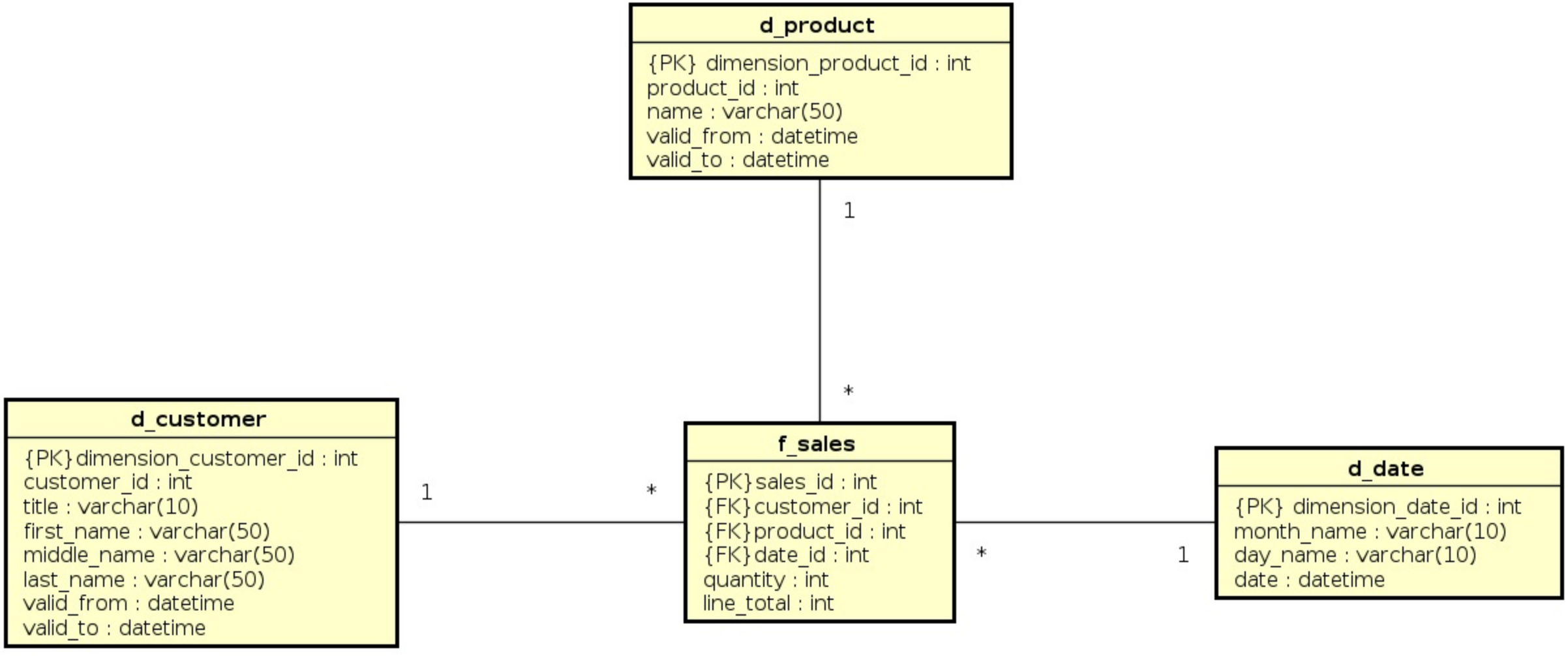
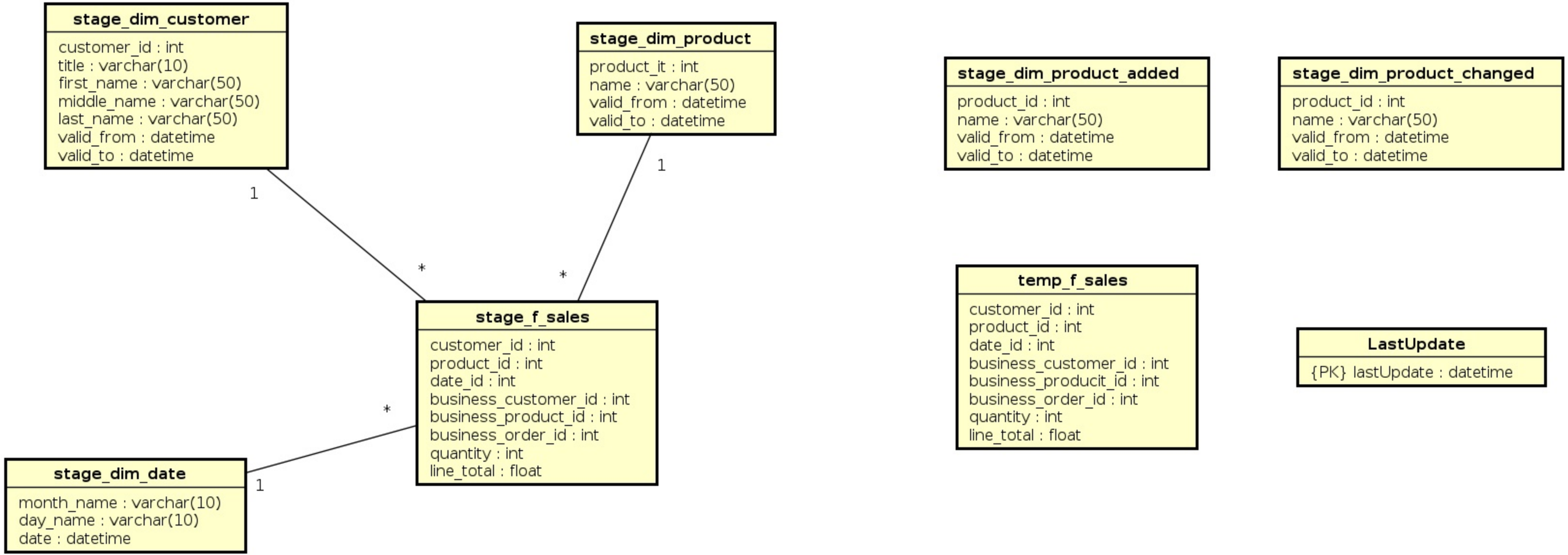

d_product
{PK} dimension_product_id : int
product_id : int
name : varchar(50)
valid_from : datetime
valid_to : datetime
1
*
d_customer
{PK}dimension_customer_id : int
customer_id : int
title : varchar(10)
first_name : varchar(50)
middle_name : varchar(50)
last_name : varchar(50)
valid_from : datetime
valid_to : datetime
1
*
f_sales
{PK}sales_id : int
{FK}customer_id : int
{FK}product_id : int
{FK}date_id : int
quantity : int
line_total : int
*
1
d_date
{PK} dimension_date_id : int
month_name : varchar(10)
day_name : varchar(10)
date : datetime


stage_dim_customer
customer_id : int
title : varchar(10)
first_name : varchar(50)
middle_name : varchar(50)
last_name : varchar(50)
valid_from : datetime
valid_to : datetime
stage_dim_product
product_it : int
name : varchar(50)
valid_from : datetime
valid_to : datetime
stage_dim_product_added
product_id : int
name : varchar(50)
valid_from : datetime
valid_to : datetime
stage_dim_product_changed
product_id : int
name : varchar(50)
valid_from : datetime
valid_to : datetime
1
1
*
*
stage_f_sales
customer_id : int
product_id : int
date_id : int
business_customer_id : int
business_product_id : int
business_order_id : int
quantity : int
line_total : float
temp_f_sales
customer_id : int
product_id : int
date_id : int
business_customer_id : int
business_producit_id : int
business_order_id : int
quantity : int
line_total : float
LastUpdate
{PK} lastUpdate : datetime
*
1
stage_dim_date
month_name : varchar(10)
day_name : varchar(10)
date : datetime

Create Star Schema Tables

```
--This statement creates dimension table d_customer with attributes and primary key is assigned to dimension_customer_id

CREATE TABLE AdventureWorks_DW.star_schema.d_customer
(
   dimension_customer_id INT       NOT NULL IDENTITY,
   customer_id         INT       NOT NULL,
   title             varchar(10) NOT NULL,
