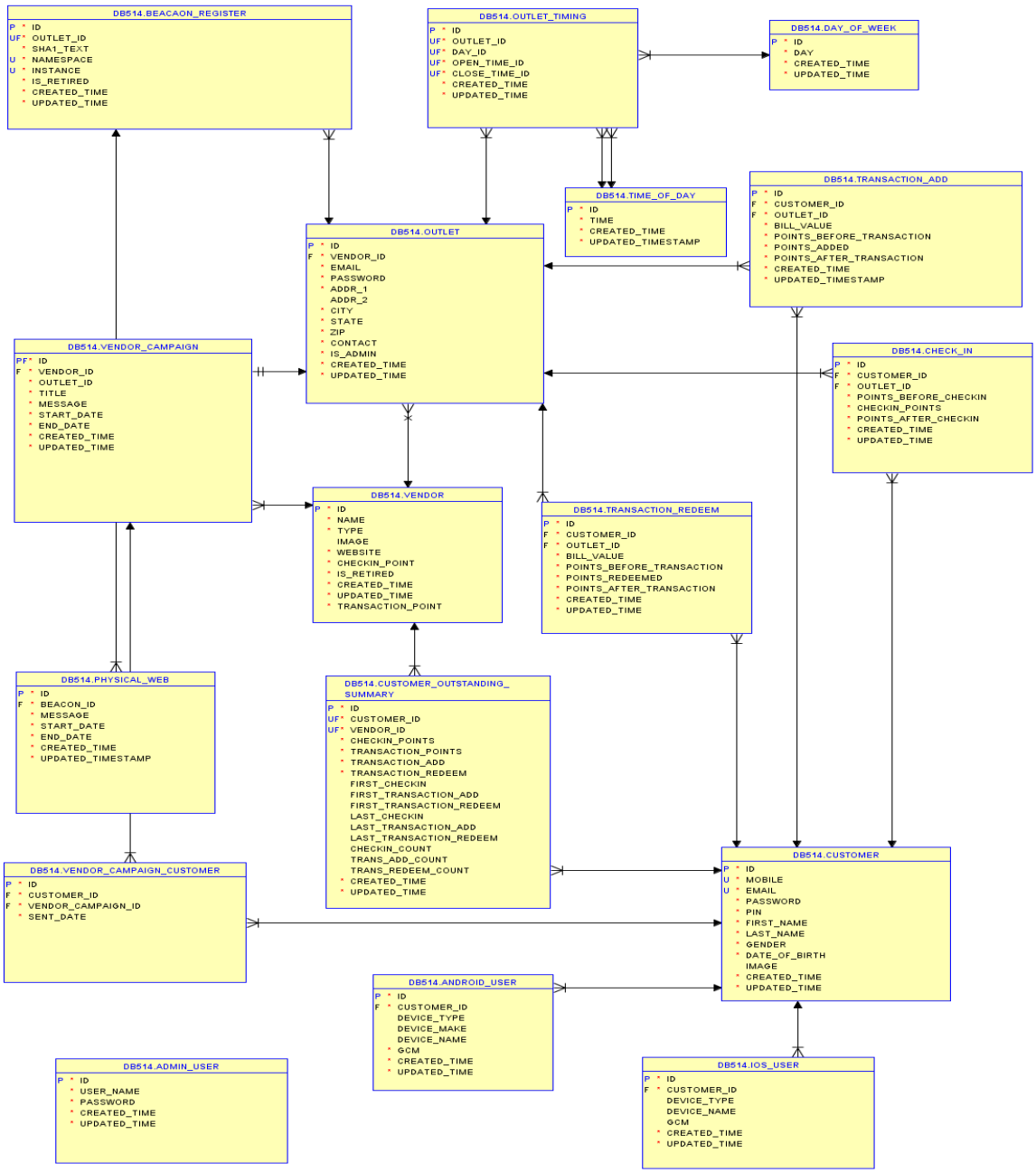


FIG:1: Complete ERD schema of vendor loyalty application.

2.2 Classification

The database is divided into 3 main sub sets that is customer(fig:2), vendor(fig:3) and outlet(fig:4). The database will support the users with data of multiple vendors, with their outlets. Similarly the vendors will be supported with the data of their customer, their check in timings correspondingly the day of the week, customer outstanding summary which allows them to assess their customer`s loyalty and to track the sales and loyalty of their outlets in different proximities and deploy beacons at an area where proximity marketing is required.

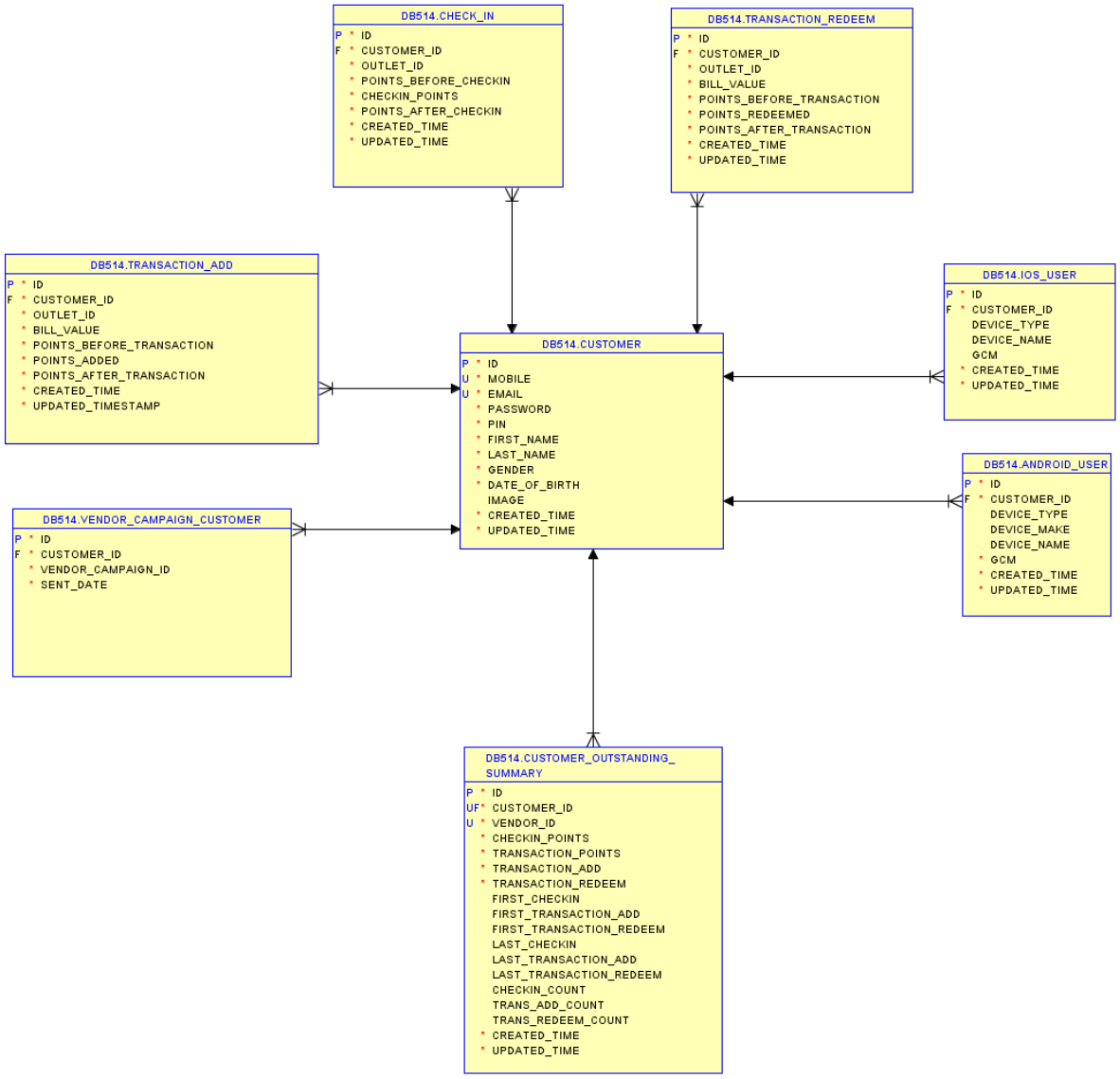


FIG: 2 vendor loyalty database customer schema.

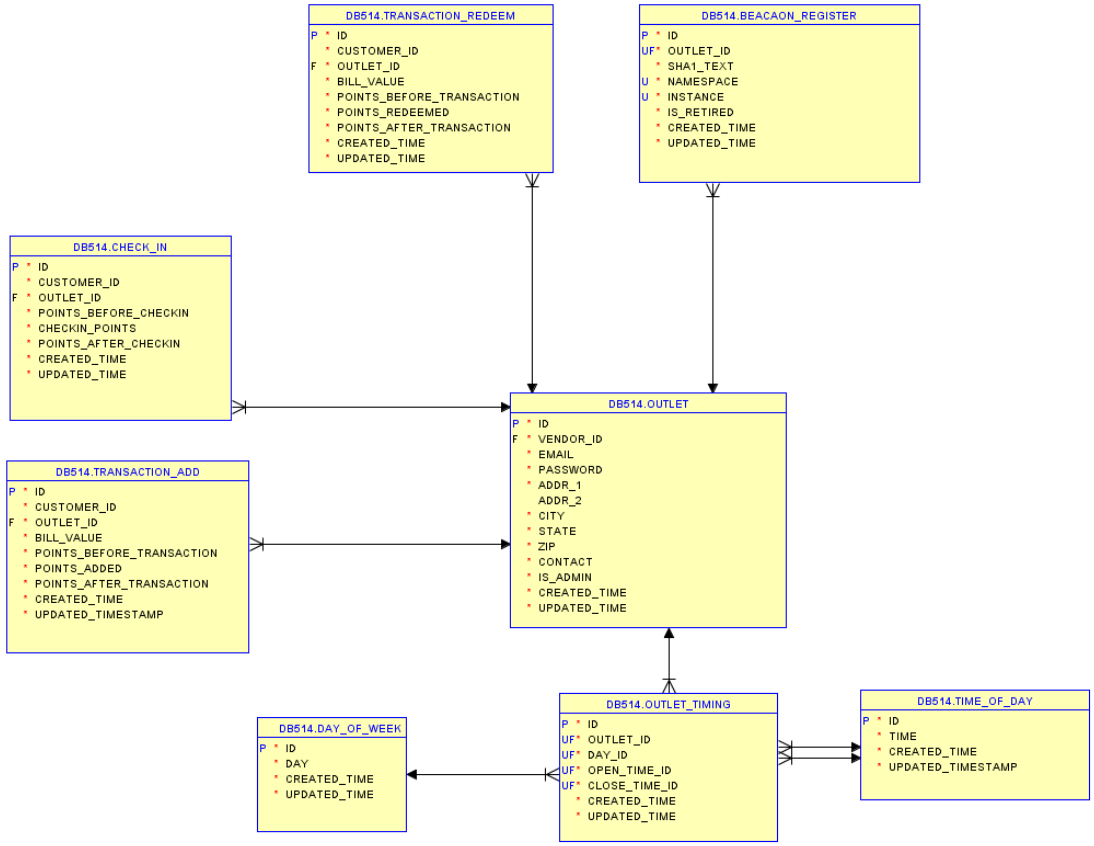


FIG:3 Vendor loyalty database outlet schema.

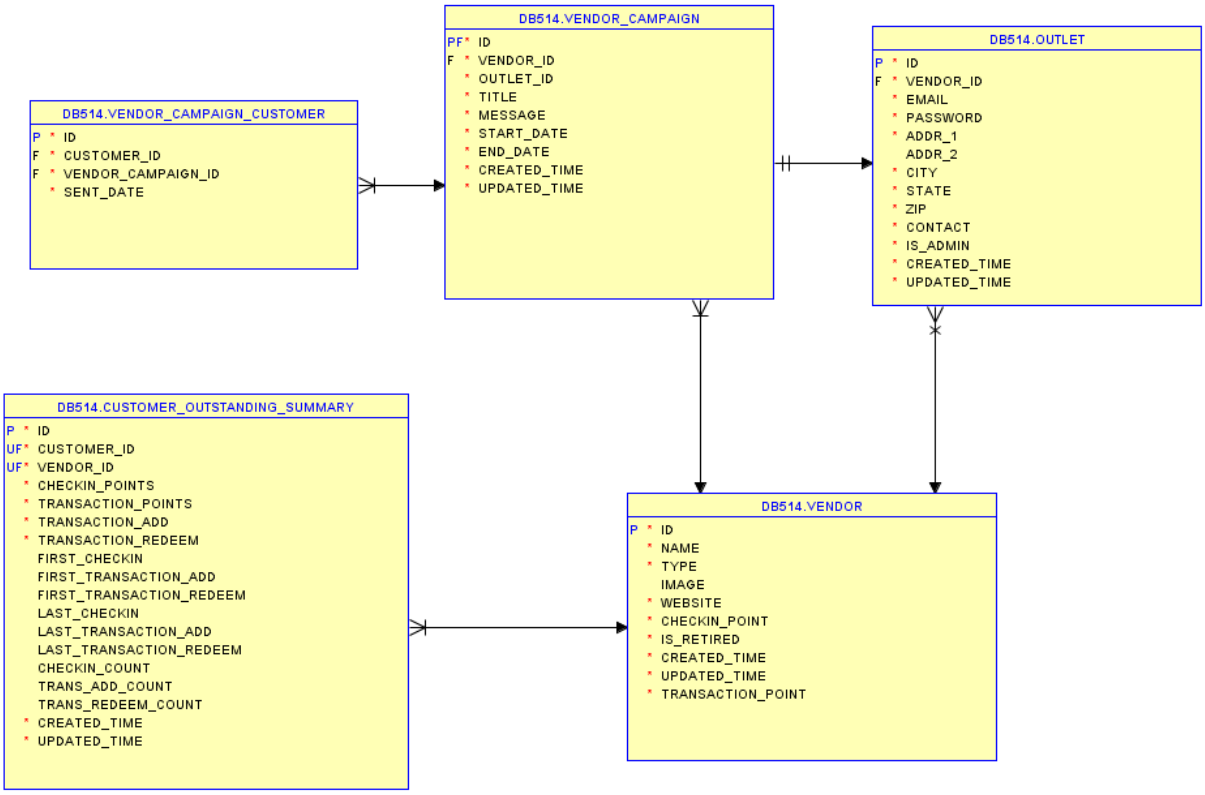


FIG:4 Vendor loyalty application vendor schema.

The following are the specifications of the server used to create and manage the database.

awt.toolkit	sun.awt.windows.WToolkit
copyright.year.end	2017
copyright.year.start	2005
eclipse.home.location	file:/C:/Users/vinay/Desktop/sql/sqldeveloper/
eclipse.parsers.setTCCL	false
excluded.modules	org.eclipse.osgi
felix.log.level	4
file.encoding	Cp1252
file.encoding.pkg	sun.io
Java(TM) Platform	1.8.0_144
Oracle IDE	17.3.0.271.2323
Versioning Support	17.3.0.271.2323

3. Physical Design

Vendor loyalty application database

TABLES:

ADMIN_USER
ANDROID_USER
BEACAON_REGISTER
CHECK_IN
CUSTOMER
CUSTOMER_OUTSTANDING_SUMMARY
DAY_OF_WEEK
EMPLOYEE
IOS_USER
OUTLET
OUTLET_TIMING
PHYSICAL_WEB
TIME_OF_DAY
TRANSACTION_ADD
TRANSACTION_REDEEM
VENDOR
VENDOR_CAMPAIGN
VENDOR_CAMPAIGN_CUSTOMER

ADMIN_USER:

COLUMNS

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ID	NUMBER(38,0)	No	null	1	null
USER_NAME	VARCHAR2(50 BYTE)	No	null	2	null
PASSWORD	VARCHAR2(50 BYTE)	No	null	3	null

STATISTICS

NAME	VALUE
NUM_ROWS	40
BLOCKS	5
AVG_ROW_LEN	48
SAMPLE_SIZE	40
LAST_ANALYZED	03-NOV-17
LAST_ANALYZED_SINCE	03-NOV-17

KEYS

INDEX_OWNER	INDEX_NAME	TABLE_OWNER	TABLE_NAME	COLUMN_NAME	COLUMN_POSITION	DESCEND
DB514	ADMINUSER_PK	DB514	ADMIN_USER	ID	1	ASC
DB514	CUSTOMERID_FK	DB514	ADMIN_USER	ID	1	ASC

SQL

```
CREATE TABLE "DB514"."ADMIN_USER"
  (        "ID" NUMBER(*,0) NOT NULL ENABLE,
           "USER_NAME" VARCHAR2(50 BYTE) NOT NULL ENABLE,
           "PASSWORD" VARCHAR2(50 BYTE) NOT NULL ENABLE,
           "CREATED_TIME" DATE DEFAULT CURRENT_TIMESTAMP NOT NULL ENABLE,
           "UPDATED_TIME" DATE DEFAULT CURRENT_TIMESTAMP NOT NULL ENABLE,
            CONSTRAINT "ADMINUSER_PK" PRIMARY KEY ("ID")
  USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
  STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
  PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1
```

```
BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "STUDENTS"  ENABLE
 ) SEGMENT CREATION IMMEDIATE
PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255
NOCOMPRESS LOGGING
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1
BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "STUDENTS"   NO INMEMORY ;
```

ANDROID_USER

COLUMNS

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ID	NUMBER(38,0)	No	null	1	null
CUSTOMER_ID	NUMBER(38,0)	No	null	2	null
DEVICE_TYPE	VARCHAR2(50 BYTE)	Yes	null	3	null
DEVICE_MAKE	VARCHAR2(50 BYTE)	Yes	null	4	null
DEVICE_NAME	VARCHAR2(50 BYTE)	Yes	null	5	null
GCM	VARCHAR2(50 BYTE)	No	null	6	null

KEYS

CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_CONSTRAINT_NAME
ANDROID_USER_FK1	Foreign Key	null	DB514	CUSTOMER	CUSTOMER_PK
TABLE1_PK	Primary Key	null	null	null	null

STATISTICS

NAME	VALUE
NUM_ROWS	500
BLOCKS	5
AVG_ROW_LEN	62
SAMPLE_SIZE	500

SQL

```
CREATE TABLE "DB514"."ANDROID_USER"
 (	"ID" NUMBER(*,0) NOT NULL ENABLE,
	"CUSTOMER_ID" NUMBER(*,0) NOT NULL ENABLE,
	"DEVICE_TYPE" VARCHAR2(50 BYTE),
	"DEVICE_MAKE" VARCHAR2(50 BYTE),
	"DEVICE_NAME" VARCHAR2(50 BYTE),
	"GCM" VARCHAR2(50 BYTE) NOT NULL ENABLE,
	"CREATED_TIME" DATE DEFAULT CURRENT_TIMESTAMP NOT NULL ENABLE,
	"UPDATED_TIME" DATE DEFAULT CURRENT_TIMESTAMP NOT NULL ENABLE,
	 CONSTRAINT "TABLE1_PK" PRIMARY KEY ("ID")
 USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
 STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
 PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1
 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
 TABLESPACE "STUDENTS"  ENABLE,
	CONSTRAINT "ANDROID_USER_FK1" FOREIGN KEY ("CUSTOMER_ID")
	 REFERENCES "DB514"."CUSTOMER" ("ID") ENABLE
 ) SEGMENT CREATION IMMEDIATE
 PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255
NOCOMPRESS LOGGING
 STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
 PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1
 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
 TABLESPACE "STUDENTS"   NO INMEMORY ;
```

