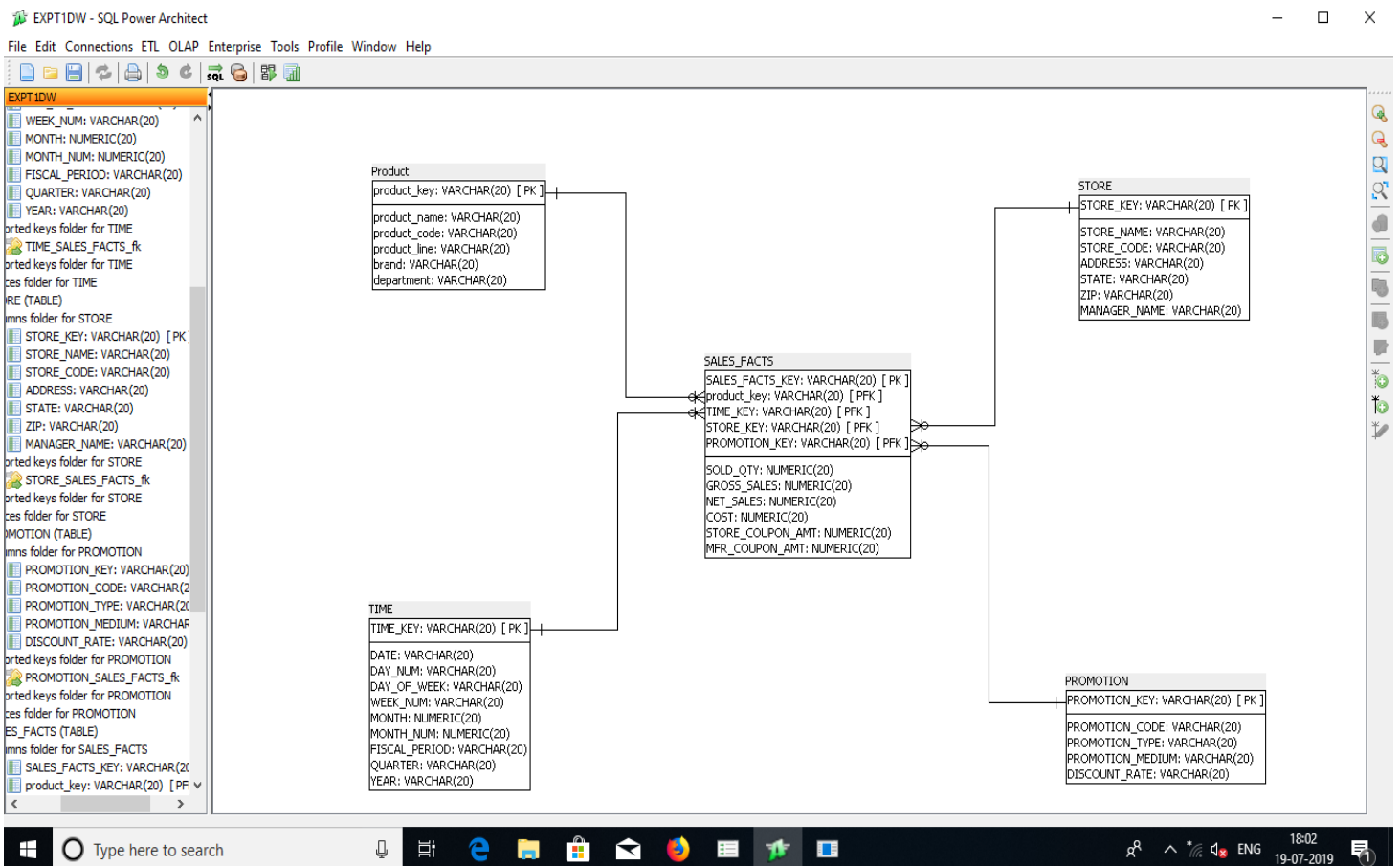# Practical No 1

AIM: Design a Star Schema Architecture For Given Problem.