   first_name          varchar(50) NOT NULL,
   middle_name         varchar(50) NOT NULL,
   last_name           varchar(50) NOT NULL,
   valid_from          DATETIME    NOT NULL,
   valid_to          DATETIME    NOT NULL,
   PRIMARY KEY (dimension_customer_id)
);
CREATE TABLE AdventureWorks_DW.star_schema.d_price_range
(
   dimension_price_range_id INT IDENTITY,
   start_price           decimal(10, 2),
   end_price             decimal(10, 2),
   PRIMARY KEY (dimension_price_range_id)
);
--This statement creates dimension table d_product with attributes and primary key is assigned to dimension_product_id
CREATE TABLE AdventureWorks_DW.star_schema.d_product
(
   dimension_product_id INT       NOT NULL IDENTITY,
   product_id         INT       NOT NULL,
   price_range_id     INT       NOT NULL,
   name             varchar(50) NOT NULL,
   valid_from         DATETIME    NOT NULL,
   valid_to          DATETIME    NOT NULL,
   PRIMARY KEY (dimension_product_id),
   FOREIGN KEY (price_range_id) REFERENCES AdventureWorks_DW.star_schema.d_price_range (dimension_price_range_id)
);
--This statement creates dimension table d_date with attributes and primary key is assigned to dimension_date_id
CREATE TABLE AdventureWorks_DW.star_schema.d_date
(
   dimension_date_id INT       NOT NULL IDENTITY,
   month_name      varchar(10) NOT NULL,
   day_name        varchar(10) NOT NULL,
   date          date      NOT NULL,
   PRIMARY KEY (dimension_date_id)
);
--This statement creates fact table f_sales with attributes, primary key is assigned to sales_id and foreign keys customer_id,
product_id
CREATE TABLE AdventureWorks_DW.star_schema.f_sales
(
   sales_id    INT NOT NULL IDENTITY,
   customer_id INT NOT NULL,
   product_id  INT NOT NULL,
   date_id     INT NOT NULL,
   quantity    INT NOT NULL,
   line_total  INT NOT NULL,
   PRIMARY KEY (sales_id),
   FOREIGN KEY (customer_id) REFERENCES AdventureWorks_DW.star_schema.d_customer (dimension_customer_id),