BEACON_REGISTER

COLUMNS

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ID	NUMBER(38,0)	No	null	1	null
OUTLET_ID	NUMBER(38,0)	No	null	2	null
SHA1_TEXT	VARCHAR2(50 BYTE)	No	null	3	null
NAMESPACE	VARCHAR2(50 BYTE)	No	null	4	null
INSTANCE	VARCHAR2(20 BYTE)	No	null	5	null
IS_RETIRED	CHAR(1 BYTE)	No	'N'	6	null

STATISTICS

NAME	VALUE
NUM_ROWS	500
BLOCKS	13
AVG_ROW_LEN	98
SAMPLE_SIZE	500

CONSTRAINTS

CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_CONSTRAINT_NAME	DELETE_RULE
BEACAON_REGISTER_FK1	Foreign_Key	null	DB514	OUTLET	OUTLET_PK	NO ACTION
BEACAON_REGISTER_PK	Primary_Key	null	null	null	null	null
BEACAON_REGISTER_UK1	Unique	null	null	null	null	null

SQL

```
CREATE TABLE BEACAON_REGISTER
(
  ID NUMBER(*, 0) NOT NULL
, OUTLET_ID NUMBER(*, 0) NOT NULL
, SHA1_TEXT VARCHAR2(50 BYTE) NOT NULL
, NAMESPACE VARCHAR2(50 BYTE) NOT NULL
, INSTANCE VARCHAR2(20 BYTE) NOT NULL
, IS_RETIRED CHAR(1 BYTE) DEFAULT 'N' NOT NULL
, CREATED_TIME DATE DEFAULT current_timestamp NOT NULL
, UPDATED_TIME DATE DEFAULT current_timestamp NOT NULL
```

```
, CONSTRAINT BEACAON_REGISTER_PK PRIMARY KEY
  (
    ID
  )
  USING INDEX
  (
      CREATE UNIQUE INDEX BEACAON_REGISTER_PK ON BEACAON_REGISTER (ID ASC)
      LOGGING
      TABLESPACE STUDENTS
      PCTFREE 10
      INITRANS 2
      STORAGE
      (
        INITIAL 65536
        NEXT 1048576
        MINEXTENTS 1
        MAXEXTENTS UNLIMITED
        BUFFER_POOL DEFAULT
      )
      NOPARALLEL
  )
  ENABLE
)
LOGGING
TABLESPACE STUDENTS
PCTFREE 10
INITRANS 1
STORAGE
(
```

```
  INITIAL 65536
  NEXT 1048576
  MINEXTENTS 1
  MAXEXTENTS UNLIMITED
  BUFFER_POOL DEFAULT
)
NOCOMPRESS
NO INMEMORY
NOPARALLEL;


ALTER TABLE BEACAON_REGISTER
ADD CONSTRAINT BEACAON_REGISTER_UK1 UNIQUE
(
  OUTLET_ID
, NAMESPACE
, INSTANCE
)
USING INDEX
(
   CREATE UNIQUE INDEX BEACAON_REGISTER_UK1 ON BEACAON_REGISTER (OUTLET_ID ASC,
NAMESPACE ASC, INSTANCE ASC)
   LOGGING
   TABLESPACE STUDENTS
   PCTFREE 10
   INITRANS 2
   STORAGE
   (
     INITIAL 65536
     NEXT 1048576
```

```
    MINEXTENTS 1
    MAXEXTENTS UNLIMITED
    BUFFER_POOL DEFAULT
   )
   NOPARALLEL
)
 ENABLE;


ALTER TABLE BEACAON_REGISTER
ADD CONSTRAINT BEACAON_REGISTER_FK1 FOREIGN KEY
(
  OUTLET_ID
)
REFERENCES OUTLET
(
  ID
)
ENABLE;
```

CHECK_IN

COLUMNS

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ID	NUMBER(38,0)	No	null	1	null
CUSTOMER_ID	NUMBER(38,0)	No	null	2	null
OUTLET_ID	NUMBER(38,0)	No	null	3	null
POINTS_BEFORE_CHECKIN	NUMBER(10,2)	No	null	4	null
CHECKIN_POINTS	NUMBER(10,2)	No	null	5	null
POINTS_AFTER_CHECKIN	NUMBER(10,2)	No	null	6	null

STATISTICS

NAME	VALUE
NUM_ROWS	0
BLOCKS	0
AVG_ROW_LEN	0
SAMPLE_SIZE	0

CONSTRAINTS

CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_CONSTRAINT_NAME	DELETE_RULE
CHECK_IN_FK1	Foreign_Key	null	DB514	CUSTOMER	CUSTOMER_PK	NO ACTION
CHECK_IN_FK2	Foreign_Key	null	DB514	OUTLET	OUTLET_PK	NO ACTION
CHECK_IN_PK	Primary_Key	null	null	null	null	null

SQL

```
CREATE TABLE CHECK_IN
(
 ID NUMBER(*, 0) NOT NULL
, CUSTOMER_ID NUMBER(*, 0) NOT NULL
, OUTLET_ID NUMBER(*, 0) NOT NULL
, POINTS_BEFORE_CHECKIN NUMBER(10, 2) NOT NULL
, CHECKIN_POINTS NUMBER(10, 2) NOT NULL
, POINTS_AFTER_CHECKIN NUMBER(10, 2) NOT NULL
, CREATED_TIME DATE DEFAULT current_timestamp NOT NULL
, UPDATED_TIME DATE DEFAULT current_timestamp NOT NULL
, CONSTRAINT CHECK_IN_PK PRIMARY KEY
 (
  ID
 )
 USING INDEX
 (
    CREATE UNIQUE INDEX CHECK_IN_PK ON CHECK_IN (ID ASC)
    LOGGING
```

```
    TABLESPACE STUDENTS
    PCTFREE 10
    INITRANS 2
    STORAGE
    (
      BUFFER_POOL DEFAULT
    )
    NOPARALLEL
  )
  ENABLE
)
LOGGING
TABLESPACE STUDENTS
PCTFREE 10
INITRANS 1
STORAGE
(
  BUFFER_POOL DEFAULT
)
NOCOMPRESS
NO INMEMORY
NOPARALLEL;


ALTER TABLE CHECK_IN
ADD CONSTRAINT CHECK_IN_FK1 FOREIGN KEY
(
  CUSTOMER_ID
)
REFERENCES CUSTOMER
```

```
(
  ID
)
ENABLE;


ALTER TABLE CHECK_IN
ADD CONSTRAINT CHECK_IN_FK2 FOREIGN KEY
(
  OUTLET_ID
)
REFERENCES OUTLET
(
  ID
)
ENABLE;
```

CUSTOMER

COLUMNS

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ID	NUMBER(38,0)	No	null	1	null
MOBILE	VARCHAR2(20 BYTE)	No	null	2	null
EMAIL	VARCHAR2(500 BYTE)	No	null	3	null
PASSWORD	VARCHAR2(20 BYTE)	No	null	4	null
PIN	NUMBER(6,0)	No	null	5	null
FIRST_NAME	VARCHAR2(20 BYTE)	No	null	6	null
LAST_NAME	VARCHAR2(20 BYTE)	No	null	7	null
GENDER	CHAR(1 BYTE)	No	null	8	null
DATE_OF_BIRTH	DATE	No	null	9	null
IMAGE	VARCHAR2(100 BYTE)	Yes	null	10	null

STATISITCS

NAME	VALUE
NUM_ROWS	10000
BLOCKS	244
AVG_ROW_LEN	92
SAMPLE_SIZE	10000

CONSTRAINTS

CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_CONSTRAINT_NAME	DELETE_RULE
CUSTOMER_EMAIL_UK	Unique	null	null	null	null	null
CUSTOMER_MOBILE_UK	Unique	null	null	null	null	null
CUSTOMER_PK	Primary_Key	null	null	null	null	null

SQL

```
CREATE TABLE CUSTOMER
(
  ID NUMBER(*, 0) NOT NULL
, MOBILE VARCHAR2(20 BYTE) NOT NULL
, EMAIL VARCHAR2(500 BYTE) NOT NULL
, PASSWORD VARCHAR2(20 BYTE) NOT NULL
, PIN NUMBER(6, 0) NOT NULL
, FIRST_NAME VARCHAR2(20 BYTE) NOT NULL
, LAST_NAME VARCHAR2(20 BYTE) NOT NULL
, GENDER CHAR(1 BYTE) NOT NULL
, DATE_OF_BIRTH DATE NOT NULL
, IMAGE VARCHAR2(100 BYTE)
, CREATED_TIME DATE DEFAULT current_timestamp NOT NULL
, UPDATED_TIME DATE DEFAULT current_timestamp NOT NULL
, CONSTRAINT CUSTOMER_PK PRIMARY KEY
  (
    ID
  )
```

```
 USING INDEX
 (
   CREATE UNIQUE INDEX CUSTOMER_PK ON CUSTOMER (ID ASC)
   LOGGING
   TABLESPACE STUDENTS
   PCTFREE 10
   INITRANS 2
   STORAGE
   (
    INITIAL 65536
    NEXT 1048576
    MINEXTENTS 1
    MAXEXTENTS UNLIMITED
    BUFFER_POOL DEFAULT
   )
   NOPARALLEL
 )
 ENABLE
)
LOGGING
TABLESPACE STUDENTS
PCTFREE 10
INITRANS 1
STORAGE
(
 INITIAL 65536
 NEXT 1048576
 MINEXTENTS 1
 MAXEXTENTS UNLIMITED
```

```
  BUFFER_POOL DEFAULT
)
NOCOMPRESS
NO INMEMORY
NOPARALLEL;

ALTER TABLE CUSTOMER
ADD CONSTRAINT CUSTOMER_EMAIL_UK UNIQUE
(
  EMAIL
)
USING INDEX
(
   CREATE UNIQUE INDEX CUSTOMER_EMAIL_UK ON CUSTOMER (EMAIL ASC)
   LOGGING
   TABLESPACE STUDENTS
   PCTFREE 10
   INITRANS 2
   STORAGE
   (
     INITIAL 65536
     NEXT 1048576
     MINEXTENTS 1
     MAXEXTENTS UNLIMITED
     BUFFER_POOL DEFAULT
   )
   NOPARALLEL
)
 ENABLE;
```

```
ALTER TABLE CUSTOMER
ADD CONSTRAINT CUSTOMER_MOBILE_UK UNIQUE
(
  MOBILE
)
USING INDEX
(
   CREATE UNIQUE INDEX CUSTOMER_MOBILE_UK ON CUSTOMER (MOBILE ASC)
   LOGGING
   TABLESPACE STUDENTS
   PCTFREE 10
   INITRANS 2
   STORAGE
   (
     INITIAL 65536
     NEXT 1048576
     MINEXTENTS 1
     MAXEXTENTS UNLIMITED
     BUFFER_POOL DEFAULT
   )
   NOPARALLEL
)
 ENABLE;
```

CUSTOMER_OUTSTANDING_SUMMARY

COLUMNS

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ID	NUMBER(38,0)	No	null	1	null
CUSTOMER_ID	NUMBER(38,0)	No	null	2	null
VENDOR_ID	NUMBER(38,0)	No	null	3	null
CHECKIN_POINTS	NUMBER(10,2)	No	null	4	null
TRANSACTION_POINTS	NUMBER(10,2)	No	null	5	null
TRANSACTION_ADD	NUMBER(10,2)	No	null	6	null
TRANSACTION_REDEEM	NUMBER(10,2)	No	null	7	null
FIRST_CHECKIN	DATE	Yes	null	8	null
FIRST_TRANSACTION_ADD	DATE	Yes	null	9	null
FIRST_TRANSACTION_REDEEM	DATE	Yes	null	10	null
LAST_CHECKIN	DATE	Yes	null	11	null
LAST_TRANSACTION_ADD	DATE	Yes	null	12	null
LAST_TRANSACTION_REDEEM	DATE	Yes	null	13	null
CHECKIN_COUNT	NUMBER(38,0)	Yes	null	14	null
TRANS_ADD_COUNT	NUMBER(38,0)	Yes	null	15	null
TRANS_REDEEM_COUNT	NUMBER(38,0)	Yes	null	16	null

STATISTICS

NAME	VALUE
NUM_ROWS	0
BLOCKS	0
AVG_ROW_LEN	0
SAMPLE_SIZE	0

CONSTRAINTS

CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_CONSTRAINT_NAME	DELETE_RULE
CUSTOMER_OUTSTANDING_SUMM_FK1	Foreign_Key	null	DB514	CUSTOMER	CUSTOMER_PK	NO ACTION
CUSTOMER_OUTSTANDING_SUMM_FK2	Foreign_Key	null	DB514	VENDOR	VENDOR_PK	NO ACTION
CUSTOMER_OUTSTANDING_SUMM_UK1	Unique	null	null	null	null	null
CUSTOMER_SUMMARY_PK	Primary_Key	null	null	null	null	null

SQL

```
CREATE TABLE "DB514"."CUSTOMER_OUTSTANDING_SUMMARY"
(       "ID" NUMBER(*,0) NOT NULL ENABLE,
        "CUSTOMER_ID" NUMBER(*,0) NOT NULL ENABLE,
        "VENDOR_ID" NUMBER(*,0) NOT NULL ENABLE,
        "CHECKIN_POINTS" NUMBER(10,2) NOT NULL ENABLE,
        "TRANSACTION_POINTS" NUMBER(10,2) NOT NULL ENABLE,
        "TRANSACTION_ADD" NUMBER(10,2) NOT NULL ENABLE,
        "TRANSACTION_REDEEM" NUMBER(10,2) NOT NULL ENABLE,
        "FIRST_CHECKIN" DATE,
        "FIRST_TRANSACTION_ADD" DATE,
        "FIRST_TRANSACTION_REDEEM" DATE,
        "LAST_CHECKIN" DATE,
        "LAST_TRANSACTION_ADD" DATE,
        "LAST_TRANSACTION_REDEEM" DATE,
        "CHECKIN_COUNT" NUMBER(*,0),
        "TRANS_ADD_COUNT" NUMBER(*,0),
        "TRANS_REDEEM_COUNT" NUMBER(*,0),
        "CREATED_TIME" DATE DEFAULT current_timestamp NOT NULL ENABLE,
        "UPDATED_TIME" DATE DEFAULT current_timestamp NOT NULL ENABLE,
         CONSTRAINT "CUSTOMER_SUMMARY_PK" PRIMARY KEY ("ID")
USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
STORAGE(
BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "STUDENTS"  ENABLE,
        CONSTRAINT "CUSTOMER_OUTSTANDING_SUMM_UK1" UNIQUE ("CUSTOMER_ID",
"VENDOR_ID")
USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
STORAGE(
```

```
BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "STUDENTS"  ENABLE,
        CONSTRAINT "CUSTOMER_OUTSTANDING_SUMM_FK1" FOREIGN KEY ("CUSTOMER_ID")
         REFERENCES "DB514"."CUSTOMER" ("ID") ENABLE,
        CONSTRAINT "CUSTOMER_OUTSTANDING_SUMM_FK2" FOREIGN KEY ("VENDOR_ID")
         REFERENCES "DB514"."VENDOR" ("ID") ENABLE
 ) SEGMENT CREATION DEFERRED
PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255
NOCOMPRESS LOGGING
STORAGE(
BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "STUDENTS"   NO INMEMORY ;
```

DAY_OF_WEEK

COLUMNS

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ID	NUMBER(38,0)	No	null	1	null
DAY	VARCHAR2(20 BYTE)	No	null	2	null

STATISTICS

NAME	VALUE
NUM_ROWS	0
BLOCKS	0
AVG_ROW_LEN	0
SAMPLE_SIZE	0

CONSTRAINTS

CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_CONSTRAINT_NAME	DELETE_RULE
DAY_OF_WEEK_PK	Primary_Key	null	null	null	null	null

SQL

```
CREATE TABLE "DB514"."DAY_OF_WEEK"
  (		"ID" NUMBER(*,0) NOT NULL ENABLE,
		"DAY" VARCHAR2(20 BYTE) NOT NULL ENABLE,
		"CREATED_TIME" DATE DEFAULT current_timestamp NOT NULL ENABLE,
		"UPDATED_TIME" DATE DEFAULT current_timestamp NOT NULL ENABLE,
		 CONSTRAINT "DAY_OF_WEEK_PK" PRIMARY KEY ("ID")
  USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
  STORAGE(
  BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
  TABLESPACE "STUDENTS"  ENABLE
   ) SEGMENT CREATION DEFERRED
  PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255
 NOCOMPRESS LOGGING
  STORAGE(
  BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
  TABLESPACE "STUDENTS"   NO INMEMORY ;


  CREATE OR REPLACE EDITIONABLE TRIGGER "DB514"."DAY_OF_WEEK_TRG"
BEFORE INSERT ON DAY_OF_WEEK
FOR EACH ROW
BEGIN
  <<COLUMN_SEQUENCES>>
  BEGIN
    IF INSERTING AND :NEW.ID IS NULL THEN
      SELECT .NEXTVAL INTO :NEW.ID FROM SYS.DUAL;
    END IF;
  END COLUMN_SEQUENCES;
END;
```

```
/
ALTER TRIGGER "DB514"."DAY_OF_WEEK_TRG" ENABLE;


 CREATE OR REPLACE EDITIONABLE TRIGGER "DB514"."DAY_OF_WEEK_TRG1"
BEFORE INSERT ON DAY_OF_WEEK
FOR EACH ROW
BEGIN
 <<COLUMN_SEQUENCES>>
 BEGIN
  IF INSERTING AND :NEW.ID IS NULL THEN
    SELECT DAY_OF_WEEK_SEQ.NEXTVAL INTO :NEW.ID FROM SYS.DUAL;
  END IF;
 END COLUMN_SEQUENCES;
END;
/
ALTER TRIGGER "DB514"."DAY_OF_WEEK_TRG1" ENABLE;
```

EMPLOYEE

COLUMNS

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ID	VARCHAR2(20 BYTE)	No	null	1	null
FIRST_NAME	VARCHAR2(50 BYTE)	No	null	2	null
LAST_NAME	VARCHAR2(50 BYTE)	No	null	3	null
EMAIL	VARCHAR2(50 BYTE)	No	null	4	null
GENDER	CHAR(1 BYTE)	No	null	5	null
DATE_OF_BIRTH	DATE	No	null	6	null

STATISTICS

NAME	VALUE
NUM_ROWS	0
BLOCKS	0
AVG_ROW_LEN	0
SAMPLE_SIZE	0

CONSTRAINTS

CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_CONSTRAINT_NAME	DELETE_RULE
EMPLOYEE_PK	Primary_Key	null	null	null	null	null
SYS_C0065486	Check	"ID" IS NOT NULL	null	null	null	null
SYS_C0065487	Check	"FIRST_NAME" IS NOT NULL	null	null	null	null
SYS_C0065488	Check	"LAST_NAME" IS NOT NULL	null	null	null	null
SYS_C0065489	Check	"EMAIL" IS NOT NULL	null	null	null	null
SYS_C0065490	Check	"GENDER" IS NOT NULL	null	null	null	null
SYS_C0065492	Check	"CREATED_TIME" IS NOT NULL	null	null	null	null
SYS_C0065493	Check	"UPDATED_TIME" IS NOT NULL	null	null	null	null
SYS_C0065494	Check	"DATE_OF_BIRTH" IS NOT NULL	null	null	null	null