Star Schema :

Db table :

--STAR SCHEMA

```sql
 CREATE TABLE TIME (
 TIME_KEY VARCHAR2(10) NOT NULL,
 MONTH_NUMBER NUMBER NOT NULL,
 MONTH VARCHAR2(20) NOT NULL,
 QUARTER NUMBER NOT NULL,
 FISCAL_PERIOD NUMBER NOT NULL,
 YEAR NUMBER NOT NULL,
 CONSTRAINT TIME_PK PRIMARY KEY (TIME_KEY)
 );


 CREATE TABLE PLAN (
 PLAN_KEY VARCHAR2(10) NOT NULL,
 PLAN_NAME VARCHAR2(20) NOT NULL,
 PLAN_CODE NUMBER NOT NULL,
 NUM_OF_PHONES NUMBER NOT NULL,
 MONTHLY_MINUTES NUMBER NOT NULL,
 ROLLOVER_MINUTES NUMBER NOT NULL,
 CONSTRAINT PLAN_PK PRIMARY KEY (PLAN_KEY)
 );


 CREATE TABLE STATUS (
 STATUS_KEY VARCHAR2(10) NOT NULL,
 NEW_CUSTOMER VARCHAR2(20) NOT NULL,
 NEW_ADDRESS VARCHAR2(45) NOT NULL,
 PAYMENT_OVERDUE NUMBER NOT NULL,
 CLOSED_THIS_PERIOD NUMBER NOT NULL,
 CONSTRAINT STATUS_PK PRIMARY KEY (STATUS_KEY)
 );


 CREATE TABLE CUSTOMER (
 CUSTOMER_KEY VARCHAR2(10) NOT NULL,
 CUSTOMER_NAME VARCHAR2(20) NOT NULL,
 CUSTOMER_CODE NUMBER NOT NULL,
 FAMILY_SIZE NUMBER NOT NULL,
 ADDRESS VARCHAR2(45) NOT NULL,
 STATE VARCHAR2(20) NOT NULL,
 ZIP NUMBER NOT NULL,
 CONSTRAINT CUSTOMER_PK PRIMARY KEY (CUSTOMER_KEY)
 );


 CREATE TABLE USAGE_FACTS (
 PLAN_MINUTES NUMBER NOT NULL,
 MNTHLY_ACCESS_CHARGES NUMBER NOT NULL,
 OVERAGE_MINUTES NUMBER NOT NULL,
 MNTHLY_OVERAGE_CHARGES NUMBER NOT NULL,
 VOICE_USAGE NUMBER NOT NULL,
 DATA_USAGE VARCHAR2(10) NOT NULL,
 CUSTOMER_KEY VARCHAR2(10) NOT NULL,
```

```
STATUS_KEY VARCHAR2(10) NOT NULL,
TIME_KEY VARCHAR2(10) NOT NULL,
PLAN_KEY VARCHAR2(10) NOT NULL
);


ALTER TABLE USAGE_FACTS ADD CONSTRAINT TIME_USAGE_FACTS_FK
FOREIGN KEY (TIME_KEY)
REFERENCES TIME (TIME_KEY)
NOT DEFERRABLE;

ALTER TABLE USAGE_FACTS ADD CONSTRAINT PLAN_USAGE_FACTS_FK
FOREIGN KEY (PLAN_KEY)
REFERENCES PLAN (PLAN_KEY)
NOT DEFERRABLE;

ALTER TABLE USAGE_FACTS ADD CONSTRAINT STATUS_USAGE_FACTS_FK
FOREIGN KEY (STATUS_KEY)
REFERENCES STATUS (STATUS_KEY)
NOT DEFERRABLE;

ALTER TABLE USAGE_FACTS ADD CONSTRAINT CUSTOMER_USAGE_FACTS_FK
FOREIGN KEY (CUSTOMER_KEY)
REFERENCES CUSTOMER (CUSTOMER_KEY)
NOT DEFERRABLE;

DESC CUSTOMER;
Name Null? Type
---------------------- -------- ----------------
CUSTOMER_KEY NOT NULL VARCHAR2(10)
CUSTOMER_NAME NOT NULL VARCHAR2(20)
CUSTOMER_CODE NOT NULL NUMBER
FAMILY_SIZE NOT NULL NUMBER
ADDRESS NOT NULL VARCHAR2(45)
STATE NOT NULL VARCHAR2(20)
ZIP NOT NULL NUMBER

INSERT INTO CUSTOMER VALUES('101','NISHI',11,5,'SAMARTHWADI','MAHARASHTRA',445001);
INSERT INTO CUSTOMER VALUES('102','NIDHI',21,9,'RAMNAGAR','MAHARASHTRA',440010);

SQL> SELECT* FROM CUSTOMER;

CUSTOMER_K CUSTOMER_NAME CUSTOMER_CODE FAMILY_SIZE
---------- -------------------- ------------- -----------
ADDRESS STATE ZIP
---------------------------------------------- ------------------- ----------
101 Rashi 11 5
SAMARTHWADI MAHARASHTRA 445001

102 sakshi  21 9
RAMNAGAR MAHARASHTRA 440010


SQL> DESC STATUS;
Name Null? Type
---------------------- -------- ----------------
```