   FOREIGN KEY (product_id) REFERENCES AdventureWorks_DW.star_schema.d_product (dimension_product_id),
   FOREIGN KEY (date_id) REFERENCES AdventureWorks_DW.star_schema.d_date (dimension_date_id)
);
```

Create Staging Schema Tables

```
-- ***********************************************
-- ************ CREATING STAGE TABLES ************
-- ***********************************************
--This statement creates staging dimension table stage_dim_customer with attributes and assigned
-- primary key as customer_id
CREATE TABLE StagingDatabase.staging.stage_dim_customer
(
   customer_id INT NOT NULL,
   title      varchar(10),
   first_name  varchar(50),
   middle_name varchar(50),
   last_name   varchar(50),
   valid_from  DATETIME,
   valid_to    DATETIME,
);
--This statement creates staging dimension table stage_dim_product with attributes and assigned
-- primary key as dimension_product_id
CREATE TABLE StagingDatabase.staging.stage_dim_product
(
   product_id     INT,
   price_range_id INT,
   name          varchar(50),
   price         DECIMAL(10, 2),
   valid_from     DATETIME,
   valid_to      DATETIME,
);

-- Create a table which holds last update variable
CREATE TABLE StagingDatabase.staging.LastUpdate
(
   lastUpdate DATETIME DEFAULT GETDATE()
);

-- Inset value into LastUpdate table
INSERT INTO StagingDatabase.staging.LastUpdate(lastUpdate)
VALUES (GETDATE());

--This statement creates staging fact table stage_f_sales with attributes and assigned primary key as sales_id
CREATE TABLE StagingDatabase.staging.stage_f_sales
(
   customer_id        INT     NULL,
   product_id         INT     NULL,
   date_id            INT     NULL,
   business_customer_id INT     NULL,
   business_product_id  INT     NULL,
   business_order_date  DATETIME NULL,
   quantity           INT     NULL,
   line_total         FLOAT    NULL,
);

-- Create temporary table for f_sales.