SQL

```
CREATE TABLE "DB514"."EMPLOYEE"
  (        "ID" VARCHAR2(20 BYTE) NOT NULL ENABLE,
           "FIRST_NAME" VARCHAR2(50 BYTE) NOT NULL ENABLE,
           "LAST_NAME" VARCHAR2(50 BYTE) NOT NULL ENABLE,
           "EMAIL" VARCHAR2(50 BYTE) NOT NULL ENABLE,
           "GENDER" CHAR(1 BYTE) NOT NULL ENABLE,
           "DATE_OF_BIRTH" DATE NOT NULL ENABLE,
           "CREATED_TIME" DATE DEFAULT CURRENT_TIMESTAMP NOT NULL ENABLE,
           "UPDATED_TIME" DATE DEFAULT CURRENT_TIMESTAMP NOT NULL ENABLE,
            CONSTRAINT "EMPLOYEE_PK" PRIMARY KEY ("ID")
  USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
  TABLESPACE "STUDENTS"  ENABLE
   ) SEGMENT CREATION DEFERRED
  PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255
 NOCOMPRESS LOGGING
```

```
 TABLESPACE "STUDENTS" ;


 CREATE OR REPLACE EDITIONABLE TRIGGER "DB514"."EMPLOYEE_TRG"
BEFORE INSERT ON EMPLOYEE
FOR EACH ROW
BEGIN
 <<COLUMN_SEQUENCES>>
 BEGIN
  NULL;
 END COLUMN_SEQUENCES;
END;
/
ALTER TRIGGER "DB514"."EMPLOYEE_TRG" ENABLE;
```

IOS_USER

COLUMNS

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ID	NUMBER(38,0)	No	null	1	null
CUSTOMER_ID	NUMBER(38,0)	No	null	2	null
DEVICE_TYPE	VARCHAR2(50 BYTE)	Yes	null	3	null
DEVICE_NAME	VARCHAR2(50 BYTE)	Yes	null	4	null
GCM	VARCHAR2(50 BYTE)	Yes	null	5	null

STATISTICS

NAME	VALUE
NUM_ROWS	500
BLOCKS	5
AVG_ROW_LEN	57
SAMPLE_SIZE	500

CONSTRAINTS

CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_CONSTRAINT_NAME	DELETE_RULE
IOS_USER_FK1	Foreign_Key	null	DB514	CUSTOMER	CUSTOMER_PK	NO ACTION
IOS_USER_PK	Primary_Key	null	null	null	null	null
SYS_C0065222	Check	"ID" IS NOT NULL	null	null	null	null
SYS_C0065223	Check	"CUSTOMER_ID" IS NOT NULL	null	null	null	null
SYS_C0065224	Check	"CREATED_TIME" IS NOT NULL	null	null	null	null
SYS_C0065225	Check	"UPDATED_TIME" IS NOT NULL	null	null	null	null

SQL

```
CREATE TABLE "DB514"."IOS_USER"
 (	"ID" NUMBER(*,0) NOT NULL ENABLE,
	"CUSTOMER_ID" NUMBER(*,0) NOT NULL ENABLE,
	"DEVICE_TYPE" VARCHAR2(50 BYTE),
	"DEVICE_NAME" VARCHAR2(50 BYTE),
	"GCM" VARCHAR2(50 BYTE),
	"CREATED_TIME" DATE DEFAULT CURRENT_TIMESTAMP NOT NULL ENABLE,
	"UPDATED_TIME" DATE DEFAULT CURRENT_TIMESTAMP NOT NULL ENABLE,
	 CONSTRAINT "IOS_USER_PK" PRIMARY KEY ("ID")
 USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
 STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
 PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1
 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
 TABLESPACE "STUDENTS"  ENABLE,
	 CONSTRAINT "IOS_USER_FK1" FOREIGN KEY ("CUSTOMER_ID")
	  REFERENCES "DB514"."CUSTOMER" ("ID") ENABLE
 ) SEGMENT CREATION IMMEDIATE
 PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255
NOCOMPRESS LOGGING
 STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
 PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1
 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
```

```
TABLESPACE "STUDENTS"   NO INMEMORY ;
```

OUTLET

COLUMNS

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ID	NUMBER(38,0)	No	null	1	null
VENDOR_ID	NUMBER(38,0)	No	null	2	null
EMAIL	VARCHAR2(50 BYTE)	No	null	3	null
PASSWORD	VARCHAR2(20 BYTE)	No	null	4	null
ADDR_1	VARCHAR2(500 BYTE)	No	null	5	null
ADDR_2	VARCHAR2(500 BYTE)	Yes	null	6	null
CITY	VARCHAR2(50 BYTE)	No	null	7	null
STATE	VARCHAR2(50 BYTE)	No	null	8	null
ZIP	VARCHAR2(20 BYTE)	No	null	9	null
CONTACT	VARCHAR2(20 BYTE)	No	null	10	null
IS_ADMIN	CHAR(1 BYTE)	No	'Y'	11	null
CREATED_TIME	DATE	No	CURRENT_TIMESTAMP	12	null
UPDATED_TIME	DATE	No	CURRENT_TIMESTAMP	13	null

STATISTICS

NAME	VALUE
NUM_ROWS	10000
BLOCKS	244
AVG_ROW_LEN	105
SAMPLE_SIZE	10000

CONSTRAINTS

CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_CONSTRAINT_NAME	DELETE_RULE
OUTLET_FK	Foreign_Key	null	DB514	VENDOR	VENDOR_PK	CASCADE
OUTLET_PK	Primary_Key	null	null	null	null	null
SYS_C0065107	Check	"ID" IS NOT NULL	null	null	null	null
SYS_C0065108	Check	"VENDOR_ID" IS NOT NULL	null	null	null	null
SYS_C0065109	Check	"EMAIL" IS NOT NULL	null	null	null	null
SYS_C0065110	Check	"PASSWORD" IS NOT NULL	null	null	null	null
SYS_C0065111	Check	"ADDR_1" IS NOT NULL	null	null	null	null
SYS_C0065112	Check	"CITY" IS NOT NULL	null	null	null	null
SYS_C0065113	Check	"STATE" IS NOT NULL	null	null	null	null
SYS_C0065114	Check	"ZIP" IS NOT NULL	null	null	null	null
SYS_C0065115	Check	"CONTACT" IS NOT NULL	null	null	null	null
SYS_C0065116	Check	"IS_ADMIN" IS NOT NULL	null	null	null	null
SYS_C0065117	Check	"CREATED_TIME" IS NOT NULL	null	null	null	null
SYS_C0065118	Check	"UPDATED_TIME" IS NOT NULL	null	null	null	null

SQL

```
CREATE TABLE "DB514"."OUTLET"
 (	"ID" NUMBER(*,0) NOT NULL ENABLE,
	"VENDOR_ID" NUMBER(*,0) NOT NULL ENABLE,
	"EMAIL" VARCHAR2(50 BYTE) NOT NULL ENABLE,
	"PASSWORD" VARCHAR2(20 BYTE) NOT NULL ENABLE,
	"ADDR_1" VARCHAR2(500 BYTE) NOT NULL ENABLE,
	"ADDR_2" VARCHAR2(500 BYTE),
	"CITY" VARCHAR2(50 BYTE) NOT NULL ENABLE,
	"STATE" VARCHAR2(50 BYTE) NOT NULL ENABLE,
	"ZIP" VARCHAR2(20 BYTE) NOT NULL ENABLE,
	"CONTACT" VARCHAR2(20 BYTE) NOT NULL ENABLE,
	"IS_ADMIN" CHAR(1 BYTE) DEFAULT 'Y' NOT NULL ENABLE,
	"CREATED_TIME" DATE DEFAULT CURRENT_TIMESTAMP NOT NULL ENABLE,
	"UPDATED_TIME" DATE DEFAULT CURRENT_TIMESTAMP NOT NULL ENABLE,
	 CONSTRAINT "OUTLET_PK" PRIMARY KEY ("ID")
 USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
 STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
 PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1
```

```
BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "STUDENTS"  ENABLE,
        CONSTRAINT "OUTLET_FK" FOREIGN KEY ("VENDOR_ID")
         REFERENCES "DB514"."VENDOR" ("ID") ON DELETE CASCADE ENABLE
 ) SEGMENT CREATION IMMEDIATE
PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255
NOCOMPRESS LOGGING
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1
BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "STUDENTS"   NO INMEMORY ;
```

OUTLET TIMING

COLUMNS

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ID	NUMBER(38,0)	No	null	1	null
OUTLET_ID	NUMBER(38,0)	No	null	2	null
DAY_ID	NUMBER(38,0)	No	null	3	null
OPEN_TIME_ID	NUMBER(38,0)	No	null	4	null
CLOSE_TIME_ID	NUMBER(38,0)	No	null	5	null
CREATED_TIME	DATE	No	current_timestamp	6	null
UPDATED_TIME	DATE	No	current_timestamp	7	null

CONSTRAINTS

CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_CONSTRAINT_NAME	DELETE_RULE
OUTLET_TIMING_FK1	Foreign_Key	null	DB514	OUTLET	OUTLET_PK	NO ACTION
OUTLET_TIMING_FK2	Foreign_Key	null	DB514	DAY_OF_WEEK	DAY_OF_WEEK_PK	NO ACTION
OUTLET_TIMING_FK3	Foreign_Key	null	DB514	TIME_OF_DAY	TIME_OF_DAY_PK	NO ACTION
OUTLET_TIMING_FK4	Foreign_Key	null	DB514	TIME_OF_DAY	TIME_OF_DAY_PK	NO ACTION
OUTLET_TIMING_PK	Primary_Key	null	null	null	null	null
OUTLET_TIMING_UK1	Unique	null	null	null	null	null
SYS_C0065131	Check	"ID" IS NOT NULL	null	null	null	null
SYS_C0065132	Check	"OUTLET_ID" IS NOT NULL	null	null	null	null
SYS_C0065133	Check	"DAY_ID" IS NOT NULL	null	null	null	null
SYS_C0065134	Check	"OPEN_TIME_ID" IS NOT NULL	null	null	null	null
SYS_C0065135	Check	"CLOSE_TIME_ID" IS NOT NULL	null	null	null	null
SYS_C0065136	Check	"CREATED_TIME" IS NOT NULL	null	null	null	null
SYS_C0065137	Check	"UPDATED_TIME" IS NOT NULL	null	null	null	null

SQL

```
CREATE TABLE "DB514"."OUTLET_TIMING"
 (	"ID" NUMBER(*,0) NOT NULL ENABLE,
	"OUTLET_ID" NUMBER(*,0) NOT NULL ENABLE,
	"DAY_ID" NUMBER(*,0) NOT NULL ENABLE,
	"OPEN_TIME_ID" NUMBER(*,0) NOT NULL ENABLE,
	"CLOSE_TIME_ID" NUMBER(*,0) NOT NULL ENABLE,
	"CREATED_TIME" DATE DEFAULT current_timestamp NOT NULL ENABLE,
	"UPDATED_TIME" DATE DEFAULT current_timestamp NOT NULL ENABLE,
	 CONSTRAINT "OUTLET_TIMING_PK" PRIMARY KEY ("ID")
 USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
 STORAGE(
 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
 TABLESPACE "STUDENTS"  ENABLE,
	 CONSTRAINT "OUTLET_TIMING_UK1" UNIQUE ("OUTLET_ID", "DAY_ID", "OPEN_TIME_ID",
"CLOSE_TIME_ID")
 USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
 STORAGE(
 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
 TABLESPACE "STUDENTS"  ENABLE,
	 CONSTRAINT "OUTLET_TIMING_FK1" FOREIGN KEY ("OUTLET_ID")
```

```
 REFERENCES "DB514"."OUTLET" ("ID") ENABLE,
CONSTRAINT "OUTLET_TIMING_FK2" FOREIGN KEY ("DAY_ID")
 REFERENCES "DB514"."DAY_OF_WEEK" ("ID") ENABLE,
CONSTRAINT "OUTLET_TIMING_FK3" FOREIGN KEY ("OPEN_TIME_ID")
 REFERENCES "DB514"."TIME_OF_DAY" ("ID") ENABLE,
CONSTRAINT "OUTLET_TIMING_FK4" FOREIGN KEY ("CLOSE_TIME_ID")
 REFERENCES "DB514"."TIME_OF_DAY" ("ID") ENABLE
) SEGMENT CREATION DEFERRED
PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255
NOCOMPRESS LOGGING
STORAGE(
BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "STUDENTS"   NO INMEMORY ;
```

PHIYSICAL_WEB

COLUMNS

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ID	NUMBER(38,0)	No	null	1	null
BEACON_ID	NUMBER(38,0)	No	null	2	null
MESSAGE	VARCHAR2(500 BYTE)	No	null	3	null
START_DATE	DATE	No	null	4	null
END_DATE	DATE	No	null	5	null
CREATED_TIME	DATE	No	CURRENT_TIMESTAMP	6	null
UPDATED_TIMESTAMP	DATE	No	CURRENT_TIMESTAMP	7	null

CONSTRAINTS

CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_CONSTRAINT_NAME	DELETE_RULE
PHYSICAL_WEB_FK1	Foreign_Key	null	DB514	BEACAON_REGISTER	BEACAON_REGISTER_PK	NO ACTION
PHYSICAL_WEB_PK	Primary_Key	null	null	null	null	null
SYS_C0065247	Check	"ID" IS NOT NULL	null	null	null	null
SYS_C0065248	Check	"BEACON_ID" IS NOT NULL	null	null	null	null
SYS_C0065249	Check	"MESSAGE" IS NOT NULL	null	null	null	null
SYS_C0065250	Check	"START_DATE" IS NOT NULL	null	null	null	null
SYS_C0065251	Check	"END_DATE" IS NOT NULL	null	null	null	null
SYS_C0065252	Check	"CREATED_TIME" IS NOT NULL	null	null	null	null
SYS_C0065253	Check	"UPDATED_TIMESTAMP" IS NOT NULL	null	null	null	null

SQL

```
CREATE TABLE "DB514"."PHYSICAL_WEB"
 (	"ID" NUMBER(*,0) NOT NULL ENABLE,
	"BEACON_ID" NUMBER(*,0) NOT NULL ENABLE,
	"MESSAGE" VARCHAR2(500 BYTE) NOT NULL ENABLE,
	"START_DATE" DATE NOT NULL ENABLE,
	"END_DATE" DATE NOT NULL ENABLE,
	"CREATED_TIME" DATE DEFAULT CURRENT_TIMESTAMP NOT NULL ENABLE,
	"UPDATED_TIMESTAMP" DATE DEFAULT CURRENT_TIMESTAMP NOT NULL ENABLE,
	 CONSTRAINT "PHYSICAL_WEB_PK" PRIMARY KEY ("ID")
 USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
 STORAGE(
 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
 TABLESPACE "STUDENTS"  ENABLE,
	 CONSTRAINT "PHYSICAL_WEB_FK1" FOREIGN KEY ("BEACON_ID")
	  REFERENCES "DB514"."BEACAON_REGISTER" ("ID") ENABLE
 ) SEGMENT CREATION DEFERRED
 PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255
NOCOMPRESS LOGGING
 STORAGE(
 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
```

```
TABLESPACE "STUDENTS"   NO INMEMORY ;
```

TIME_OF_DAY

COLUMNS

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ID	NUMBER(38,0)	No	null	1	null
TIME	VARCHAR2(20 BYTE)	No	null	2	null
CREATED_TIME	DATE	No	current_timestamp	3	null
UPDATED_TIMESTAMP	DATE	No	current_timestamp	4	null

CONSTRAINTS

CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_CONSTRAINT_NAME	DELETE_RULE
SYS_C0065121	Check	"ID" IS NOT NULL	null	null	null	null
SYS_C0065122	Check	"TIME" IS NOT NULL	null	null	null	null
SYS_C0065123	Check	"CREATED_TIME" IS NOT NULL	null	null	null	null
SYS_C0065124	Check	"UPDATED_TIMESTAMP" IS NOT NULL	null	null	null	null
TIME_OF_DAY_PK	Primary_Key	null	null	null	null	null

SQL

```
CREATE TABLE "DB514"."TIME_OF_DAY"
  (        "ID" NUMBER(*,0) NOT NULL ENABLE,
           "TIME" VARCHAR2(20 BYTE) NOT NULL ENABLE,
           "CREATED_TIME" DATE DEFAULT current_timestamp NOT NULL ENABLE,
           "UPDATED_TIMESTAMP" DATE DEFAULT current_timestamp NOT NULL ENABLE,
            CONSTRAINT "TIME_OF_DAY_PK" PRIMARY KEY ("ID")
  USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
  STORAGE(
  BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
  TABLESPACE "STUDENTS"  ENABLE
   ) SEGMENT CREATION DEFERRED
  PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255
 NOCOMPRESS LOGGING
```

```
STORAGE(
BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "STUDENTS"   NO INMEMORY ;
```

TRANSACTION_ADD

COLUMNS

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ID	NUMBER(38,0)	No	null	1	null
CUSTOMER_ID	NUMBER(38,0)	No	null	2	null
OUTLET_ID	NUMBER(38,0)	No	null	3	null
BILL_VALUE	NUMBER(10,2)	No	null	4	null
POINTS_BEFORE_TRANSACTION	NUMBER(10,2)	No	null	5	null
POINTS_ADDED	NUMBER(10,2)	No	null	6	null
POINTS_AFTER_TRANSACTION	NUMBER(10,2)	No	null	7	null
CREATED_TIME	DATE	No	current_timestamp	8	null
UPDATED_TIMESTAMP	DATE	No	current_timestamp	9	null

CONSTRAINTS

CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_CONSTRAINT_NAME	DELETE_RULE
SYS_C0065178	Check	"ID" IS NOT NULL	null	null	null	null
SYS_C0065179	Check	"CUSTOMER_ID" IS NOT NULL	null	null	null	null
SYS_C0065180	Check	"OUTLET_ID" IS NOT NULL	null	null	null	null
SYS_C0065181	Check	"BILL_VALUE" IS NOT NULL	null	null	null	null
SYS_C0065182	Check	"POINTS_BEFORE_TRANSACTION" IS NOT NULL	null	null	null	null
SYS_C0065183	Check	"POINTS_ADDED" IS NOT NULL	null	null	null	null
SYS_C0065184	Check	"POINTS_AFTER_TRANSACTION" IS NOT NULL	null	null	null	null
SYS_C0065185	Check	"CREATED_TIME" IS NOT NULL	null	null	null	null
SYS_C0065186	Check	"UPDATED_TIMESTAMP" IS NOT NULL	null	null	null	null
TRANSACTION_ADD_FK1	Foreign_Key	null	DB514	CUSTOMER	CUSTOMER_PK	NO ACTION
TRANSACTION_ADD_FK2	Foreign_Key	null	DB514	OUTLET	OUTLET_PK	NO ACTION
TRANSACTION_ADD_PK	Primary_Key	null	null	null	null	null