STATUS_KEY NOT NULL VARCHAR2(10)
NEW_CUSTOMER NOT NULL VARCHAR2(20)
NEW_ADDRESS NOT NULL VARCHAR2(45)
PAYMENT_OVERDUE NOT NULL NUMBER
CLOSED_THIS_PERIOD NOT NULL NUMBER

INSERT INTO STATUS VALUES('101','MEGHA','NARENDRANAGAR',2000,1997);
INSERT INTO STATUS VALUES('102','SAKSHI','VASHI',20,2000);

SQL> SELECT* FROM STATUS;

STATUS_KEY NEW_CUSTOMER NEW_ADDRESS
---------- -------------------- ---
PAYMENT_OVERDUE CLOSED_THIS_PERIOD
--------------- ------------------
101 MEGHA NARENDRANAGAR
2000 1997

102 SAKSHI VASHI
20 2000

SQL> DESC PLAN;
Name Null? Type
---------------------------- -------- -------------------
PLAN_KEY NOT NULL VARCHAR2(10)
PLAN_NAME NOT NULL VARCHAR2(20)
PLAN_CODE NOT NULL NUMBER
NUM_OF_PHONES NOT NULL NUMBER
MONTHLY_MINUTES NOT NULL NUMBER
ROLLOVER_MINUTES NOT NULL NUMBER

INSERT INTO PLAN VALUES('101','VIP',41,1,1200,70);
INSERT INTO PLAN VALUES('102','SPORT',12,1,700,20);

SQL> SELECT* FROM PLAN;

PLAN_KEY PLAN_NAME PLAN_CODE NUM_OF_PHONES MONTHLY_MINUTES
---------- -------------------- ---------- ------------- ---------------
ROLLOVER_MINUTES
----
101 VIP 41 1 1200
70

102 SPORT 12 1 700
20
SQL> DESC TIME;
Name Null? Type
---------------------------- -------- -------------------
TIME_KEY NOT NULL VARCHAR2(10)
MONTH_NUMBER NOT NULL NUMBER
MONTH NOT NULL VARCHAR2(20)
QUARTER NOT NULL NUMBER
FISCAL_PERIOD NOT NULL NUMBER
YEAR NOT NULL NUMBER

INSERT INTO TIME VALUES('101',25,'APRIL',1,2,2021);
INSERT INTO TIME VALUES('102',27,'MAY',4,2,2021);

SQL> SELECT* FROM TIME;

TIME_KEY MONTH_NUMBER MONTH QUARTER FISCAL_PERIOD YEAR
---------- ------------ -------------------- ---------- ------------- ----------
T101 3 MARCH 1 3 2020
T102 5 MAY 2 4 2020

SQL> DESC USAGE_FACTS;
Name Null? Type
----------------------------- -------- --------------------
PLAN_MINUTES NOT NULL NUMBER
MNTHLY_ACCESS_CHARGES NOT NULL NUMBER
OVERAGE_MINUTES NOT NULL NUMBER
MNTHLY_OVERAGE_CHARGES NOT NULL NUMBER
VOICE_USAGE NOT NULL NUMBER
DATA_USAGE NOT NULL VARCHAR2(10)
CUSTOMER_KEY NOT NULL VARCHAR2(10)
STATUS_KEY NOT NULL VARCHAR2(10)
TIME_KEY NOT NULL VARCHAR2(10)
PLAN_KEY NOT NULL VARCHAR2(10)