CREATE TABLE StagingDatabase.staging.temp_f_sales
(
   customer_id        INT     NULL,
   product_id         INT     NULL,
   date_id            INT     NULL,
   business_customer_id INT     NULL,
   business_product_id  INT     NULL,
```

```
   business_order_date  DATETIME NULL,
   quantity             INT      NULL,
   line_total           FLOAT    NULL,
);

-- Create temporary table to store added products so we can handle valid_to attribute
CREATE TABLE StagingDatabase.staging.stage_dim_product_added
(
   product_id    INT,
   price_range_id INT,
   name          varchar(50),
   price         DECIMAL(10, 2),
   valid_from    DATETIME,
   valid_to      DATETIME,
);

-- Create temporary table to store updated products so we can handle valid_to attribute and
-- deleting old products
CREATE TABLE StagingDatabase.staging.stage_dim_product_changed
(
   product_id    INT,
   price_range_id INT,
   name          varchar(50),
   price         DECIMAL(10, 2),
   valid_from    DATETIME,
   valid_to      DATETIME,
);

-- Create temporary table to store updated customers so we can handle valid_to attribute and
-- deleting old customers
CREATE TABLE StagingDatabase.staging.stage_dim_customer_changed
(
   customer_id INT,
   title       varchar(10),
   first_name  varchar(50),
   middle_name varchar(50),
   last_name   varchar(50),
   valid_from  DATETIME,
   valid_to    DATETIME,

);
-- Create temporary table to store added customers so we can handle valid_to attribute
CREATE TABLE StagingDatabase.staging.stage_dim_customer_added
(
   customer_id INT,
   title       varchar(10),
   first_name  varchar(50),
   middle_name varchar(50),
   last_name   varchar(50),
   valid_from  DATETIME,
   valid_to    DATETIME,

);
```

Initial Load

```
-- ****************************************************************
-- ********** INSERTING AND FIXING DATA IN STAGE TABLES ***********
-- ****************************************************************

DELETE FROM StagingDatabase.staging.stage_f_sales;
DELETE FROM StagingDatabase.staging.stage_dim_product
DELETE FROM StagingDatabase.staging.stage_dim_customer
DELETE FROM AdventureWorks_DW.star_schema.d_product
DELETE FROM AdventureWorks_DW.star_schema.d_price_range
DELETE FROM AdventureWorks_DW.star_schema.d_date
DELETE FROM AdventureWorks_DW.star_schema.d_customer
DELETE FROM AdventureWorks_DW.star_schema.f_sales

-- _____ DATE _____

--This statement inserts attribute values unto staging dimension table stage_dim_date
DECLARE @StartDate DATETIME = (SELECT MIN(OrderDate) FROM AdventureWorks2017.Sales.SalesOrderHeader);
DECLARE @EndDate DATETIME = (SELECT MAX(OrderDate) FROM AdventureWorks2017.Sales.SalesOrderHeader);

WHILE @StartDate <= @EndDate
  BEGIN
    INSERT INTO AdventureWorks_DW.star_schema.d_date (date,
                                day_name,
                                month_name)
    SELECT @StartDate,
        DATENAME(weekday, @StartDate),
        DATENAME(month, @StartDate);

    SET @StartDate = DATEADD(dd, 1, @StartDate);
  END;


-- _____ Price Range _____

-- Pre-populate current_price table with this data. Data ranges will be 200
DECLARE @StartPrice decimal(10, 2) = 0.00;
DECLARE @EndPrice decimal(10, 2) = 199.99;
DECLARE @Increment decimal(10, 2) = 200.00;

DECLARE @MaxPrice decimal(10, 2) = (SELECT MAX(ListPrice)
                    FROM AdventureWorks2017.Production.Product) + 200;

WHILE @EndPrice <= @MaxPrice
  BEGIN
    INSERT INTO AdventureWorks_DW.star_schema.d_price_range (start_price, end_price)
    VALUES (@StartPrice,
        @EndPrice);
    SET @StartPrice = @StartPrice + @Increment;
    SET @EndPrice = @EndPrice + @Increment;
  END


-- _____ CUSTOMER _____

--This statement inserts attribute values into staging dimension table stage_dim_customer
INSERT INTO StagingDatabase.staging.stage_dim_customer(customer_id, title, first_name, middle_name, last_name)
SELECT CustomerID, Title, FirstName, MiddleName, LastName
FROM AdventureWorks2017.Sales.Customer
```

```