SQL

```
CREATE TABLE "DB514"."TRANSACTION_ADD"
  (        "ID" NUMBER(*,0) NOT NULL ENABLE,
           "CUSTOMER_ID" NUMBER(*,0) NOT NULL ENABLE,
           "OUTLET_ID" NUMBER(*,0) NOT NULL ENABLE,
           "BILL_VALUE" NUMBER(10,2) NOT NULL ENABLE,
           "POINTS_BEFORE_TRANSACTION" NUMBER(10,2) NOT NULL ENABLE,
           "POINTS_ADDED" NUMBER(10,2) NOT NULL ENABLE,
           "POINTS_AFTER_TRANSACTION" NUMBER(10,2) NOT NULL ENABLE,
           "CREATED_TIME" DATE DEFAULT current_timestamp NOT NULL ENABLE,
           "UPDATED_TIMESTAMP" DATE DEFAULT current_timestamp NOT NULL ENABLE,
            CONSTRAINT "TRANSACTION_ADD_PK" PRIMARY KEY ("ID")
  USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
  STORAGE(
  BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
  TABLESPACE "STUDENTS"  ENABLE,
           CONSTRAINT "TRANSACTION_ADD_FK1" FOREIGN KEY ("CUSTOMER_ID")
            REFERENCES "DB514"."CUSTOMER" ("ID") ENABLE,
           CONSTRAINT "TRANSACTION_ADD_FK2" FOREIGN KEY ("OUTLET_ID")
            REFERENCES "DB514"."OUTLET" ("ID") ENABLE
  ) SEGMENT CREATION DEFERRED
  PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255
 NOCOMPRESS LOGGING
  STORAGE(
  BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
  TABLESPACE "STUDENTS"   NO INMEMORY ;
```

TRANSACTION_REDEEM

COLUMNS

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ID	NUMBER(38,0)	No	null	1	null
CUSTOMER_ID	NUMBER(38,0)	No	null	2	null
OUTLET_ID	NUMBER(38,0)	No	null	3	null
BILL_VALUE	NUMBER(10,2)	No	null	4	null
POINTS_BEFORE_TRANSACTION	NUMBER(10,2)	No	null	5	null
POINTS_REDEEMED	NUMBER(10,2)	No	null	6	null
POINTS_AFTER_TRANSACTION	NUMBER(10,2)	No	null	7	null
CREATED_TIME	DATE	No	current_timestamp	8	null
UPDATED_TIME	DATE	No	current_timestamp	9	null

CONSTRAINTS

CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_CONSTRAINT_NAME	DELETE_RULE
SYS_C0065190	Check	"ID" IS NOT NULL	null	null	null	null
SYS_C0065191	Check	"CUSTOMER_ID" IS NOT NULL	null	null	null	null
SYS_C0065192	Check	"OUTLET_ID" IS NOT NULL	null	null	null	null
SYS_C0065193	Check	"BILL_VALUE" IS NOT NULL	null	null	null	null
SYS_C0065194	Check	"POINTS_BEFORE_TRANSACTION" IS NOT NULL	null	null	null	null
SYS_C0065195	Check	"POINTS_REDEEMED" IS NOT NULL	null	null	null	null
SYS_C0065196	Check	"POINTS_AFTER_TRANSACTION" IS NOT NULL	null	null	null	null
SYS_C0065197	Check	"CREATED_TIME" IS NOT NULL	null	null	null	null
SYS_C0065198	Check	"UPDATED_TIME" IS NOT NULL	null	null	null	null
TRANSACTION_REDEEM_FK1	Foreign_Key	null	DB514	CUSTOMER	CUSTOMER_PK	NO ACTION
TRANSACTION_REDEEM_FK2	Foreign_Key	null	DB514	OUTLET	OUTLET_PK	NO ACTION
TRANSACTION_REDEEM_PK	Primary_Key	null	null	null	null	null

SQL

```
CREATE TABLE "DB514"."TRANSACTION_REDEEM"
  (    "ID" NUMBER(*,0) NOT NULL ENABLE,
       "CUSTOMER_ID" NUMBER(*,0) NOT NULL ENABLE,
       "OUTLET_ID" NUMBER(*,0) NOT NULL ENABLE,
       "BILL_VALUE" NUMBER(10,2) NOT NULL ENABLE,
       "POINTS_BEFORE_TRANSACTION" NUMBER(10,2) NOT NULL ENABLE,
       "POINTS_REDEEMED" NUMBER(10,2) NOT NULL ENABLE,
       "POINTS_AFTER_TRANSACTION" NUMBER(10,2) NOT NULL ENABLE,
```

```
        "CREATED_TIME" DATE DEFAULT current_timestamp NOT NULL ENABLE,
        "UPDATED_TIME" DATE DEFAULT current_timestamp NOT NULL ENABLE,
         CONSTRAINT "TRANSACTION_REDEEM_PK" PRIMARY KEY ("ID")
 USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
 STORAGE(
 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
 TABLESPACE "STUDENTS"  ENABLE,
         CONSTRAINT "TRANSACTION_REDEEM_FK1" FOREIGN KEY ("CUSTOMER_ID")
          REFERENCES "DB514"."CUSTOMER" ("ID") ENABLE,
         CONSTRAINT "TRANSACTION_REDEEM_FK2" FOREIGN KEY ("OUTLET_ID")
          REFERENCES "DB514"."OUTLET" ("ID") ENABLE
  ) SEGMENT CREATION DEFERRED
 PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255
NOCOMPRESS LOGGING
 STORAGE(
 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
 TABLESPACE "STUDENTS"   NO INMEMORY ;
```

VENDOR

COLUMNS

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ID	NUMBER(38,0)	No	null	1	null
NAME	VARCHAR2(100 BYTE)	No	null	2	null
TYPE	VARCHAR2(50 BYTE)	No	null	3	null
IMAGE	VARCHAR2(100 BYTE)	Yes	null	4	null
WEBSITE	VARCHAR2(20 BYTE)	No	null	5	null
CHECKIN_POINT	NUMBER(5,2)	No	null	6	null
IS_RETIRED	CHAR(1 BYTE)	No	'N'	7	null
CREATED_TIME	DATE	No	CURRENT_TIMESTAMP	8	null
UPDATED_TIME	DATE	No	CURRENT_TIMESTAMP	9	null
TRANSACTION_POINT	NUMBER(5,2)	No	null	10	null

STATISTICS

NAME	VALUE
NUM_ROWS	10000
BLOCKS	103
AVG_ROW_LEN	60
SAMPLE_SIZE	10000

CONSTRAINTS

CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_CONSTRAINT_NAME	DELETE_RULE
SYS_C0065097	Check	"ID" IS NOT NULL	null	null	null	null
SYS_C0065098	Check	"NAME" IS NOT NULL	null	null	null	null
SYS_C0065099	Check	"TYPE" IS NOT NULL	null	null	null	null
SYS_C0065101	Check	"CHECKIN_POINT" IS NOT NULL	null	null	null	null
SYS_C0065102	Check	"IS_RETIRED" IS NOT NULL	null	null	null	null
SYS_C0065103	Check	"CREATED_TIME" IS NOT NULL	null	null	null	null
SYS_C0065104	Check	"UPDATED_TIME" IS NOT NULL	null	null	null	null
SYS_C0065105	Check	"TRANSACTION_POINT" IS NOT NULL	null	null	null	null
SYS_C0065459	Check	"WEBSITE" IS NOT NULL	null	null	null	null
VENDOR_PK	Primary_Key	null	null	null	null	null

SQL

```
CREATE TABLE "DB514"."VENDOR"
```

```
(       "ID" NUMBER(*,0) NOT NULL ENABLE,
        "NAME" VARCHAR2(100 BYTE) NOT NULL ENABLE,
        "TYPE" VARCHAR2(50 BYTE) NOT NULL ENABLE,
        "IMAGE" VARCHAR2(100 BYTE),
        "WEBSITE" VARCHAR2(20 BYTE) NOT NULL ENABLE,
        "CHECKIN_POINT" NUMBER(5,2) NOT NULL ENABLE,
        "IS_RETIRED" CHAR(1 BYTE) DEFAULT 'N' NOT NULL ENABLE,
        "CREATED_TIME" DATE DEFAULT CURRENT_TIMESTAMP NOT NULL ENABLE,
        "UPDATED_TIME" DATE DEFAULT CURRENT_TIMESTAMP NOT NULL ENABLE,
        "TRANSACTION_POINT" NUMBER(5,2) NOT NULL ENABLE,
         CONSTRAINT "VENDOR_PK" PRIMARY KEY ("ID")
 USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
 STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
 PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1
 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
 TABLESPACE "STUDENTS"  ENABLE
 ) SEGMENT CREATION IMMEDIATE
 PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255
NOCOMPRESS LOGGING
 STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
 PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1
 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
 TABLESPACE "STUDENTS"   NO INMEMORY ;
```

VENDOR_CAMPAIGN

COLUMNS

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ID	NUMBER(38,0)	No	null	1	null
VENDOR_ID	NUMBER(38,0)	No	null	2	null
OUTLET_ID	NUMBER(38,0)	No	null	3	null
TITLE	VARCHAR2(50 BYTE)	No	null	4	null
MESSAGE	VARCHAR2(100 BYTE)	No	null	5	null
START_DATE	DATE	No	null	6	null
END_DATE	DATE	No	null	7	null
CREATED_TIME	DATE	No	current_timestamp	8	null
UPDATED_TIME	DATE	No	current_timestamp	9	null

CONSTRAINTS

CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_CONSTRAINT_NAME	DELETE_RULE
SYS_C0065228	Check	"ID" IS NOT NULL	null	null	null	null
SYS_C0065229	Check	"VENDOR_ID" IS NOT NULL	null	null	null	null
SYS_C0065230	Check	"OUTLET_ID" IS NOT NULL	null	null	null	null
SYS_C0065231	Check	"TITLE" IS NOT NULL	null	null	null	null
SYS_C0065232	Check	"MESSAGE" IS NOT NULL	null	null	null	null
SYS_C0065233	Check	"START_DATE" IS NOT NULL	null	null	null	null
SYS_C0065234	Check	"END_DATE" IS NOT NULL	null	null	null	null
SYS_C0065235	Check	"CREATED_TIME" IS NOT NULL	null	null	null	null
SYS_C0065236	Check	"UPDATED_TIME" IS NOT NULL	null	null	null	null
VENDOR_CAMPAIGN_FK1	Foreign_Key	null	DB514	VENDOR	VENDOR_PK	NO ACTION
VENDOR_CAMPAIGN_FK2	Foreign_Key	null	DB514	OUTLET	OUTLET_PK	NO ACTION
VENDOR_CAMPAIGN_PK	Primary_Key	null	null	null	null	null

SQL

```
CREATE TABLE "DB514"."VENDOR_CAMPAIGN"
  (    "ID" NUMBER(*,0) NOT NULL ENABLE,
       "VENDOR_ID" NUMBER(*,0) NOT NULL ENABLE,
       "OUTLET_ID" NUMBER(*,0) NOT NULL ENABLE,
       "TITLE" VARCHAR2(50 BYTE) NOT NULL ENABLE,
       "MESSAGE" VARCHAR2(100 BYTE) NOT NULL ENABLE,
       "START_DATE" DATE NOT NULL ENABLE,
       "END_DATE" DATE NOT NULL ENABLE,
       "CREATED_TIME" DATE DEFAULT current_timestamp NOT NULL ENABLE,
```

```
        "UPDATED_TIME" DATE DEFAULT current_timestamp NOT NULL ENABLE,
         CONSTRAINT "VENDOR_CAMPAIGN_PK" PRIMARY KEY ("ID")
 USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
 STORAGE(
 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
 TABLESPACE "STUDENTS"  ENABLE,
         CONSTRAINT "VENDOR_CAMPAIGN_FK1" FOREIGN KEY ("VENDOR_ID")
          REFERENCES "DB514"."VENDOR" ("ID") ENABLE,
         CONSTRAINT "VENDOR_CAMPAIGN_FK2" FOREIGN KEY ("ID")
          REFERENCES "DB514"."OUTLET" ("ID") ENABLE
  ) SEGMENT CREATION DEFERRED
 PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255
NOCOMPRESS LOGGING
 STORAGE(
 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
 TABLESPACE "STUDENTS"   NO INMEMORY ;
```

VENDOR_CAMPAIGN_CUSTOMER

COLUMNS

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ID	NUMBER(38,0)	No	null	1	null
CUSTOMER_ID	NUMBER(38,0)	No	null	2	null
VENDOR_CAMPAIGN_ID	NUMBER(38,0)	No	null	3	null
SENT_DATE	DATE	No	current_timestamp	4	null

CONSTRAINTS

CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_CONSTRAINT_NAME	DELETE_RULE
SYS_C0065240	Check	"ID" IS NOT NULL	null	null	null	null
SYS_C0065241	Check	"CUSTOMER_ID" IS NOT NULL	null	null	null	null
SYS_C0065242	Check	"VENDOR_CAMPAIGN_ID" IS NOT NULL	null	null	null	null
SYS_C0065243	Check	"SENT_DATE" IS NOT NULL	null	null	null	null
VENDOR_CAMPAIGN_CUSTOMER_FK1	Foreign_Key	null	DB514	VENDOR_CAMPAIGN	VENDOR_CAMPAIGN_PK	NO ACTION
VENDOR_CAMPAIGN_CUSTOMER_FK2	Foreign_Key	null	DB514	CUSTOMER	CUSTOMER_PK	NO ACTION
VENDOR_CAMPAIGN_CUSTOMER_PK	Primary_Key	null	null	null	null	null

SQL

```
CREATE TABLE "DB514"."VENDOR_CAMPAIGN_CUSTOMER"
  (        "ID" NUMBER(*,0) NOT NULL ENABLE,
           "CUSTOMER_ID" NUMBER(*,0) NOT NULL ENABLE,
           "VENDOR_CAMPAIGN_ID" NUMBER(*,0) NOT NULL ENABLE,
           "SENT_DATE" DATE DEFAULT current_timestamp NOT NULL ENABLE,
            CONSTRAINT "VENDOR_CAMPAIGN_CUSTOMER_PK" PRIMARY KEY ("ID")
  USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
  STORAGE(
  BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
  TABLESPACE "STUDENTS"  ENABLE,
           CONSTRAINT "VENDOR_CAMPAIGN_CUSTOMER_FK1" FOREIGN KEY
("VENDOR_CAMPAIGN_ID")
            REFERENCES "DB514"."VENDOR_CAMPAIGN" ("ID") ENABLE,
           CONSTRAINT "VENDOR_CAMPAIGN_CUSTOMER_FK2" FOREIGN KEY ("CUSTOMER_ID")
            REFERENCES "DB514"."CUSTOMER" ("ID") ENABLE
  ) SEGMENT CREATION DEFERRED
  PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255
 NOCOMPRESS LOGGING
  STORAGE(
  BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
  TABLESPACE "STUDENTS"   NO INMEMORY ;
```

Data Generation and Loading

Data was generated and collected from multiple sources online and was imported into the oracle database using the import function in oracle SQL developer.

The following table shows the tables and the number of data points generated.

Table Name	Data Points Generated
ADMIN_USER	40
ANDROID_USER	500
BEACAON_REGISTER	500
CHECK_IN	595
CUSTOMER	10,000
CUSTOMER_OUTSTANDING_SUMMARY	0
DAY_OF_WEEK	0
EMPLOYEE	0
IOS_USER	500
OUTLET	10,000
OUTLET_TIMING	0
PHYSICAL_WEB	0
TIME_OF_DAY	0
TRANSACTION_ADD	595
TRANSACTION_REDEEM	595
VENDOR	10,000
VENDOR_CAMPAIGN	0
VENDOR_CAMPAIGN_CUSTOMER	0

4. Performance Tuning

Experiment 1 (B-Tree Indexes)

Improvement in performance by using B+ tree on Customers table when fetching details for a particular ID. The query on the existing customer database would be to fetch Mobile, Email and First name for ID 17282. With the help of B-tree Index we compare how the performance is improved by looking at the Cost factor.

Step 1. Create table index_test equivalent to Customer Table

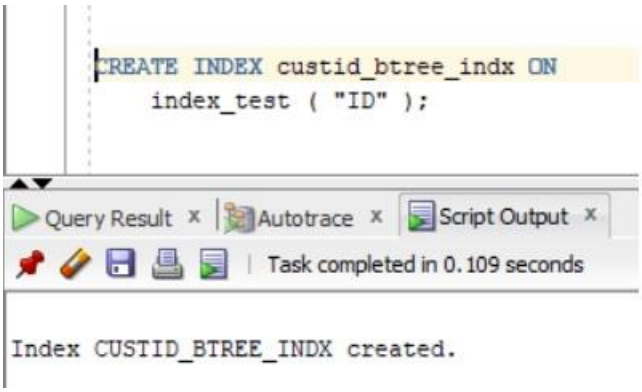
```
CREATE TABLE index_test
   AS
      SELECT
         *
      FROM
         customer;
```

Step 2. Run a query to fetch details like Mobile, Email and First name for ID 17282. We can see here that the Cost of the operation is 84.

```
SELECT
   mobile,
   email,
   first_name
FROM
   index_test
WHERE
   id = 17282;
```

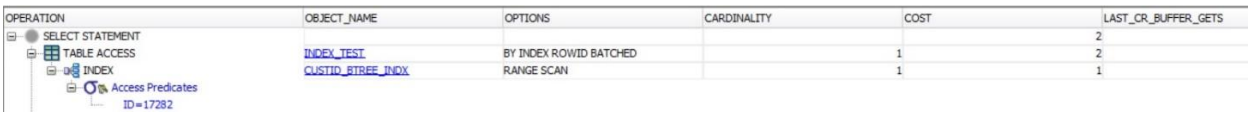
Step 3. Create Bitmap index on Customer ID

```
CREATE INDEX custid_btree_indx ON
   index_test ( "ID" );
```



Step 4. Execute the earlier query again. Now comparing the performance, we can see the Cost has reduced considerably from 84 to 5.

```
SELECT
   mobile,
   email,
   first_name
FROM
   index_test
WHERE
   id = 17282;
```



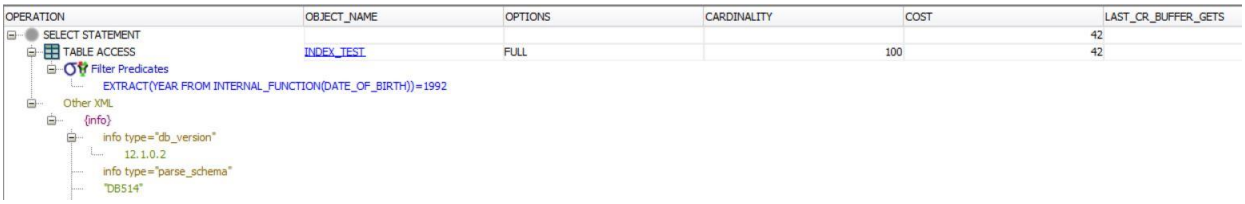
Experiment 2 (Function Based Index)

In usual indexing which creates a two-dimensional map of rows and values in a specific column. On the other hand, a function-based index is an index that is created on the results of a function or expression.

Here we will create an index on column Date_of_birth, we need to mention the exact value for the index to be used. However, if we run the same index on a function then the index won't be valid. We create function based index where we create indexes on columns where we are performing a function on that column.