INSERT INTO USAGE_FACTS
VALUES(1200,100,300,989,5000,'550000KB','101','101','101','101');
INSERT INTO USAGE_FACTS
VALUES(500,300,50,579,50000,'70000000KB','102','102','102','102');

SQL> SELECT* FROM USAGE_FACTS;

PLAN_MINUTES MNTHLY_ACCESS_CHARGES OVERAGE_MINUTES MNTHLY_OVERAGE_CHARGES
------------ --------------------- --------------- ----------------------
VOICE_USAGE DATA_USAGE CUSTOMER_K STATUS_KEY TIME_KEY PLAN_KEY
----------- ---------- ---------- ---------- ---------- ----------
1200 100 300 989
5000 550000KB 101 101 101 101

500 300 50 579
50000 70000000KB 102 102 102 102

Snowflake schema :

PLAN

PLAN_KEY: VARCHAR(10) [PK]

PLAN_NAME: VARCHAR(20)
PLAN_CODE: NUMERIC
NUM_OF_PHONES: NUMERIC
MONTHLY_MINUTES: NUMERIC
ROLLOVER_MINUTES: NUMERIC

CUSTOMER

CUSTOMER_KEY: VARCHAR(10) [PK]

CUSTOMER_NAME: VARCHAR(20)
CUSTOMER_CODE: NUMERIC
FAMILY_SIZE: NUMERIC
LOCATION_KEY: VARCHAR(10) [FK]

LOCATION

LOCATION_KEY: VARCHAR(10) [PK]

STREET: VARCHAR(20)
CITY: VARCHAR(20)
STATE: VARCHAR(20)
COUNTRY: VARCHAR(20)
ZIP: NUMERIC

SALES

PLAN_MINUTES: NUMERIC
OVERAGE_MINUTES: NUMERIC
MNTHLY_ACCESS_CHARGES: NUMERIC
MNTHLY_OVERAGE_CHARGES: NUMERIC
VOICE_USAGE: NUMERIC
DATA_USAGE: VARCHAR(10)
CUSTOMER_KEY: VARCHAR(10) [FK]
STATUS_KEY: VARCHAR(10) [FK]
PLAN_KEY: VARCHAR(10) [FK]
TIME_KEY: VARCHAR(10) [FK]

TIME

TIME_KEY: VARCHAR(10) [PK]

MONTH_NUMBER: NUMERIC
MONTH: VARCHAR(20)
QUARTER: NUMERIC
FISCAL_PERIOD: NUMERIC
YEAR: NUMERIC

STATUS

STATUS_KEY: VARCHAR(10) [PK]