    JOIN AdventureWorks2017.Person.Person ON Customer.PersonID = Person.BusinessEntityID;

--This statement removes null values in the title attribute in stage_dim_customer table by replacing with 'N/A'
UPDATE StagingDatabase.staging.stage_dim_customer
SET title='N/A'
WHERE title IS NULL;

--This statement removes null values in the middle_name attribute in stage_dim_customer table by replacing with 'N/A'
UPDATE StagingDatabase.staging.stage_dim_customer
SET middle_name='N/A'
WHERE middle_name IS NULL;

-- Create new date for valid_from attribute. It will be the date when it was added to data warehouse
UPDATE StagingDatabase.staging.stage_dim_customer
SET valid_from=GETDATE()
WHERE valid_from IS NULL;

-- This statement replaces all NULL values with date 31.12.9999
UPDATE StagingDatabase.staging.stage_dim_customer
SET valid_to='9999-12-31'
WHERE valid_to IS NULL;


-- _____ PRODUCT _____

--This statement inserts attribute values into staging dimension table stage_dim_product
INSERT INTO StagingDatabase.staging.stage_dim_product(product_id, name, valid_from, valid_to, price)
SELECT ProductID, Name, SellStartDate, SellEndDate, ListPrice
from AdventureWorks2017.Production.Product;

--This statement removes null values in the name attribute in stage_dim_product table by replacing with 'N/A'
UPDATE StagingDatabase.staging.stage_dim_product
SET name='N/A'
WHERE name IS NULL;

-- This statement replaces all NULL values with date 31.12.9999
UPDATE StagingDatabase.staging.stage_dim_product
SET valid_to='9999-12-31'
WHERE valid_to IS NULL;

-- Update reference to price range
UPDATE StagingDatabase.staging.stage_dim_product
SET price_range_id = (SELECT dimension_price_range_id
                      FROM AdventureWorks_DW.star_schema.d_price_range
                      WHERE price BETWEEN start_price AND end_price)
WHERE price_range_id IS NULL;

-- ********************************************************************
-- ********** INSERTING FIXED DATA INTO DW DIMENSION TABLES ***********
-- ********************************************************************

--This statement inserts attribute vales into dimension d_product table
INSERT INTO AdventureWorks_DW.star_schema.d_product (product_id, price_range_id, name, valid_from, valid_to)
SELECT product_id, price_range_id, name, valid_from, valid_to
FROM StagingDatabase.staging.stage_dim_product;

--This statement inserts attribute vales into dimension d_customer table
INSERT INTO AdventureWorks_DW.star_schema.d_customer (customer_id, title, first_name, middle_name, last_name,
                                    valid_from, valid_to)
SELECT *
FROM StagingDatabase.staging.stage_dim_customer;


-- ************************************************************
-- ********** INSERTING FIXED DATA INTO FACT TABLES ***********
```

```
-- ************************************************************

--This statement inserts attribute values into staging fact table stage_f_sales
INSERT INTO StagingDatabase.staging.stage_f_sales(business_customer_id, business_product_id, business_order_date,
                                quantity, line_total)
   (SELECT C.CustomerID, P.ProductID, OrderDate, SOD.OrderQty, SOD.LineTotal
    FROM AdventureWorks2017.Sales.SalesOrderHeader SOH
          JOIN AdventureWorks2017.Sales.SalesOrderDetail SOD on SOH.SalesOrderID = SOD.SalesOrderID
          JOIN AdventureWorks2017.Sales.Customer C on SOH.CustomerID = C.CustomerID
          JOIN AdventureWorks2017.Production.Product P on SOD.ProductID = P.ProductID
    WHERE OnlineOrderFlag = 1);


-- ****************************************************************
-- ********************* LOOKUP SURROGATE KEYS **********************
-- ****************************************************************

--This statement extracts the customer_id from staging dimension table stage_dim_customer and assigns it to the
-- customer_id attribute in stage_f_sales table when the value is null
UPDATE StagingDatabase.staging.stage_f_sales
SET customer_id = (SELECT dimension_customer_id