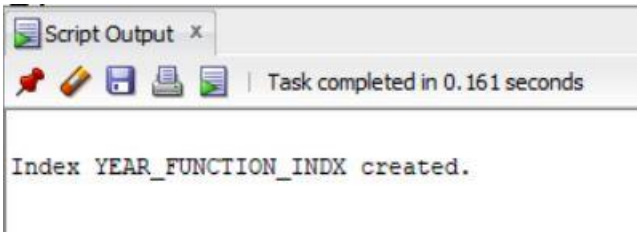
Step 1. Here the index is linked to particular column in the table also note that the Cost for processing this query is 84.

```
SELECT
  *
FROM
  index_test
WHERE
  EXTRACT(YEAR FROM date_of_birth) = '1992';
```

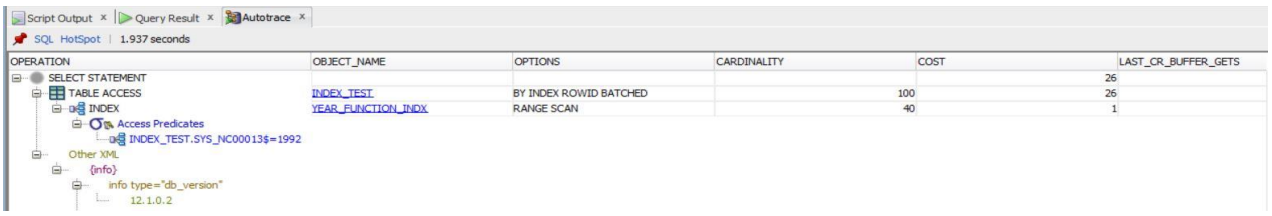


Step 2. Now we are creating the Index on the whole Function.

```
CREATE INDEX year_function_indx ON
  index_test ( EXTRACT(YEAR FROM date_of_birth));
```



Step 3. After running the earlier query again, as compared to the earlier index which was created on the single column DATE_OF_BIRTH, here the Index is created on the while function YEAR_FUNCTION_INDEX as seen from the picture and also the Cost is reduced considerably from 84 to 53 .



Experiment 3: Parallel Processing

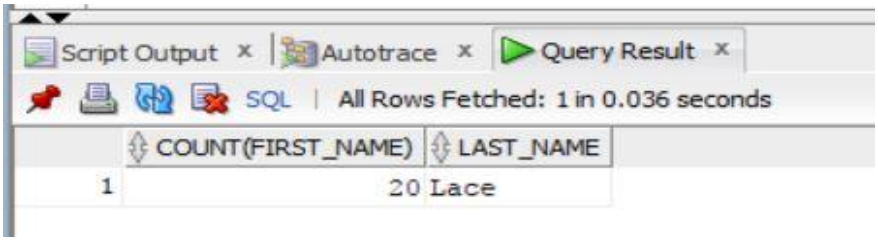
When we run SQL statements in parallel, multiple processes work together simultaneously to run a single SQL statement. By dividing the work necessary to run a statement among multiple processes, we can run the statement more quickly than if only a single process ran it.

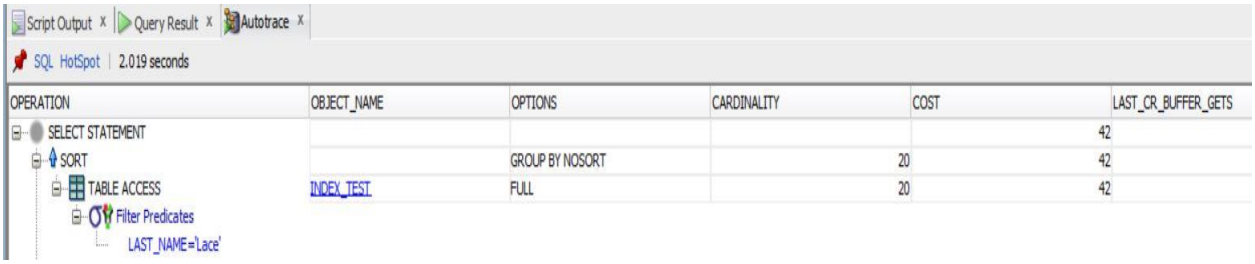
Here we will compare how Parallel processing works against default serial processing, and how the CPU time is reduced considerably improving the performance. However, its comes at the expense of Cost.

Step1. We are fetching all records where Last Name is Lace.

```
SELECT
   COUNT(first_name),
   last_name
FROM
   index_test
WHERE
   last_name = 'Lace'
GROUP BY
   last_name;
```

Step 2. Performance for the above query where serial processing takes place is shown below where CPU time is 0.036 and Cost is 126.





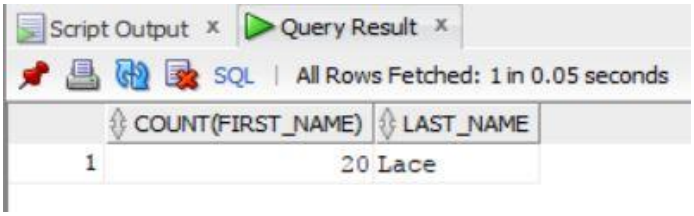
Step 3. Here we are enabling the Parallel execution where degree of processing is 2

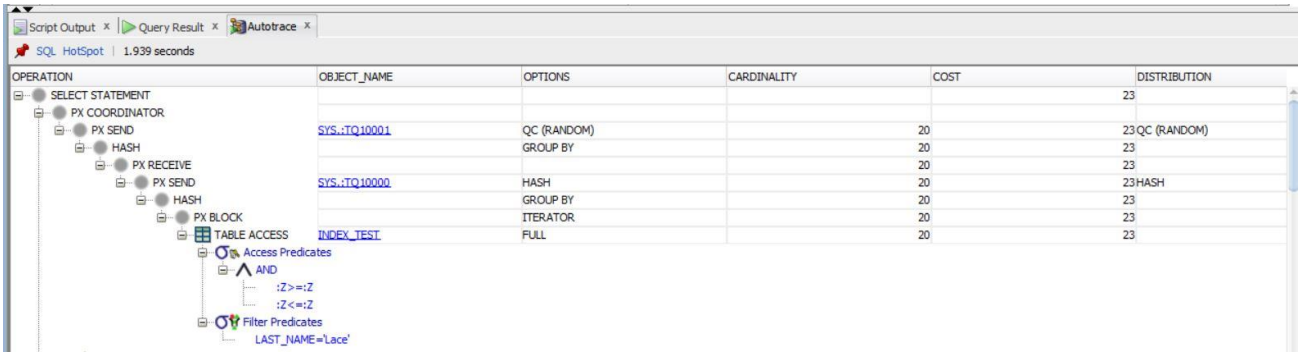
```
ALTER SESSION ENABLE PARALLEL QUERY;
ALTER TABLE index_test PARALLEL(DEGREE 2);
```

Step 4. The below image shows that the Parallel Query processing has been Enabled.

```
Session altered.


Table INDEX_TEST altered.
```

Step 5. As seen after running the earlier query again here, the CPU time has reduced considerably, but at the expense of Cost. CPU time has now reduced to 0.05 seconds, but Cost has increased to 184.





5. DBA Scripts

1) Displays information about all database users

```
SELECT username,
    account_status,
    TO_CHAR(lock_date, 'DD-MON-YYYY') AS lock_date,
    TO_CHAR(expiry_date, 'DD-MON-YYYY') AS expiry_date,
    default_tablespace,
    temporary_tablespace,
    TO_CHAR(created, 'DD-MON-YYYY') AS created,
    profile,
    initial_rsrc_consumer_group,
    editions_enabled,
    authentication_type
FROM   dba_users
ORDER BY username;
```

Script Output | Query Result

All Rows Fetched: 1097 in 0.792 seconds

	USERNAME	ACCOUNT_STATUS	LOCK_DATE	EXPIRY_DATE	DEFAULT_TABLESPACE	TEMPORARY_TABLESPACE	CREATED	PROFILE	INITIAL_RSRC_CONSUMER_GROUP	EDITIONS_ENABLED	AI
432	DB505	OPEN	(null)	25-FEB-2018	STUDENTS	TEMP	15-AUG-2017	DEFAULT	DEFAULT_CONSUMER_GROUP	N	PAS
433	DB506	OPEN	(null)	11-FEB-2018	STUDENTS	TEMP	15-AUG-2017	DEFAULT	DEFAULT_CONSUMER_GROUP	N	PAS
434	DB507	OPEN	(null)	11-FEB-2018	STUDENTS	TEMP	15-AUG-2017	DEFAULT	DEFAULT_CONSUMER_GROUP	N	PAS
435	DB508	OPEN	(null)	11-FEB-2018	STUDENTS	TEMP	15-AUG-2017	DEFAULT	DEFAULT_CONSUMER_GROUP	N	PAS
436	DB509	OPEN	(null)	11-FEB-2018	STUDENTS	TEMP	15-AUG-2017	DEFAULT	DEFAULT_CONSUMER_GROUP	N	PAS
437	DB510	OPEN	(null)	11-FEB-2018	STUDENTS	TEMP	15-AUG-2017	DEFAULT	DEFAULT_CONSUMER_GROUP	N	PAS
438	DB511	OPEN	(null)	11-FEB-2018	STUDENTS	TEMP	15-AUG-2017	DEFAULT	DEFAULT_CONSUMER_GROUP	N	PAS
439	DB512	OPEN	(null)	11-FEB-2018	STUDENTS	TEMP	15-AUG-2017	DEFAULT	DEFAULT_CONSUMER_GROUP	N	PAS
440	DB513	OPEN	(null)	11-FEB-2018	STUDENTS	TEMP	15-AUG-2017	DEFAULT	DEFAULT_CONSUMER_GROUP	N	PAS
441	DB514	OPEN	(null)	01-MAY-2018	STUDENTS	TEMP	15-AUG-2017	DEFAULT	DEFAULT_CONSUMER_GROUP	N	PAS
442	DB515	OPEN	(null)	11-FEB-2018	STUDENTS	TEMP	15-AUG-2017	DEFAULT	DEFAULT_CONSUMER_GROUP	N	PAS
443	DB516	OPEN	(null)	11-FEB-2018	STUDENTS	TEMP	15-AUG-2017	DEFAULT	DEFAULT_CONSUMER_GROUP	N	PAS
444	DB517	OPEN	(null)	11-FEB-2018	STUDENTS	TEMP	15-AUG-2017	DEFAULT	DEFAULT_CONSUMER_GROUP	N	PAS
445	DB518	OPEN	(null)	11-FEB-2018	STUDENTS	TEMP	15-AUG-2017	DEFAULT	DEFAULT_CONSUMER_GROUP	N	PAS
446	DB519	OPEN	(null)	11-FEB-2018	STUDENTS	TEMP	15-AUG-2017	DEFAULT	DEFAULT_CONSUMER_GROUP	N	PAS
447	DB520	OPEN	(null)	11-FEB-2018	STUDENTS	TEMP	15-AUG-2017	DEFAULT	DEFAULT_CONSUMER_GROUP	N	PAS
448	DB521	OPEN	(null)	11-FEB-2018	STUDENTS	TEMP	15-AUG-2017	DEFAULT	DEFAULT_CONSUMER_GROUP	N	PAS
449	DB522	OPEN	(null)	11-FEB-2018	STUDENTS	TEMP	15-AUG-2017	DEFAULT	DEFAULT_CONSUMER_GROUP	N	PAS
450	DB523	OPEN	(null)	11-FEB-2018	STUDENTS	TEMP	15-AUG-2017	DEFAULT	DEFAULT_CONSUMER_GROUP	N	PAS

2) Displays general information about the database.

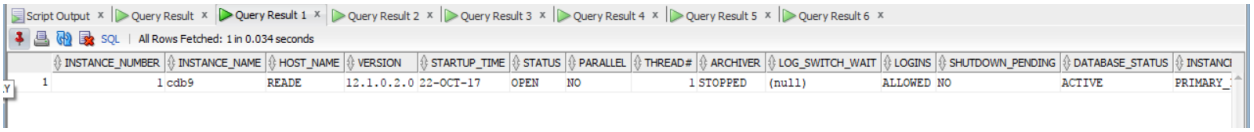
```
SELECT *
FROM   v$database;
```

Script Output | Query Result | Query Result 1 | Query Result 2 | Query Result 3 | Query Result 4 | Query Result 5 | Query Result 6

All Rows Fetched: 1 in 0.047 seconds

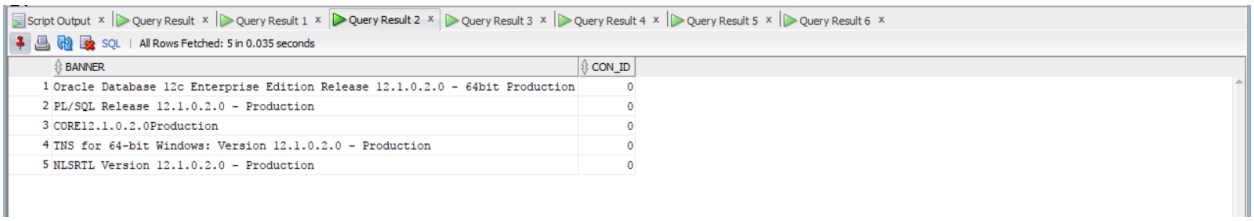
	DBID	NAME	CREATED	RESETLOGS_CHANGE#	RESETLOGS_TIME	PRIOR_RESETLOGS_CHANGE#	PRIOR_RESETLOGS_TIME	LOG_MODE	CHECKPOINT_CHANGE#	ARCHIVE_CHANGE#	CONTROLFILE_TYPE
1	269270238	CDB9	06-FEB-15	2233668	06-FEB-15	1	11-SEP-14	NOARCHIVELOG	102057087	102056981	CURRENT

```
SELECT *
FROM   v$instance;
```



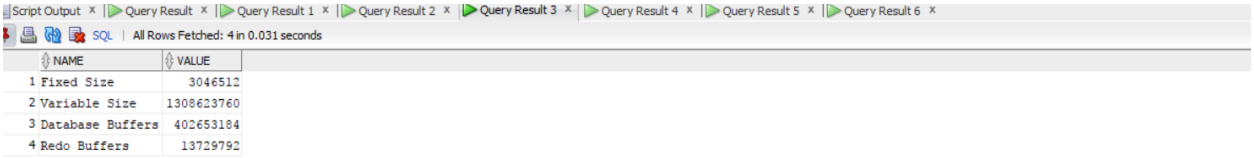
	INSTANCE_NUMBER	INSTANCE_NAME	HOST_NAME	VERSION	STARTUP_TIME	STATUS	PARALLEL	THREAD#	ARCHIVER	LOG_SWITCH_WAIT	LOGINS	SHUTDOWN_PENDING	DATABASE_STATUS	INSTANCI
1	1	cdb9	READE	12.1.0.2.0	22-OCT-17	OPEN	NO	1	STOPPED	(null)	ALLOWED	NO	ACTIVE	PRIMARY_

```
SELECT *
FROM   v$version;
```



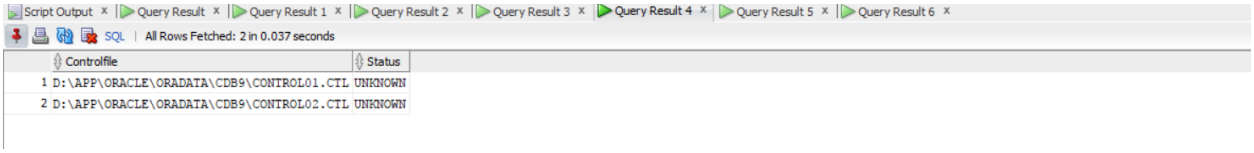
	BANNER	CON_ID
1	Oracle Database 12c Enterprise Edition Release 12.1.0.2.0 - 64bit Production	0
2	PL/SQL Release 12.1.0.2.0 - Production	0
3	CORE12.1.0.2.0Production	0
4	TNS for 64-bit Windows: Version 12.1.0.2.0 - Production	0
5	NLSRTL Version 12.1.0.2.0 - Production	0

```
SELECT a.name,
    a.value
FROM   v$sga a;
```



	NAME	VALUE
1	Fixed Size	3046512
2	Variable Size	1308623760
3	Database Buffers	402653184
4	Redo Buffers	13729792

```
SELECT Substr(c.name,1,60) "Controlfile",
    NVL(c.status,'UNKNOWN') "Status"
FROM   v$controlfile c
ORDER BY 1;
```



	Controlfile	Status
1	D:\APP\ORACLE\ORADATA\CDB9\CONTROL01.CTL	UNKNOWN
2	D:\APP\ORACLE\ORADATA\CDB9\CONTROL02.CTL	UNKNOWN

```
SELECT Substr(d.name,1,60) "Datafile",
    NVL(d.status,'UNKNOWN') "Status",
    d.enabled "Enabled",
    LPad(To_Char(Round(d.bytes/1024000,2),'9999990.00'),10,' ') "Size (M)"
FROM   v$datafile d
ORDER BY 1;
```

Script Output | Query Result | Query Result 1 | Query Result 2 | Query Result 3 | Query Result 4 | Query Result 5 | Quer

SQL | All Rows Fetched: 20 in 0.163 seconds

	Datafile	Status	Enabled	Size (M)
1	D:\APP\ORACLE\ORADATA\CDB9\COLORS01.DBF	ONLINE	READ WRITE	421.8
2	D:\APP\ORACLE\ORADATA\CDB9\COLORS02.DBF	ONLINE	READ WRITE	825.3
3	D:\APP\ORACLE\ORADATA\CDB9\COLORS03.DBF	ONLINE	READ WRITE	345.0
4	D:\APP\ORACLE\ORADATA\CDB9\COLORS04.DBF	ONLINE	READ WRITE	1048.5
5	D:\APP\ORACLE\ORADATA\CDB9\EXAMPLE01.DBF	ONLINE	READ WRITE	1290.8
6	D:\APP\ORACLE\ORADATA\CDB9\STUDENTS01.DBF	ONLINE	READ WRITE	1048.5
7	D:\APP\ORACLE\ORADATA\CDB9\STUDENTS02.DBF	ONLINE	READ WRITE	1048.5
8	D:\APP\ORACLE\ORADATA\CDB9\STUDENTS03.DBF	ONLINE	READ WRITE	1048.5
9	D:\APP\ORACLE\ORADATA\CDB9\STUDENTS04.DBF	ONLINE	READ WRITE	1048.5
10	D:\APP\ORACLE\ORADATA\CDB9\STUDENTS05.DBF	ONLINE	READ WRITE	1048.5
11	D:\APP\ORACLE\ORADATA\CDB9\STUDENTS06.DBF	ONLINE	READ WRITE	1048.5
12	D:\APP\ORACLE\ORADATA\CDB9\STUDENTS07.DBF	ONLINE	READ WRITE	1048.5
13	D:\APP\ORACLE\ORADATA\CDB9\STUDENTS08.DBF	ONLINE	READ WRITE	1048.5
14	D:\APP\ORACLE\ORADATA\CDB9\STUDENTS09.DBF	ONLINE	READ WRITE	1048.5
15	D:\APP\ORACLE\ORADATA\CDB9\STUDENTS10.DBF	ONLINE	READ WRITE	1048.5
16	D:\APP\ORACLE\ORADATA\CDB9\SYSAUX01.DBF	ONLINE	READ WRITE	2181.1
17	D:\APP\ORACLE\ORADATA\CDB9\SYSTEM01.DBF	SYSTEM	READ WRITE	952.3
18	D:\APP\ORACLE\ORADATA\CDB9\UNDOTBS01.DBF	ONLINE	READ WRITE	2503.6
19	D:\APP\ORACLE\ORADATA\CDB9\USERS01.DBF	ONLINE	READ WRITE	885.7
20	D:\APP\ORACLE\ORADATA\CDB9\USERS02.DBF	ONLINE	READ WRITE	1048.5

```
SELECT l.group# "Group",
    Substr(l.member,1,60) "Logfile",
    NVL(l.status,'UNKNOWN') "Status"
FROM   v$logfile l
ORDER BY 1,2;
```