NEW_CUSTOMER: VARCHAR(20)
NEW_ADDRESS: VARCHAR(45)
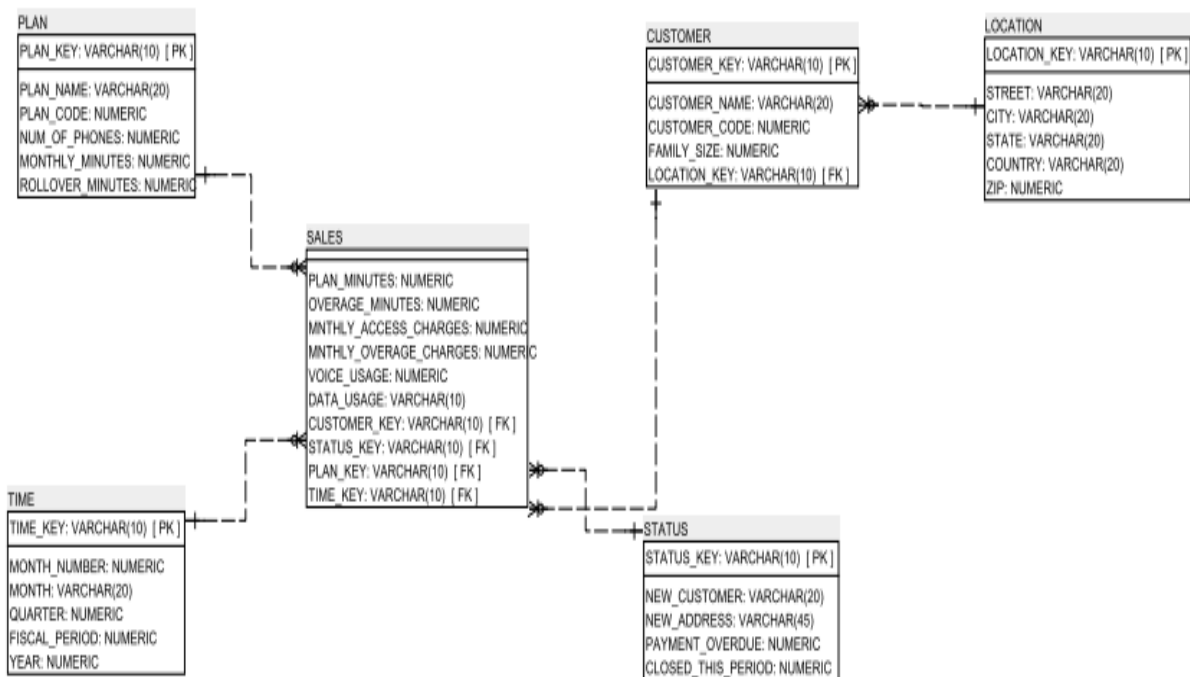PAYMENT_OVERDUE: NUMERIC
CLOSED_THIS_PERIOD: NUMERIC

Table Creation :