              FROM AdventureWorks_DW.star_schema.d_customer AS dim_C_id
              WHERE dim_C_id.customer_id = business_customer_id)
WHERE customer_id IS NULL;

--This statement extracts the product_id from staging dimension table stage_dim_product and assigns it to the
-- product_id attribute in stage_f_sales table when the value is null
UPDATE StagingDatabase.staging.stage_f_sales
SET product_id = (SELECT dimension_product_id
             FROM AdventureWorks_DW.star_schema.d_product AS dim_P_id
             WHERE dim_P_id.product_id = business_product_id)
WHERE product_id IS NULL;

--This statement extracts the date_id from staging dimension table stage_dim_date and assigns it to the
-- date_id attribute in stage_f_sales table when the value is null
UPDATE StagingDatabase.staging.stage_f_sales
SET date_id = (SELECT dimension_date_id
           FROM AdventureWorks_DW.star_schema.d_date AS dim_D_id
           WHERE dim_D_id.date = business_order_date)
WHERE date_id IS NULL;


-- ********************************************************************************************
-- ********************* INSERT VALUES INTO DATA WAREHOUSE FACT TABLE **********************
-- ********************************************************************************************

INSERT INTO AdventureWorks_DW.star_schema.f_sales(customer_id, product_id, date_id, quantity, line_total)
SELECT customer_id, product_id, date_id, quantity, line_total
FROM StagingDatabase.staging.stage_f_sales;
```

Difference Calculations Product

```
-- ********************************************************************************************
-- ************************************ NEW PRODUCTS ******************************************
-- ********************************************************************************************

-- Add new dates in D_Date if missing
DECLARE @StartDate DATETIME = (SELECT MAX(Date)
                    FROM AdventureWorks_DW.star_schema.d_date);
DECLARE @EndDate DATETIME = (SELECT MAX(OrderDate)
                   FROM AdventureWorks2017.Sales.SalesOrderHeader);

WHILE @StartDate <= @EndDate
  BEGIN
    INSERT INTO AdventureWorks_DW.star_schema.d_date (date,
                                  day_name,
                                  month_name)
    SELECT @StartDate,
        DATENAME(weekday, @StartDate),
        DATENAME(month, @StartDate);

    SET @StartDate = DATEADD(dd, 1, @StartDate);
  END;

-- Search and insert newly added product into staging added product table
INSERT INTO StagingDatabase.staging.stage_dim_product_added (product_id, name, valid_from, valid_to, price)
SELECT ProductID, Name, SellStartDate, SellEndDate, ListPrice
FROM AdventureWorks2017.Production.Product
WHERE productID IN (SELECT productID
            FROM AdventureWorks2017.Production.Product
              EXCEPT
            SELECT product_id
            FROM AdventureWorks_DW.star_schema.d_product);

-- Replace all NULL values with date 31.12.9999
UPDATE StagingDatabase.staging.stage_dim_product_added
SET valid_to='9999-12-31'
WHERE valid_to IS NULL;

-- Update reference to price range
UPDATE StagingDatabase.staging.stage_dim_product_added
SET price_range_id = (SELECT dimension_price_range_id
              FROM AdventureWorks_DW.star_schema.d_price_range
              WHERE price BETWEEN start_price AND end_price)
WHERE price_range_id IS NULL;


-- Load newly added and modified rows into the Data Warehouse
INSERT INTO AdventureWorks_DW.star_schema.d_product (product_id, price_range_id, name, valid_from, valid_to)
SELECT product_id, price_range_id, name, valid_from, valid_to
FROM StagingDatabase.staging.stage_dim_product_added;

-- ********************************************************************************************
-- ************************************ DELETED PRODUCTS **************************************
-- ********************************************************************************************

-- Retrieve and update data warehouse, set valid_to attribute to yesterdays date for deleted
-- products.