Script Output | Query Result | Query Result 1 | Query Result 2 | Query Result 3 | Query Result 4 | Query Result 5 | Query Result 6

SQL | All Rows Fetched: 3 in 0.037 seconds

	Group	Logfile	Status
1	1	D:\APP\ORACLE\ORADATA\CDB9\REDO01.LOG	UNKNOWN
2	2	D:\APP\ORACLE\ORADATA\CDB9\REDO02.LOG	UNKNOWN
3	3	D:\APP\ORACLE\ORADATA\CDB9\REDO03.LOG	UNKNOWN

3) Displays information about specified tables.

```
SELECT t.table_name,
    t.tablespace_name,
    t.num_rows,
    t.avg_row_len,
    t.blocks,
    t.empty_blocks,
    ROUND(t.blocks * ts.block_size/1024/1024,2) AS size_mb
FROM   dba_tables t
    JOIN dba_tablespaces ts ON t.tablespace_name = ts.tablespace_name
WHERE  t.owner = UPPER('db514')
```

ORDER BY t.table_name;

Script Output | Query Result

SQL | All Rows Fetched: 18 in 0.285 seconds

	TABLE_NAME	TABLESPACE_NAME	NUM_ROWS	AVG_ROW_LEN	BLOCKS	EMPTY_BLOCKS	SIZE_MB
1	ADMIN_USER	STUDENTS	40	48	5	0	0.04
2	ANDROID_USER	STUDENTS	500	62	5	0	0.04
3	BEACAON_REGISTER	STUDENTS	500	98	13	0	0.1
4	CHECK_IN	STUDENTS	0	0	0	0	0
5	CUSTOMER	STUDENTS	10000	92	244	0	1.91
6	CUSTOMER_OUTSTANDING_SUMMARY	STUDENTS	0	0	0	0	0
7	DAY_OF_WEEK	STUDENTS	0	0	0	0	0
8	EMPLOYEE	STUDENTS	0	0	0	0	0
9	IOS_USER	STUDENTS	500	57	5	0	0.04
10	OUTLET	STUDENTS	10000	105	244	0	1.91
11	OUTLET_TIMING	STUDENTS	0	0	0	0	0
12	PHYSICAL_WEB	STUDENTS	0	0	0	0	0
13	TIME_OF_DAY	STUDENTS	0	0	0	0	0
14	TRANSACTION_ADD	STUDENTS	0	0	0	0	0
15	TRANSACTION_REDEEM	STUDENTS	0	0	0	0	0
16	VENDOR	STUDENTS	10000	60	103	0	0.8
17	VENDOR_CAMPAIGN	STUDENTS	0	0	0	0	0
18	VENDOR_CAMPAIGN_CUSTOMER	STUDENTS	0	0	0	0	0

4) Displays information about specified indexes.

```
SELECT table_owner,
    table_name,
    owner AS index_owner,
    index_name,
    tablespace_name,
    num_rows,
    status,
    index_type
FROM   dba_indexes
WHERE  table_owner = UPPER('db514')
AND    table_name = DECODE(UPPER('customer'), 'ALL', table_name, UPPER('customer'))
ORDER BY table_owner, table_name, index_owner, index_name;
```

Script Output | Query Result

SQL | All Rows Fetched: 3 in 0.115 seconds

	TABLE_OWNER	TABLE_NAME	INDEX_OWNER	INDEX_NAME	TABLESPACE_NAME	NUM_ROWS	STATUS	INDEX_TYPE
1	DB514	CUSTOMER	DB514	CUSTOMER_EMAIL_UK	STUDENTS	10000	VALID	NORMAL
2	DB514	CUSTOMER	DB514	CUSTOMER_MOBILE_UK	STUDENTS	10000	VALID	NORMAL
3	DB514	CUSTOMER	DB514	CUSTOMER_PK	STUDENTS	10000	VALID	NORMAL

5) Displays information on all database sessions.

```
SELECT NVL(s.username, '(oracle)') AS username,
       s.osuser,
       s.sid,
       s.serial#,
       p.spid,
       s.lockwait,
       s.status,
       s.service_name,
       s.module,
       s.machine,
       s.program,
       TO_CHAR(s.logon_Time,'DD-MON-YYYY HH24:MI:SS') AS logon_time,
       s.last_call_et AS last_call_et_secs
FROM   v$session s,
       v$process p
WHERE  s.paddr = p.addr
ORDER BY s.username, s.osuser;
```

Script Output | Query Result

Fetched 50 rows in 0.162 seconds

	USERNAME	OSUSER	SID	SERIAL#	SPID	LOCKWAIT	STATUS	SERVICE_NAME	MODULE	MACHINE	PROGRAM	LOGON_TIME	LAST_
4	DB269	harsha	58	21864	1136	(null)	INACTIVE	SYS$USERS	SQL Developer	LAPTOP-5EQGQDIL	SQL Developer	09-NOV-2017 11:29:33	
5	DB287	rahul	74	35163	3712	(null)	INACTIVE	SYS$USERS	SQL Developer	DESKTOP-P4K7TNS	SQL Developer	09-NOV-2017 12:53:34	
6	DB299	Prithvi	41	63224	2876	(null)	INACTIVE	SYS$USERS	SQL Developer	DESKTOP-80BTK3P	SQL Developer	09-NOV-2017 10:32:54	
7	DB501	clonn	70	32213	1188	(null)	INACTIVE	SYS$USERS	SQL Developer	Los-Gargolas	SQL Developer	09-NOV-2017 13:07:43	
8	DB504	User	52	1655	592	(null)	INACTIVE	SYS$USERS	SQL Developer	DESKTOP-8Q54V4V	SQL Developer	09-NOV-2017 11:46:20	
9	DB506	yajur	67	8868	3048	(null)	INACTIVE	SYS$USERS	SQL Developer	DESKTOP-TPOJ7IR	SQL Developer	09-NOV-2017 13:19:49	
10	DB507	Bhaumix	82	25	2984	(null)	INACTIVE	SYS$USERS	SQL Developer	USF-Gold-Wifi-226-51-192....	SQL Developer	09-NOV-2017 11:15:58	
11	DB509	SRINIVAS RAO	39	3080	1704	(null)	INACTIVE	SYS$USERS	SQL Developer	LAPTOP-E24JRR05	SQL Developer	09-NOV-2017 13:04:26	
12	DB509	vamsi	93	58573	2136	(null)	INACTIVE	SYS$USERS	SQL Developer	DESKTOP-2FEBVIR	SQL Developer	09-NOV-2017 12:34:16	
13	DB510	ayush	64	29448	1700	(null)	INACTIVE	SYS$USERS	SQL Developer	Ayush-VAIO	SQL Developer	09-NOV-2017 13:01:49	
14	DB510	ayush	53	6752	3220	(null)	INACTIVE	SYS$USERS	SQL Developer	Ayush-VAIO	SQL Developer	09-NOV-2017 10:48:00	
15	DB511	Mithil	66	54646	1184	(null)	INACTIVE	SYS$USERS	SQL Developer	DESKTOP-4N4E2TD	SQL Developer	09-NOV-2017 09:20:25	
16	DB511	Nagalaxmi	33	62155	1360	(null)	INACTIVE	SYS$USERS	SQL Developer	Nagalaxmi-PC	SQL Developer	09-NOV-2017 10:54:10	
17	DB514	Saikumar Nanjala	87	40799	3280	(null)	ACTIVE	SYS$USERS	SQL Developer	SaiKumar	SQL Developer	09-NOV-2017 12:04:01	
18	DB514	prane	49	3041	856	(null)	INACTIVE	SYS$USERS	SQL Developer	Praneeth	SQL Developer	09-NOV-2017 11:50:17	
19	DB515	Sai	73	24775	3516	(null)	INACTIVE	SYS$USERS	SQL Developer	Lenovo-PC	SQL Developer	09-NOV-2017 12:02:12	
20	DB515	Sai	51	32008	3548	(null)	INACTIVE	SYS$USERS	SQL Developer	Lenovo-PC	SQL Developer	09-NOV-2017 13:20:54	
21	DB515	Sanjana	91	57873	600	(null)	INACTIVE	SYS$USERS	SQL Developer	owner-PC	SQL Developer	09-NOV-2017 13:20:43	
22	DB515	pandu	85	34975	3016	(null)	INACTIVE	SYS$USERS	SQL Developer	DESKTOP-DACASGR	SQL Developer	09-NOV-2017 11:34:33	
23	DB570	jeet	65	7465	3764	(null)	INACTIVE	SYS$USERS	SQL Developer	DESKTOP-CUH0U6D	SQL Developer	09-NOV-2017 12:32:35	
24	DB579	GauriNaik	79	10996	1856	(null)	INACTIVE	SYS$USERS	SQL Developer	gauri	SQL Developer	09-NOV-2017 10:57:13	
25	DB579	vamsi	55	65436	2684	(null)	INACTIVE	SYS$USERS	SQL Developer	DESKTOP-2FEBVIR	SQL Developer	09-NOV-2017 11:54:43	
26	(oracle)	oracle	35	49406	3232	(null)	ACTIVE	SYS$BACKGROUND	Streams	READE	ORACLE.EXE (QM02)	22-OCT-2017 01:52:31	
27	(oracle)	oracle	34	50821	2744	(null)	ACTIVE	SYS$BACKGROUND	(null)	READE	ORACLE.EXE (CJQ0)	22-OCT-2017 01:52:27	
28	(oracle)	oracle	47	27408	3116	(null)	ACTIVE	SYS$BACKGROUND	KTSJ	READE	ORACLE.EXE (W002)	22-OCT-2017 06:12:41	
29	(oracle)	oracle	19	52801	2544	(null)	ACTIVE	SYS$BACKGROUND	(null)	READE	ORACLE.EXE (MMON)	22-OCT-2017 01:51:58	

6) Displays all database property values.

```
SELECT property_name,
       property_value
```

```
FROM   database_properties
ORDER BY property_name;
```

Script Output × Query Result ×

SQL | All Rows Fetched: 38 in 0.034 seconds

	PROPERTY_NAME	PROPERTY_VALUE
1	DBTIMEZONE	00:00
2	DEFAULT_EDITION	ORA$BASE
3	DEFAULT_PERMANENT_TABLESPACE	USERS
4	DEFAULT_TBS_TYPE	SMALLFILE
5	DEFAULT_TEMP_TABLESPACE	TEMP
6	DICT.BASE	2
7	DST_PRIMARY_TT_VERSION	18
8	DST_SECONDARY_TT_VERSION	0
9	DST_UPGRADE_STATE	NONE
10	EXPORT_VIEWS_VERSION	8
11	Flashback Timestamp TimeZone	GMT
12	GLOBAL_DB_NAME	CDB9
13	MAX_STRING_SIZE	STANDARD
14	NLS_CALENDAR	GREGORIAN
15	NLS_CHARACTERSET	WE8MSWIN1252
16	NLS_COMP	BINARY
17	NLS_CURRENCY	$
18	NLS_DATE_FORMAT	DD-MON-RR
19	NLS_DATE_LANGUAGE	AMERICAN
20	NLS_DUAL_CURRENCY	$
21	NLS_ISO_CURRENCY	AMERICA
22	NLS_LANGUAGE	AMERICAN
23	NLS_LENGTH_SEMANTICS	BYTE
24	NLS_NCHAR_CHARACTERSET	AL16UTF16
25	NLS_NCHAR_CONV_EXCP	FALSE
26	NLS_NUMERIC_CHARACTERS	.,
27	NLS_RDBMS_VERSION	12.1.0.2.0

7) Lists the column definitions for the specified table.

```
SELECT table_name,
    column_id,
    column_name,
```

```
    data_type,
    (CASE
      WHEN data_type IN ('VARCHAR2','CHAR') THEN TO_CHAR(data_length)
      WHEN data_scale IS NULL OR data_scale = 0 THEN TO_CHAR(data_precision)
      ELSE TO_CHAR(data_precision) || ',' || TO_CHAR(data_scale)
    END) "SIZE",
    DECODE(nullable, 'Y', '', 'NOT NULL') nullable
FROM   user_tab_columns
WHERE  table_name = DECODE(UPPER('customer'), 'ALL', table_name, UPPER('customer'))
ORDER BY table_name, column_id;
```

Script Output × Query Result ×

SQL | All Rows Fetched: 12 in 0.231 seconds

	TABLE_NAME	COLUMN_ID	COLUMN_NAME	DATA_TYPE	SIZE	NULLABLE
1	CUSTOMER	1	ID	NUMBER	(null)	NOT NULL
2	CUSTOMER	2	MOBILE	VARCHAR2	20	NOT NULL
3	CUSTOMER	3	EMAIL	VARCHAR2	500	NOT NULL
4	CUSTOMER	4	PASSWORD	VARCHAR2	20	NOT NULL
5	CUSTOMER	5	PIN	NUMBER	6	NOT NULL
6	CUSTOMER	6	FIRST_NAME	VARCHAR2	20	NOT NULL
7	CUSTOMER	7	LAST_NAME	VARCHAR2	20	NOT NULL
8	CUSTOMER	8	GENDER	CHAR	1	NOT NULL
9	CUSTOMER	9	DATE_OF_BIRTH	DATE	(null)	NOT NULL
10	CUSTOMER	10	IMAGE	VARCHAR2	100	(null)
11	CUSTOMER	11	CREATED_TIME	DATE	(null)	NOT NULL
12	CUSTOMER	12	UPDATED_TIME	DATE	(null)	NOT NULL

8) Displays memory allocations for the current database sessions

```
SELECT a.inst_id,
    NVL(a.username,'(oracle)') AS username,
    a.module,
    a.program,
```

```
    Trunc(b.value/1024) AS memory_kb
FROM   gv$session a,
    gv$sesstat b,
    gv$statname c
WHERE  a.sid = b.sid
AND    a.inst_id = b.inst_id
AND    b.statistic# = c.statistic#
AND    b.inst_id = c.inst_id
AND    c.name = 'session pga memory'
AND    a.program IS NOT NULL
ORDER BY b.value DESC;
```

Script Output × Query Result ×

SQL | All Rows Fetched: 56 in 0.078 seconds

	INS...	USERN...	MODULE	PROGRAM	MEMORY_KB
32	1	DB207	SQL Developer	SQL Developer	2672
33	1	DB230	SQL Developer	SQL Developer	1840
34	1	DB247	SQL Developer	SQL Developer	2544
35	1	DB269	SQL Developer	SQL Developer	3201
36	1	DB287	SQL Developer	SQL Developer	2288
37	1	DB299	SQL Developer	SQL Developer	13488
38	1	DB501	SQL Developer	SQL Developer	7024
39	1	DB504	SQL Developer	SQL Developer	2672
40	1	DB506	SQL Developer	SQL Developer	2992
41	1	DB507	SQL Developer	SQL Developer	4272
42	1	DB509	SQL Developer	SQL Developer	2288
43	1	DB509	SQL Developer	SQL Developer	2672
44	1	DB510	SQL Developer	SQL Developer	3184
45	1	DB510	SQL Developer	SQL Developer	2736
46	1	DB511	SQL Developer	SQL Developer	17136
47	1	DB511	SQL Developer	SQL Developer	18736
48	1	DB514	SQL Developer	SQL Developer	4865
49	1	DB514	SQL Developer	SQL Developer	4208
50	1	DB515	SQL Developer	SQL Developer	2096
51	1	DB515	SQL Developer	SQL Developer	2864
52	1	DB515	SQL Developer	SQL Developer	1776
53	1	DB515	SQL Developer	SQL Developer	2928
54	1	DB570	SQL Developer	SQL Developer	2800
55	1	DB579	SQL Developer	SQL Developer	4016
56	1	DB579	SQL Developer	SQL Developer	2480

6. Queries

1) Outlets with most check-ins.

```
SELECT
   COUNT(customer_id),
   outlet_id
FROM
   check_in
GROUP BY
   outlet_id
ORDER BY COUNT(customer_id) DESC;
```

Worksheet | Query Builder

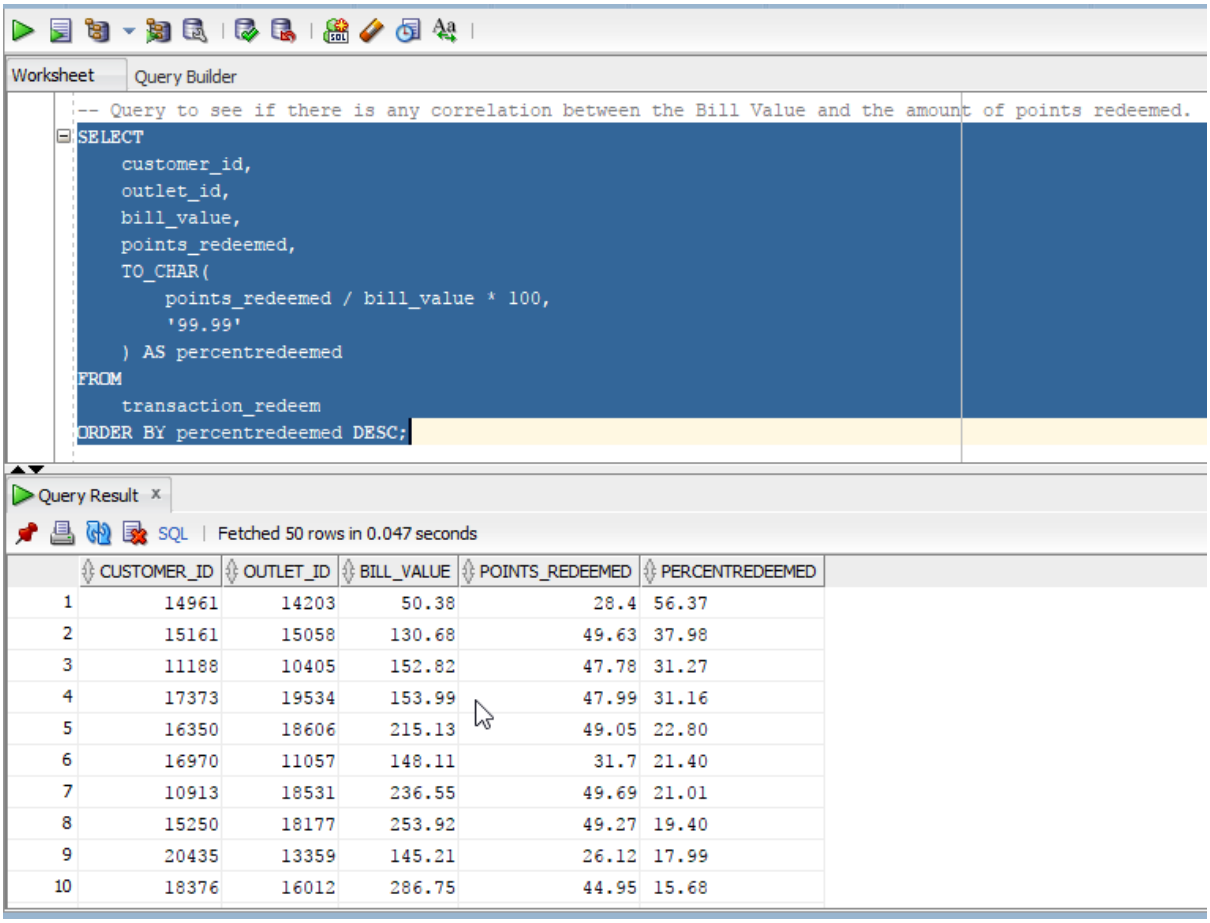
```
-- Outlets with most check-ins.
SELECT
    COUNT(customer_id),
    outlet_id
FROM
    check_in
GROUP BY
    outlet_id
ORDER BY COUNT(customer_id) DESC;
```

Query Result | SQL | Fetched 50 rows in 0.062 seconds

	COUNT(CUSTOMER_ID)	OUTLET_ID
1	2	12265
2	2	12463
3	2	16214
4	2	12228
5	2	11086
6	2	19055
7	2	18557
8	2	16460
9	2	14906
10	2	11641
11	2	15729
12	2	15914
13	2	18920

2) Query to see if there is any correlation between the Bill Value and the amount of points redeemed.