--SNOWFLAKE SCHEMA

```sql
CREATE TABLE LOCATION (
LOCATION_KEY VARCHAR2(10) NOT NULL,
STREET VARCHAR2(20) NOT NULL,
CITY VARCHAR2(20) NOT NULL,
STATE VARCHAR2(20) NOT NULL,
COUNTRY VARCHAR2(20) NOT NULL,
ZIP NUMBER NOT NULL,
CONSTRAINT LOCATION_PK PRIMARY KEY (LOCATION_KEY)
);


CREATE TABLE CUSTOMER (
CUSTOMER_KEY VARCHAR2(10) NOT NULL,
CUSTOMER_NAME VARCHAR2(20) NOT NULL,
CUSTOMER_CODE NUMBER NOT NULL,
FAMILY_SIZE NUMBER NOT NULL,
LOCATION_KEY VARCHAR2(10) NOT NULL,
CONSTRAINT CUSTOMER_PK PRIMARY KEY (CUSTOMER_KEY)
);


CREATE TABLE STATUS (
STATUS_KEY VARCHAR2(10) NOT NULL,
NEW_CUSTOMER VARCHAR2(20) NOT NULL,
NEW_ADDRESS VARCHAR2(45) NOT NULL,
PAYMENT_OVERDUE NUMBER NOT NULL,
CLOSED_THIS_PERIOD NUMBER NOT NULL,
CONSTRAINT STATUS_PK PRIMARY KEY (STATUS_KEY)
);


CREATE TABLE TIME (
TIME_KEY VARCHAR2(10) NOT NULL,
MONTH_NUMBER NUMBER NOT NULL,
MONTH VARCHAR2(20) NOT NULL,
QUARTER NUMBER NOT NULL,
FISCAL_PERIOD NUMBER NOT NULL,
YEAR NUMBER NOT NULL,
CONSTRAINT TIME_PK PRIMARY KEY (TIME_KEY)
);


CREATE TABLE PLAN (
PLAN_KEY VARCHAR2(10) NOT NULL,
PLAN_NAME VARCHAR2(20) NOT NULL,
PLAN_CODE NUMBER NOT NULL,
NUM_OF_PHONES NUMBER NOT NULL,
MONTHLY_MINUTES NUMBER NOT NULL,
ROLLOVER_MINUTES NUMBER NOT NULL,
CONSTRAINT PLAN_PK PRIMARY KEY (PLAN_KEY));
```

```sql
CREATE TABLE SALES (
PLAN_MINUTES NUMBER NOT NULL,
OVERAGE_MINUTES NUMBER NOT NULL,
MNTHLY_ACCESS_CHARGES NUMBER NOT NULL,
MNTHLY_OVERAGE_CHARGES NUMBER NOT NULL,
VOICE_USAGE NUMBER NOT NULL,
DATA_USAGE VARCHAR2(10) NOT NULL,
CUSTOMER_KEY VARCHAR2(10) NOT NULL,
STATUS_KEY VARCHAR2(10) NOT NULL,
PLAN_KEY VARCHAR2(10) NOT NULL,
TIME_KEY VARCHAR2(10) NOT NULL);


ALTER TABLE CUSTOMER ADD CONSTRAINT LOCATION_CUSTOMER_FK
FOREIGN KEY (LOCATION_KEY)
 REFERENCES LOCATION (LOCATION_KEY)
 NOT DEFERRABLE;

 ALTER TABLE SALES ADD CONSTRAINT CUSTOMER_SALES_FK
 FOREIGN KEY (CUSTOMER_KEY)
 REFERENCES CUSTOMER (CUSTOMER_KEY)
 NOT DEFERRABLE;

 ALTER TABLE SALES ADD CONSTRAINT STATUS_SALES_FK
 FOREIGN KEY (STATUS_KEY)
 REFERENCES STATUS (STATUS_KEY)
 NOT DEFERRABLE;

 ALTER TABLE SALES ADD CONSTRAINT TIME_SALES_FK
 FOREIGN KEY (TIME_KEY)
 REFERENCES TIME (TIME_KEY)
 NOT DEFERRABLE;

 ALTER TABLE SALES ADD CONSTRAINT PLAN_SALES_FK
 FOREIGN KEY (PLAN_KEY)
 REFERENCES PLAN (PLAN_KEY)
 NOT DEFERRABLE;

 SQL> desc location;
 Name Null? Type
 ----------------------------------------- -------- ---------------------------
 LOCATION_KEY NOT NULL VARCHAR2(10)
 STREET NOT NULL VARCHAR2(20)
 CITY NOT NULL VARCHAR2(20)
STATE NOT NULL VARCHAR2(20)
COUNTRY NOT NULL VARCHAR2(20)
ZIP NOT NULL NUMBER(38)

INSERT INTO LOCATION VALUES('101','FUTULA LAKE','NGP','MH','INDIA',440010);
INSERT INTO LOCATION VALUES('102','RING ROAD','NGP','MH','INDIA',440011);

SQL> SELECT* FROM LOCATION;

LOCATION_K STREET CITY STATE
---------- -------------------- -------------------- --------------------
COUNTRY ZIP
```

```
-------------------- ----------
101 FUTULA LAKE NGP MH
 INDIA 440010

 102 RING ROAD NGP MH
 INDIA 440011


SQL> DESC CUSTOMER;
Name Null? Type
---------------------------- -------- --------------------
CUSTOMER_KEY NOT NULL VARCHAR2(10)
CUSTOMER_NAME NOT NULL VARCHAR2(20)
CUSTOMER_CODE NOT NULL NUMBER(38)
FAMILY_SIZE NOT NULL NUMBER(38)
LOCATION_KEY NOT NULL VARCHAR2(10)

INSERT INTO CUSTOMER VALUES('101','NIDHI',31,7,'101');
INSERT INTO CUSTOMER VALUES('102','PADMA',21,5,'102');

SELECT* FROM CUSTOMER;

CUSTOMER_K CUSTOMER_NAME CUSTOMER_CODE FAMILY_SIZE LOCATION_K
---------- -------------------- ------------- ----------- ----------
101 NIDHI 31 7 101
102 PADMA 21 5 102

SQL> DESC STATUS;
Name Null? Type
---------------------------- -------- --------------------
STATUS_KEY NOT NULL VARCHAR2(10)
NEW_CUSTOMER NOT NULL VARCHAR2(20)
NEW_ADDRESS NOT NULL VARCHAR2(45)
PAYMENT_OVERDUE NOT NULL NUMBER(38)
CLOSED_THIS_PERIOD NOT NULL NUMBER(38)

 INSERT INTO STATUS VALUES('101','nilind','vashi',3000,2021);
 INSERT INTO STATUS VALUES('102','mahesh','goregoan',30,1999);

 SQL> SELECT* FROM STATUS;

 STATUS_KEY NEW_CUSTOMER NEW_ADDRESS
---------- -------------------- --------------------------------------------
PAYMENT_OVERDUE CLOSED_THIS_PERIOD
--------------- ------------------
101 nilind vashi
3000 2021

102 mahesh goregoan
30 1999


SQL> DESC PLAN;
Name Null? Type
---------------------------- -------- --------------------
```