UPDATE AdventureWorks_DW.star_schema.d_product
SET valid_to = DATEADD(dd, -1, GETDATE())
```

```
WHERE product_id in (
   SELECT product_id
   FROM AdventureWorks_DW.star_schema.d_product
   WHERE product_id IN (SELECT product_id
                FROM AdventureWorks_DW.star_schema.d_product
                  EXCEPT
                SELECT productID
                FROM AdventureWorks2017.Production.Product)
)

-- ********************************************************************************************
-- ********************************** UPDATED PRODUCTS ***********************************
-- ********************************************************************************************

-- Inserting updated rows into the temporary table to handle changes
INSERT INTO StagingDatabase.staging.stage_dim_product_changed
   (product_id, name, price) (SELECT ProductID,
                           Name,
                           price_range_id = (SELECT dimension_price_range_id
                                    FROM AdventureWorks_DW.star_schema.d_price_range
                                    WHERE ListPrice BETWEEN start_price AND end_price)
                     FROM AdventureWorks2017.Production.Product
                       EXCEPT
                     SELECT product_id, name, d_product.price_range_id
                     FROM AdventureWorks_DW.star_schema.d_product
                       EXCEPT (
                          SELECT ProductID,
                               Name,
                               price_range_id = (SELECT dimension_price_range_id
                                        FROM AdventureWorks_DW.star_schema.d_price_range
                                        WHERE ListPrice BETWEEN start_price AND end_price)
                          FROM AdventureWorks2017.Production.Product
                          WHERE productID IN
                              (SELECT productID
                               FROM AdventureWorks2017.Production.Product
                                 EXCEPT
                               SELECT product_id
                               FROM AdventureWorks_DW.star_schema.d_product)
                     ));

-- Update valid_to attribute to '9999-12-31'
UPDATE StagingDatabase.staging.stage_dim_product_changed
SET valid_to = '9999-12-31'
WHERE valid_to IS NULL;

-- Update valid_from to today's date
UPDATE StagingDatabase.staging.stage_dim_product_changed
SET valid_from = GETDATE()
WHERE valid_from IS NULL;

-- Update reference to price range
UPDATE StagingDatabase.staging.stage_dim_product_changed
SET price_range_id = (SELECT dimension_price_range_id
             FROM AdventureWorks_DW.star_schema.d_price_range
             WHERE price BETWEEN start_price AND end_price)
WHERE price_range_id IS NULL;

-- Alter changed rows in Data Warehouse
UPDATE AdventureWorks_DW.star_schema.d_product
SET valid_to = DATEADD(dd, -1, GETDATE())
WHERE product_id in (SELECT product_id FROM StagingDatabase.staging.stage_dim_product_changed);

-- Insert new product to Data Warehouse
INSERT INTO AdventureWorks_DW.star_schema.d_product (product_id, price_range_id, name, valid_from, valid_to)
SELECT product_id, price_range_id, name, valid_from, valid_to
```

```
FROM StagingDatabase.staging.stage_dim_product_changed;

-- Delete data in temporary tables
DELETE
FROM StagingDatabase.staging.stage_dim_product_changed;

DELETE
FROM StagingDatabase.staging.stage_dim_product_added;
```

Difference Calculations

Customer

```
-- Search and insert newly added customer into staging added Customer table
INSERT INTO StagingDatabase.staging.stage_dim_customer_added(customer_id, title, first_name, middle_name, last_name)
SELECT CustomerID,Title,FirstName,MiddleName,LastName
FROM AdventureWorks2017.Sales.Customer JOIN AdventureWorks2017.Person.Person ON Customer.PersonID =
Person.BusinessEntityID
WHERE CustomerID IN (SELECT CustomerID
                     FROM AdventureWorks2017.Sales.Customer
                       EXCEPT
                     SELECT customer_id
                     FROM StagingDatabase.staging.stage_dim_customer);

-- Replace all NULL values with current date
UPDATE StagingDatabase.staging.stage_dim_customer_added
SET valid_from = GETDATE()
WHERE valid_to IS NULL;

-- Replace all NULL values with date 31.12.9999
UPDATE StagingDatabase.staging.stage_dim_customer_added
SET valid_to = '9999-12-31'
WHERE valid_to IS NULL;

-- Load newly added and modified rows into the Data Warehouse
INSERT INTO AdventureWorks_DW.star_schema.d_customer
SELECT *
FROM StagingDatabase.staging.stage_dim_customer_added;


-- Retrieve and update data warehouse, set valid_to attribute to yesterdays date for deleted
-- customers.