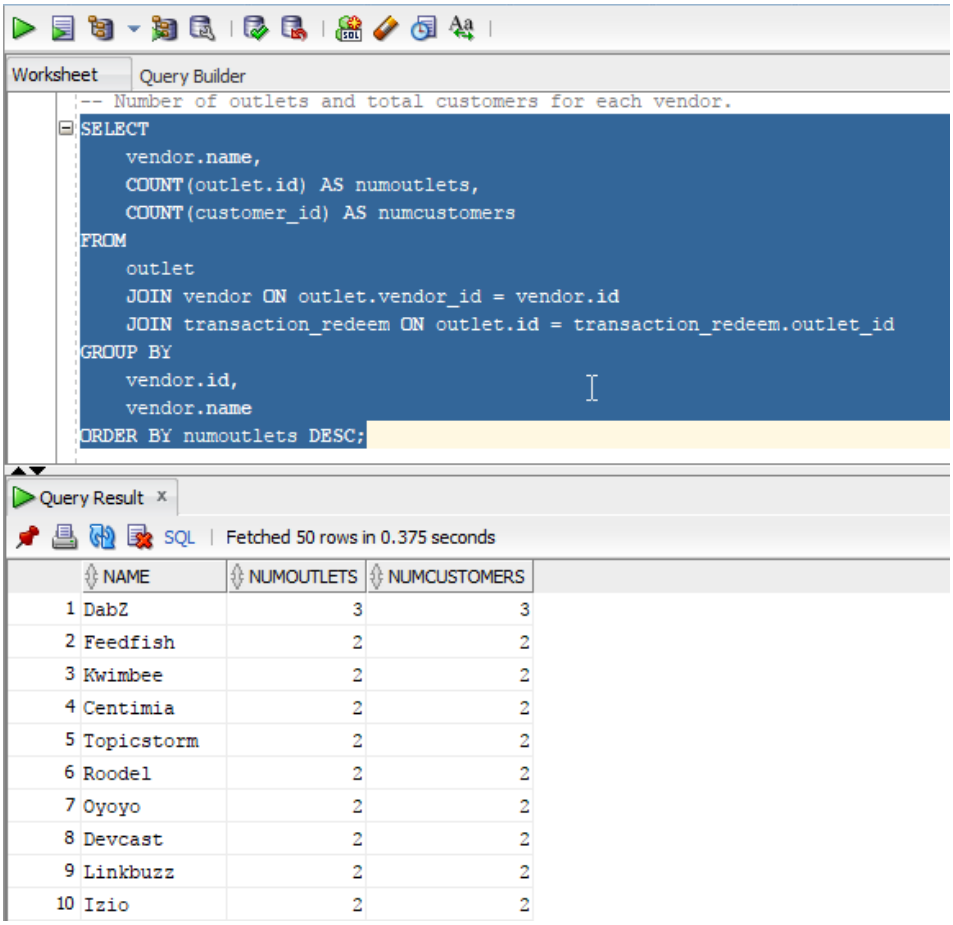
```
SELECT
   customer_id,
   outlet_id,
   bill_value,
   points_redeemed,
   TO_CHAR(
      points_redeemed / bill_value * 100,
      '99.99'
   ) AS percentredeemed
FROM
   transaction_redeem
ORDER BY percentredeemed DESC;
```



	CUSTOMER_ID	OUTLET_ID	BILL_VALUE	POINTS_REDEEMED	PERCENTREDEEMED
1	14961	14203	50.38	28.4	56.37
2	15161	15058	130.68	49.63	37.98
3	11188	10405	152.82	47.78	31.27
4	17373	19534	153.99	47.99	31.16
5	16350	18606	215.13	49.05	22.80
6	16970	11057	148.11	31.7	21.40
7	10913	18531	236.55	49.69	21.01
8	15250	18177	253.92	49.27	19.40
9	20435	13359	145.21	26.12	17.99
10	18376	16012	286.75	44.95	15.68

3) Number of outlets and total customers for each vendor.

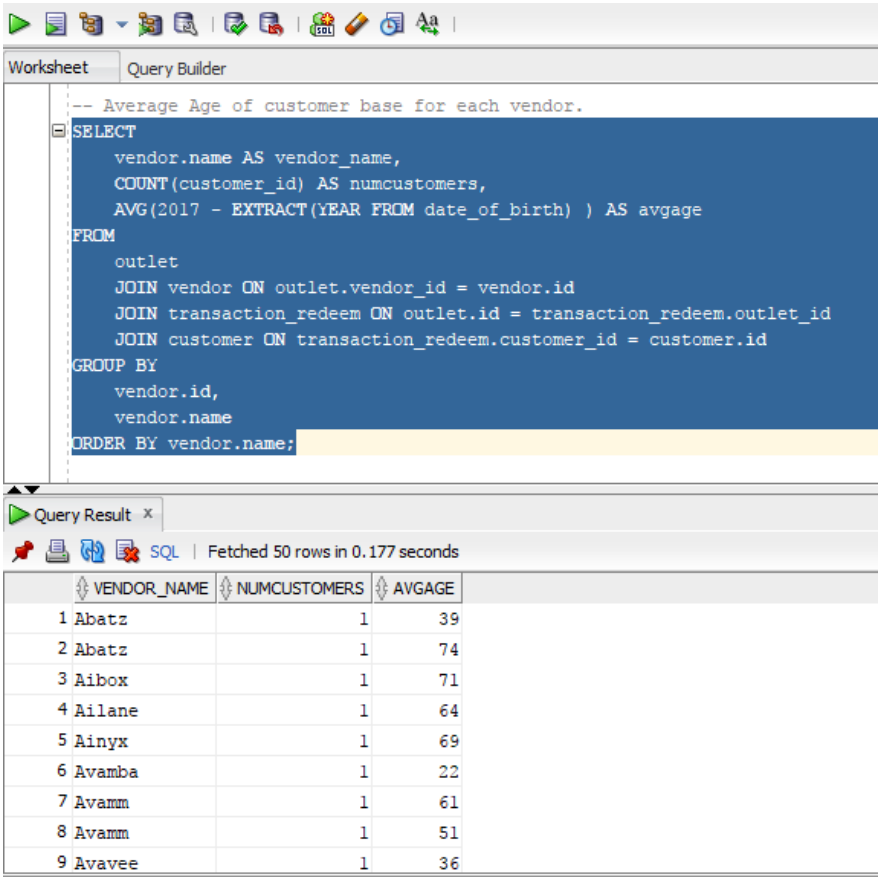
```
SELECT
   vendor.name,
   COUNT(outlet.id) AS numoutlets,
   COUNT(customer_id) AS numcustomers
FROM outlet
   JOIN vendor ON outlet.vendor_id = vendor.id
   JOIN transaction_redeem ON outlet.id = transaction_redeem.outlet_id
GROUP BY
   vendor.id,
   vendor.name
ORDER BY numoutlets DESC;
```



	NAME	NUMOUTLETS	NUMCUSTOMERS
1	DabZ	3	3
2	Feedfish	2	2
3	Kwimbee	2	2
4	Centimia	2	2
5	Topicstorm	2	2
6	Roodel	2	2
7	Oyoyo	2	2
8	Devcast	2	2
9	Linkbuzz	2	2
10	Izio	2	2

4) Average Age of customer base for each vendor.

```
SELECT
   vendor.name AS vendor_name,
   COUNT(customer_id) AS numcustomers,
   AVG(2017 - EXTRACT(YEAR FROM date_of_birth) ) AS avgage
FROM
   outlet
   JOIN vendor ON outlet.vendor_id = vendor.id
   JOIN transaction_redeem ON outlet.id = transaction_redeem.outlet_id
   JOIN customer ON transaction_redeem.customer_id = customer.id
GROUP BY
   vendor.id,
   vendor.name
ORDER BY vendor.name;
```

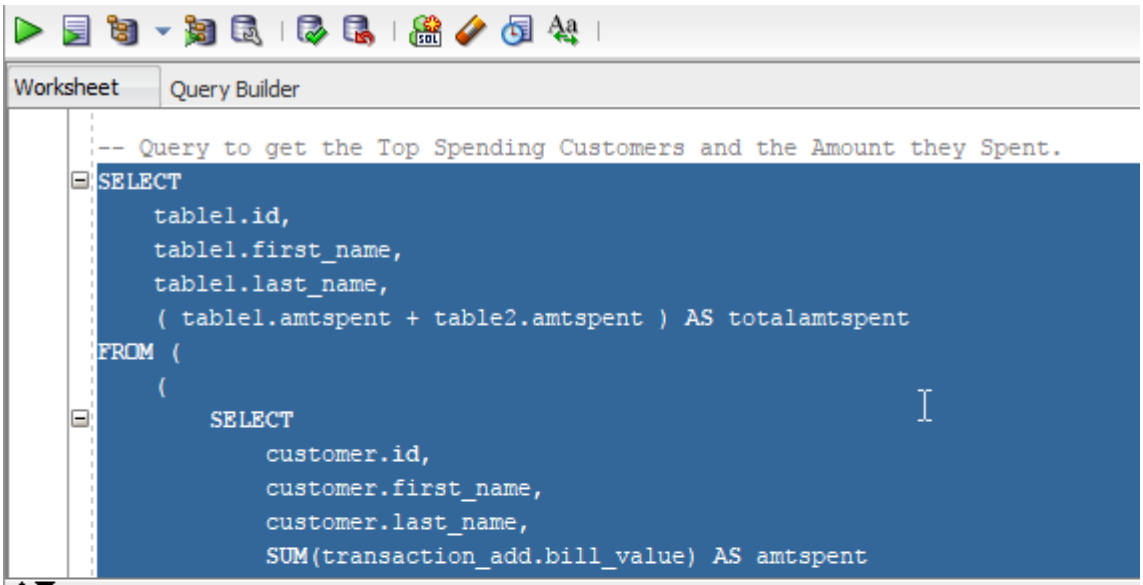


	VENDOR_NAME	NUMCUSTOMERS	AVGAGE
1	Abatz	1	39
2	Abatz	1	74
3	Aibox	1	71
4	Ailane	1	64
5	Ainyx	1	69
6	Avamba	1	22
7	Avamm	1	61
8	Avamm	1	51
9	Avavee	1	36

5) Query to get the Top Spending Customers and the Amount they Spent.

```
SELECT
   table1.id,
   table1.first_name,
   table1.last_name,
   ( table1.amtspent + table2.amtspent ) AS totalamtspent
FROM (
   (
      SELECT
         customer.id,
         customer.first_name,
         customer.last_name,
         SUM(transaction_add.bill_value) AS amtspent
      FROM
         customer
         JOIN transaction_add ON customer.id = transaction_add.customer_id
      GROUP BY
         customer.id,
         customer.first_name,
         customer.last_name
      ORDER BY amtspent DESC
   ) table1
   LEFT JOIN (
      SELECT
         customer.id,
         customer.first_name,
         customer.last_name,
         SUM(transaction_redeem.bill_value) AS amtspent
      FROM
```

```
        customer
        JOIN transaction_redeem ON customer.id = transaction_redeem.customer_id
    GROUP BY
        customer.id,
        customer.first_name,
        customer.last_name
    ORDER BY amtspent DESC
  ) table2 ON table1.id = table2.id
);
```



Query Result

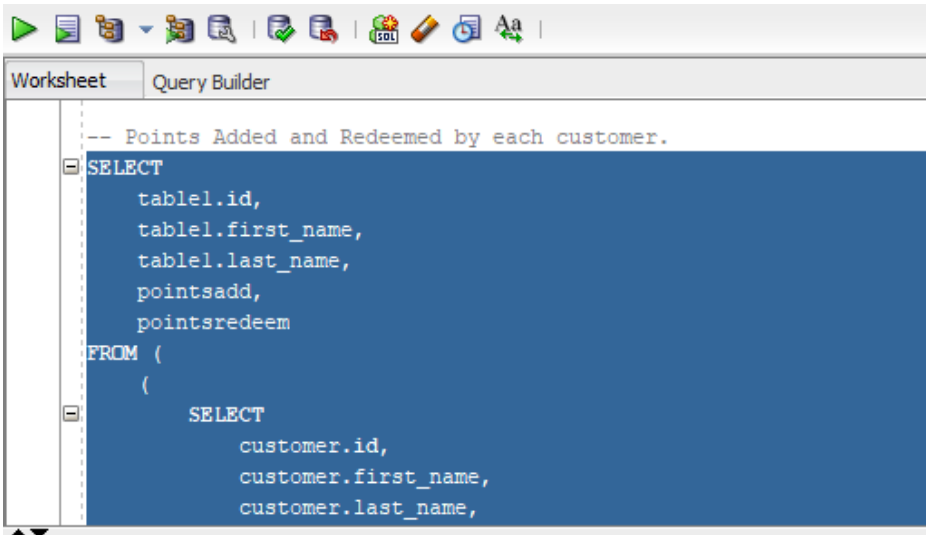
SQL | Fetched 50 rows in 0.063 seconds

	ID	FIRST_NAME	LAST_NAME	TOTALAMTSP...
1	11608	Estrella	Samu	1049.37
2	18059	Delmy	Ahle	2423.94
3	18346	Mariann	Bilden	3253.47
4	17951	Lonny	Weglarz	3292.4
5	14229	Leonida	Gobern	3465.02
6	12046	Fatima	Saylors	3723.14
7	13128	Van	Shire	3782.2
8	13082	Timothy	Mulqueen	4246.8
9	18545	Erick	Ferencz	4414.04
10	18747	Marvel	Raymo	4467.86

6) Points Added and Redeemed by each customer.

```
SELECT
   table1.id,
   table1.first_name,
   table1.last_name,
   pointsadd,
   pointsredeem
FROM (
   (
      SELECT
         customer.id,
         customer.first_name,
         customer.last_name,
         SUM(transaction_add.points_added) AS pointsadd
      FROM
         customer
         JOIN transaction_add ON customer.id = transaction_add.customer_id
      GROUP BY
         customer.id,
         customer.first_name,
         customer.last_name
      ORDER BY pointsadd DESC
   ) table1
   LEFT JOIN (
      SELECT
         customer.id,
         customer.first_name,
         customer.last_name,
         SUM(transaction_redeem.points_redeemed) AS pointsredeem
```

```
    FROM
      customer
      JOIN transaction_redeem ON customer.id = transaction_redeem.customer_id
    GROUP BY
      customer.id,
      customer.first_name,
      customer.last_name
    ORDER BY pointsredeem DESC
  ) table2 ON table1.id = table2.id
);
```



Query Result | SQL | Fetched 50 rows in 0.064 seconds

	ID	FIRST_NAME	LAST_NAME	POINTSADD	POINTSRED...
1	16757	Deandrea	Hughey	6.99	6.31
2	15564	Carmelina	Lindall	13.85	6.55
3	16055	Karl	Klonowski	19.1	7.59
4	16109	Donte	Kines	34.44	8.93
5	16928	Trinidad	Mcrae	49.29	13.88
6	14527	Chanel	Caudy	46.77	20.02
7	18059	Delmy	Ahle	6.34	21.36
8	18374	Zona	Colla	28.33	21.44
9	18346	Mariann	Bilden	35.25	22.64
10	15980	Refugia	Jacobos	11.98	22.69

7. Database Administration Programming

Stored procedure: We developed a PL/SQL script to populate data in summary table by iterating through rows of tables Customer, Vendor, Check_In, Transaction_Add, Transaction_Redeem

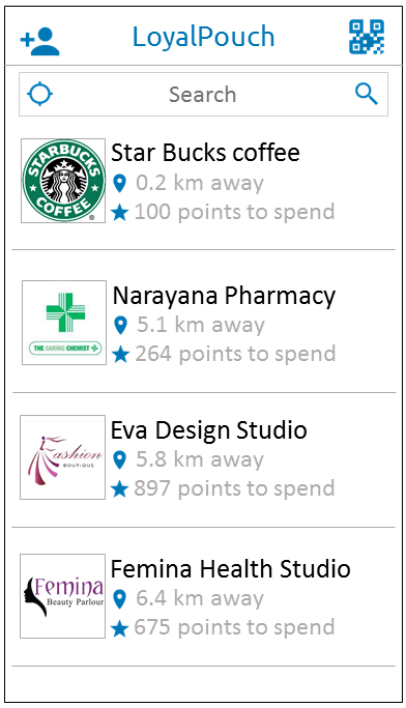
PLSQL Script

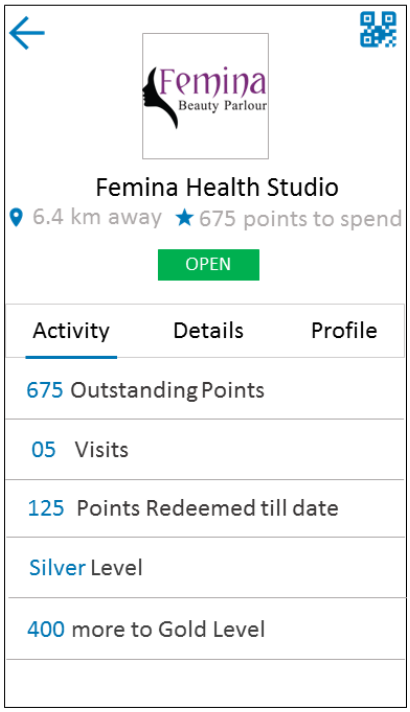
```
DECLARE
   ROW_ID PLS_INTEGER := 0;
   CUSTOMER_ID PLS_INTEGER := 10500;
   VENDOR_ID PLS_INTEGER := 10000;
   CHECKIN_POINTS DECIMAL(10, 2) := 0.00;
   TRANSACTION_POINTS DECIMAL(10, 2) := 0.00;
   TRANSACTION_ADD DECIMAL(10, 2) := 0.00;
   TRANASCTION_REDEEM DECIMAL (10, 2) := 0.00;
   FIRST_CHECKIN DATE := CURRENT_TIMESTAMP;
   FIRST_TRANSACTION_ADD DATE := CURRENT_TIMESTAMP;
   FIRST_TRANSACTION_REDEEM DATE := CURRENT_TIMESTAMP;
   LAST_CHECKIN DATE := CURRENT_TIMESTAMP;
   LAST_TRANSACTION_ADD DATE := CURRENT_TIMESTAMP;
   LAST_TRANSACTION_REDEEM DATE := CURRENT_TIMESTAMP;
   VISITS PLS_INTEGER := 0;
   TRANS_ADD_COUNT PLS_INTEGER := 0;
   TRANS_REDEEM_COUNT PLS_INTEGER := 0;
BEGIN
   <<OUTER_LOOP>>
   LOOP
   CUSTOMER_ID := CUSTOMER_ID + 1;
   VENDOR_ID := 10001;
      <<INNER_LOOP>>
      LOOP
      ROW_ID := ROW_ID + 1;
      VENDOR_ID := VENDOR_ID + 1;
      SELECT SUM(CHECKIN_POINTS) INTO :CHECKIN_POINTS FROM CHECK_IN
      INNER JOIN OUTLET ON CHECK_IN.OUTLET_ID = OUTLET.ID
      INNER JOIN VENDOR ON OUTLET.VENDOR_ID = VENDOR.ID
      WHERE CHECK_IN.CUSTOMER_ID = CUSTOMER_ID AND VENDOR.ID = VENDOR_ID;

      SELECT MIN(CHECK_IN.CREATED_TIME) INTO :FIRST_CHECKIN FROM CHECK_IN
      INNER JOIN OUTLET ON CHECK_IN.OUTLET_ID = OUTLET.ID
      INNER JOIN VENDOR ON OUTLET.VENDOR_ID = VENDOR.ID
      WHERE CHECK_IN.CUSTOMER_ID = CUSTOMER_ID AND VENDOR.ID = VENDOR_ID;

      SELECT MAX(CHECK_IN.CREATED_TIME) INTO :LAST_CHECKIN FROM CHECK_IN
      INNER JOIN OUTLET ON CHECK_IN.OUTLET_ID = OUTLET.ID
      INNER JOIN VENDOR ON OUTLET.VENDOR_ID = VENDOR.ID
      WHERE CHECK_IN.CUSTOMER_ID = CUSTOMER_ID AND VENDOR.ID = VENDOR_ID;
```