PLAN_KEY NOT NULL VARCHAR2(10)
PLAN_NAME NOT NULL VARCHAR2(20)
PLAN_CODE NOT NULL NUMBER(38)
NUM_OF_PHONES NOT NULL NUMBER(38)
MONTHLY_MINUTES NOT NULL NUMBER(38)
ROLLOVER_MINUTES NOT NULL NUMBER(38)

INSERT INTO PLAN VALUES('101','VIP',41,1,1200,70);
INSERT INTO PLAN VALUES('102','SPORT',12,1,700,20);

SQL> SELECT* FROM PLAN;

PLAN_KEY PLAN_NAME PLAN_CODE NUM_OF_PHONES MONTHLY_MINUTES
---------- -------------------- ---------- ------------- ---------------
ROLLOVER_MINUTES
----
101 VIP 41 1 1200
70

102 SPORT 12 1 700
20

SQL> DESC TIME;
Name Null? Type
----------------------------- -------- --------------------
TIME_KEY NOT NULL VARCHAR2(10)
MONTH_NUMBER NOT NULL NUMBER(38)
MONTH NOT NULL VARCHAR2(20)
QUARTER NOT NULL NUMBER(38)
FISCAL_PERIOD NOT NULL NUMBER(38)
YEAR NOT NULL NUMBER(38)

INSERT INTO TIME VALUES('101',25,'APRIL',1,2,2021);
INSERT INTO TIME VALUES('102',27,'MAY',4,2,2021);

SQL> SELECT* FROM TIME;

TIME_KEY MONTH_NUMBER MONTH QUARTER FISCAL_PERIOD YEAR
---------- ------------ -------------------- ---------- ------------- ----------
101 25 APRIL 1 2 2021
102 27 MAY 4 2 2021

SQL> DESC SALES;
Name Null? Type
--- -------- ----------------------------
PLAN_MINUTES NOT NULL NUMBER
OVERAGE_MINUTES NOT NULL NUMBER
MNTHLY_ACCESS_CHARGES NOT NULL NUMBER
MNTHLY_OVERAGE_CHARGES NOT NULL NUMBER
VOICE_USAGE NOT NULL NUMBER
DATA_USAGE NOT NULL VARCHAR2(10)
CUSTOMER_KEY NOT NULL VARCHAR2(10)
STATUS_KEY NOT NULL VARCHAR2(10)
PLAN_KEY NOT NULL VARCHAR2(10)

TIME_KEY NOT NULL VARCHAR2(10)
INSERT INTO SALES VALUES(1200,100,300,989,5000,'550000KB','101','101','101','101');
INSERT INTO SALES VALUES(500,300,50,579,50000,'70000000KB','102','102','102','102');

SQL> SELECT* FROM SALES;

PLAN_MINUTES OVERAGE_MINUTES MNTHLY_ACCESS_CHARGES MNTHLY_OVERAGE_CHARGES
------------ --------------- --------------------- ----------------------
VOICE_USAGE DATA_USAGE CUSTOMER_K STATUS_KEY PLAN_KEY TIME_KEY
----------- ---------- ---------- ---------- ---------- ----------
1200 100 300 989
5000 550000KB 101 101 101 101

500 300 50 579
50000 70000000KB 102 102 102 102