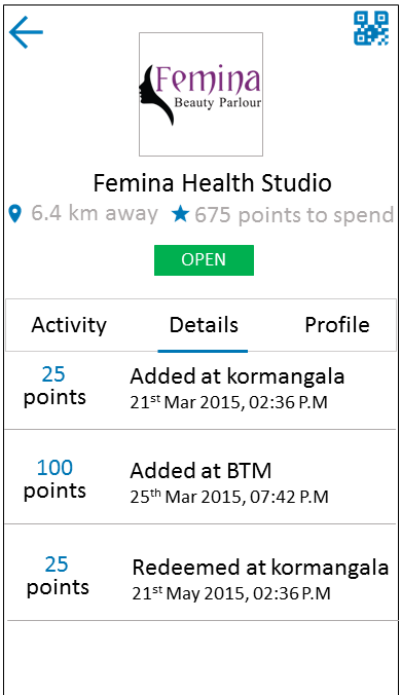
```
    SELECT COUNT(*) INTO :VISITS FROM CHECK_IN
    INNER JOIN OUTLET ON CHECK_IN.OUTLET_ID = OUTLET.ID
    INNER JOIN VENDOR ON OUTLET.VENDOR_ID = VENDOR.ID
    WHERE CHECK_IN.CUSTOMER_ID = CUSTOMER_ID AND VENDOR.ID = VENDOR_ID;

    SELECT SUM(POINTS_AFTER_TRANSACTION) INTO :TRANSACTION_ADD FROM
TRANSACTION_ADD
    INNER JOIN OUTLET ON TRANSACTION_ADD.OUTLET_ID = OUTLET.ID
    INNER JOIN VENDOR ON OUTLET.VENDOR_ID = VENDOR.ID
    WHERE TRANSACTION_ADD.CUSTOMER_ID = CUSTOMER_ID AND VENDOR.ID = VENDOR_ID;

    SELECT MIN(TRANSACTION_ADD.CREATED_TIME) INTO :FIRST_TRANSACTION_ADD FROM
TRANSACTION_ADD
    INNER JOIN OUTLET ON TRANSACTION_ADD.OUTLET_ID = OUTLET.ID
    INNER JOIN VENDOR ON OUTLET.VENDOR_ID = VENDOR.ID
    WHERE TRANSACTION_ADD.CUSTOMER_ID = CUSTOMER_ID AND VENDOR.ID = VENDOR_ID;

    SELECT MAX(TRANSACTION_ADD.CREATED_TIME) INTO :LAST_TRANSACTION_ADD FROM
TRANSACTION_ADD
    INNER JOIN OUTLET ON TRANSACTION_ADD.OUTLET_ID = OUTLET.ID
    INNER JOIN VENDOR ON OUTLET.VENDOR_ID = VENDOR.ID
    WHERE TRANSACTION_ADD.CUSTOMER_ID = CUSTOMER_ID AND VENDOR.ID = VENDOR_ID;

    SELECT COUNT(*) INTO :TRANS_ADD_COUNT FROM TRANSACTION_ADD
    INNER JOIN OUTLET ON TRANSACTION_ADD.OUTLET_ID = OUTLET.ID
    INNER JOIN VENDOR ON OUTLET.VENDOR_ID = VENDOR.ID
    WHERE TRANSACTION_ADD.CUSTOMER_ID = CUSTOMER_ID AND VENDOR.ID = VENDOR_ID;

    SELECT SUM(POINTS_AFTER_TRANSACTION) INTO :TRANASCTION_REDEEM FROM
TRANSACTION_REDEEM
    INNER JOIN OUTLET ON TRANSACTION_REDEEM.OUTLET_ID = OUTLET.ID
    INNER JOIN VENDOR ON OUTLET.VENDOR_ID = VENDOR.ID
    WHERE TRANSACTION_REDEEM.CUSTOMER_ID = CUSTOMER_ID AND VENDOR.ID = VENDOR_ID;

    SELECT MIN(TRANSACTION_REDEEM.CREATED_TIME) INTO :FIRST_TRANSACTION_REDEEM
FROM TRANSACTION_REDEEM
    INNER JOIN OUTLET ON TRANSACTION_REDEEM.OUTLET_ID = OUTLET.ID
    INNER JOIN VENDOR ON OUTLET.VENDOR_ID = VENDOR.ID
    WHERE TRANSACTION_REDEEM.CUSTOMER_ID = CUSTOMER_ID AND VENDOR.ID = VENDOR_ID;

    SELECT MAX(TRANSACTION_REDEEM.CREATED_TIME) INTO :LAST_TRANSACTION_REDEEM
FROM TRANSACTION_REDEEM
    INNER JOIN OUTLET ON TRANSACTION_REDEEM.OUTLET_ID = OUTLET.ID
    INNER JOIN VENDOR ON OUTLET.VENDOR_ID = VENDOR.ID
    WHERE TRANSACTION_REDEEM.CUSTOMER_ID = CUSTOMER_ID AND VENDOR.ID = VENDOR_ID;

    SELECT COUNT(*) INTO :TRANS_REDEEM_COUNT FROM TRANSACTION_REDEEM
```

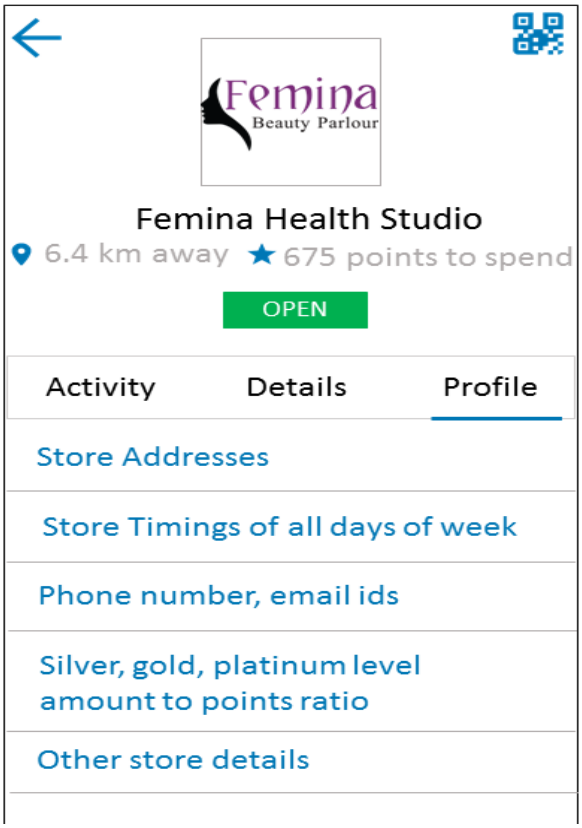
```
    INNER JOIN OUTLET ON TRANSACTION_REDEEM.OUTLET_ID = OUTLET.ID
    INNER JOIN VENDOR ON OUTLET.VENDOR_ID = VENDOR.ID
    WHERE TRANSACTION_REDEEM.CUSTOMER_ID = CUSTOMER_ID AND VENDOR.ID = VENDOR_ID;

    TRANSACTION_POINTS := TRANSACTION_ADD + TRANASCTION_REDEEM;

    INSERT INTO CUSTOMER_OUTSTANDING_SUMMARY (
      ID,
      CUSTOMER_ID,
      VENDOR_ID,
      CHECKIN_POINTS,
      TRANSACTION_POINTS,
      TRANSACTION_ADD,
      TRANSACTION_REDEEM,
      FIRST_CHECKIN,
      FIRST_TRANSACTION_ADD,
      FIRST_TRANSACTION_REDEEM,
      LAST_CHECKIN,
      LAST_TRANSACTION_ADD,
      LAST_TRANSACTION_REDEEM,
      VISITS,
      TRANS_ADD_COUNT,
      TRANS_REDEEM_COUNT
      ) VALUES (
      ROW_ID,
      CUSTOMER_ID,
      VENDOR_ID,
      CHECKIN_POINTS,
      TRANSACTION_POINTS,
      TRANSACTION_ADD,
      TRANASCTION_REDEEM,
      FIRST_CHECKIN,
      FIRST_TRANSACTION_ADD,
      FIRST_TRANSACTION_REDEEM,
      LAST_CHECKIN,
      LAST_TRANSACTION_ADD,
      LAST_TRANSACTION_REDEEM,
      VISITS,
      TRANS_ADD_COUNT,
      TRANS_REDEEM_COUNT
      );

    EXIT INNER_LOOP WHEN VENDOR_ID = 20000;
    EXIT OUTER_LOOP WHEN CUSTOMER_ID = 20500;
    END LOOP INNER_LOOP;
  END LOOP OUTER_LOOP;
END;
```

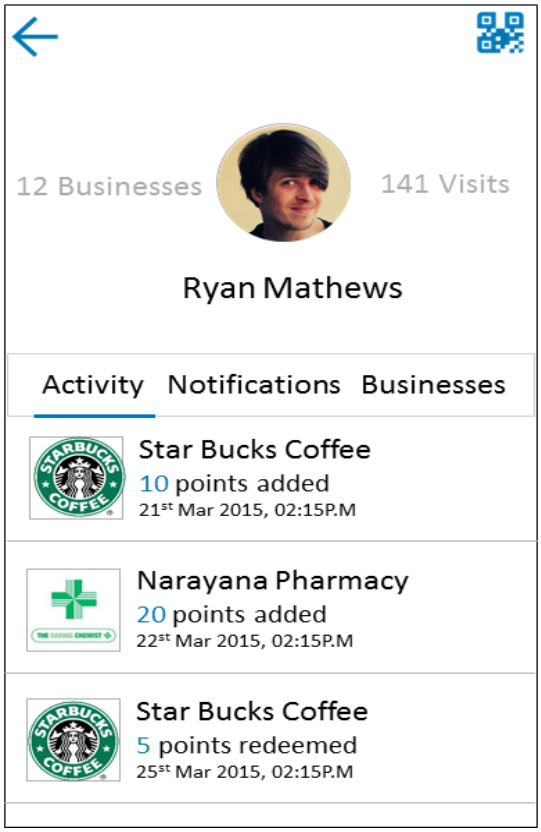
8. User Interfaces

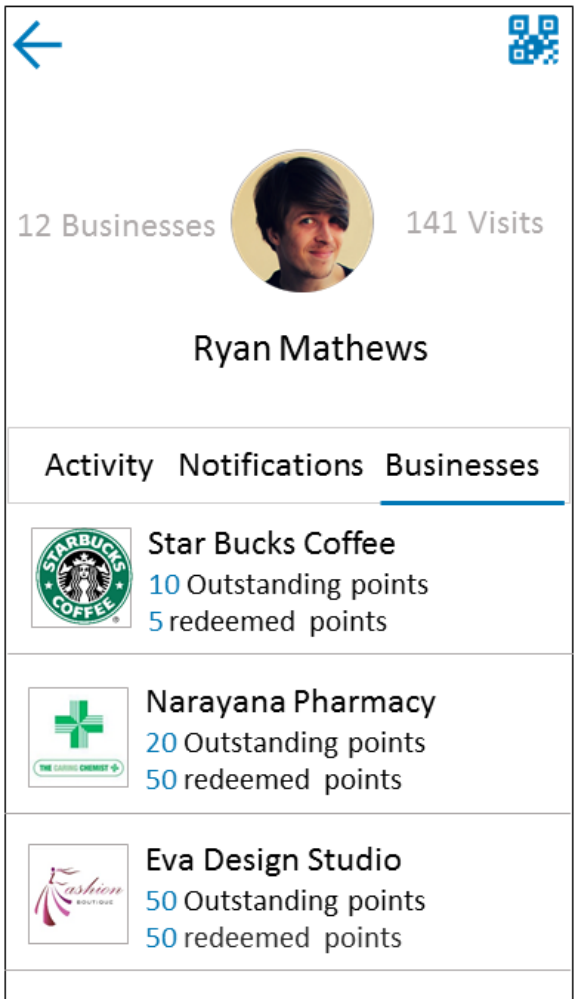


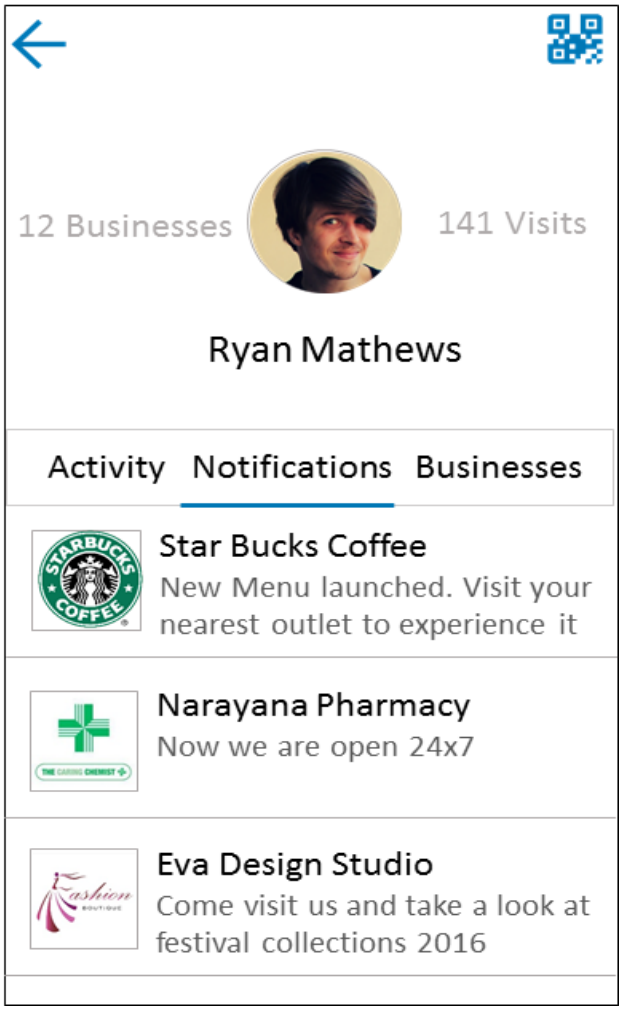









12 Businesses
141 Visits
Ryan Mathews
Activity
Notifications
Businesses
Star Bucks Coffee
10 Outstanding points
5 redeemed points
Narayana Pharmacy
20 Outstanding points
50 redeemed points
Eva Design Studio
50 Outstanding points
50 redeemed points


12 Businesses
141 Visits
Ryan Mathews
Activity
Notifications
Businesses
Star Bucks Coffee
New Menu launched. Visit your nearest outlet to experience it
Narayana Pharmacy
Now we are open 24x7
Eva Design Studio
Come visit us and take a look at festival collections 2016

Topic / Section	Description	Evaluation
Logical database design	The logical design section should include entity-relationship diagrams (ERDs) and data dictionaries for your database design, as well as any design assumptions. There should also be a complete ERD for your entire project. There is no expectation that you implement all of your design, just indicate the areas built.	20
Physical database design	This section should cover implementation-level issues. For instance, discuss predicted usage and indexing strategies that support expected activities. In addition, you may wish to discuss architecture issues, including distributed database issues (even though you may not implement anything in these areas). Artifacts could include capacity planning, storage subsystems, and data placement (e.g., tablespace / file system arrangements), indexing strategies, transaction usage maps, etc.	20
Data generation and loading	Describe the queries, stored procedures, desktop tools (e.g., MS Excel) that were used to populate the database. You may have used queries with mod function, data arithmetic, number sequences, lookup tables, and even data from the Web. Any / all of these are interesting additions to the project. You must create and populate at least five tables from your design. Two of those tables must include at least 10,000 records a piece. Include a count of the number of rows inserted into each table.	10
Performance tuning	In this section, highlight any experiments run as part of the project related to performance tuning. Experiments with different indexing strategies, optimizer changes, transaction isolation levels, function-based indexes, and table partitioning can all be interesting. Remember to look at different types of queries (e.g., point, range, scan), execution plans, and I/O burden. For each experiment include the following: (1) purpose of the experiment, (2) steps followed to run the experiment, (3) key results (include screenshots, figures, and/or tables to help highlight results), and (4) a discussion of the results that explains what happened and why.	10
Querying	In this section, create queries that highlight the types of questions that can be answered by the database. These queries should demonstrate your skills in query writing. (Analytic SQL extensions may be explored for this section.)	10
DBA scripts	During the semester, we looked at example DBA scripts that query the system catalog (a good way to explore the database engine). Provide DBA scripts that are helpful for reporting on database objects, indexes, constraints, physical storage, data files, etc. For each script provide the following: (1) SQL / PL/SQL code, (2) description of why the script is useful, (3) how the script could be used, and (4) some sample results from executing the script.	10
Database programming	For this section, highlight any stored procedures, functions, or triggers that were created that are not included in the data generation and loading topic.	10
Database security	Database security is an important area of interest that can also be investigated. Though you are limited on the implementation side, you can develop a security policy and discuss how you would implement various aspects using authentication strategies, roles, profiles, and even auditing features.	0
Interface design / Data visualization	Though interface issues are not typically the focus of the project, you are free to add emphasis here. You can do everything from sketches and mock-ups, to using HTML and other web-enabled tools to build an interface. You can also experiment with creating visualizations for your data using a variety of freely-available tools such as Tableau Public.	10