UPDATE AdventureWorks_DW.star_schema.d_customer
SET valid_to = DATEADD(dd, -1, GETDATE())
WHERE customer_id IN (
  SELECT customer_id
  FROM AdventureWorks_DW.star_schema.d_customer
  WHERE customer_id IN (SELECT customer_id
                        FROM AdventureWorks_DW.star_schema.d_customer
                          EXCEPT
                        SELECT CustomerID
                        FROM AdventureWorks2017.Sales.Customer)
)


-- Inserting updated rows into the temporary table to handle changes
INSERT INTO StagingDatabase.staging.stage_dim_customer_changed
  (customer_id, title, first_name,middle_name,last_name) (SELECT CustomerID,Title, FirstName, MiddleName, LastName
                        FROM AdventureWorks2017.Sales.Customer
                        JOIN AdventureWorks2017.Person.Person ON Customer.PersonID = Person.BusinessEntityID
                          EXCEPT
                        SELECT customer_id, title, first_name,middle_name,last_name
                        FROM StagingDatabase.staging.stage_dim_customer
                          EXCEPT (
```

```
                SELECT CustomerID,Title, FirstName, MiddleName, LastName
                FROM AdventureWorks2017.Sales.Customer
                JOIN AdventureWorks2017.Person.Person ON Customer.PersonID = Person.BusinessEntityID
                WHERE CustomerID IN
                    (SELECT CustomerID
                    FROM AdventureWorks2017.Sales.Customer
                      EXCEPT
                    SELECT customer_id
                    FROM StagingDatabase.staging.stage_dim_customer)
            ));

-- Update valid_to attribute to '9999-12-31'
UPDATE StagingDatabase.staging.stage_dim_customer_changed
SET valid_from = GETDATE()
WHERE valid_from IS NULL;


-- Update title attribute to 'N/A'
UPDATE StagingDatabase.staging.stage_dim_customer_changed
SET valid_to = '9999-12-31'
WHERE valid_to IS NULL;

-- Update middle_name attribute to 'N/A'
UPDATE StagingDatabase.staging.stage_dim_customer_changed
SET title = 'N/A'
WHERE title IS NULL;

-- Update valid_to attribute to 'N/A'
UPDATE StagingDatabase.staging.stage_dim_customer_changed
SET middle_name = 'N/A'
WHERE middle_name IS NULL;

-- Alter changed rows in Data Warehouse
UPDATE AdventureWorks_DW.star_schema.d_customer
SET valid_to = DATEADD(dd, -1, GETDATE())
WHERE customer_id in (SELECT customer_id FROM StagingDatabase.staging.stage_dim_customer_changed);

-- Insert new customer to Data Warehouse
INSERT INTO AdventureWorks_DW.star_schema.d_customer
SELECT *
FROM StagingDatabase.staging.stage_dim_customer_changed;
```

Difference Calculations Fact Sales

```
-- ********************************************************************************************
-- ********************************** FACT TABLE UPDATE ***************************************
-- ********************************************************************************************

DECLARE @LAST_UPDATE as DATETIME = (SELECT lastUpdate
                    FROM StagingDatabase.staging.LastUpdate);

-- Insert newly updated rows into temp_f_sales table. Select only the ones newer than the last update.
INSERT INTO StagingDatabase.staging.stage_f_sales
(business_customer_id, business_product_id, business_order_date, quantity, line_total)
   (SELECT C.CustomerID, P.ProductID, OrderDate, SOD.OrderQty, SOD.LineTotal
    FROM AdventureWorks2017.Sales.SalesOrderHeader SOH
         JOIN AdventureWorks2017.Sales.SalesOrderDetail SOD on SOH.SalesOrderID = SOD.SalesOrderID
         JOIN AdventureWorks2017.Sales.Customer C on SOH.CustomerID = C.CustomerID
         JOIN AdventureWorks2017.Production.Product P on SOD.ProductID = P.ProductID
    WHERE OnlineOrderFlag = 1
     AND OrderDate > @LAST_UPDATE);


-- // Product id: 770


-- Find corresponding surrogate keys.
-- ************************** Customer ***************************
UPDATE StagingDatabase.staging.stage_f_sales
SET customer_id = (SELECT dimension_customer_id
              FROM AdventureWorks_DW.star_schema.d_customer AS dim_C_id
              WHERE dim_C_id.customer_id = business_customer_id
               AND valid_to = '9999-12-31')
WHERE customer_id IS NULL;

-- ************************** Product ****************************
UPDATE StagingDatabase.staging.stage_f_sales
SET product_id = (SELECT dimension_product_id
             FROM AdventureWorks_DW.star_schema.d_product AS dim_P_id
             WHERE dim_P_id.product_id = business_product_id
              AND valid_to = '9999-12-31')
WHERE product_id IS NULL;

-- ************************** Date ****************************
UPDATE StagingDatabase.staging.stage_f_sales
SET date_id = (SELECT dimension_date_id
          FROM AdventureWorks_DW.star_schema.d_date AS dim_D_id
          WHERE dim_D_id.date = business_order_date)
WHERE date_id IS NULL;

-- Insert data into Data Warehouse Fact Sales table
INSERT INTO AdventureWorks_DW.star_schema.f_sales(customer_id, product_id, date_id, quantity, line_total)
SELECT customer_id, product_id, date_id, quantity, line_total
FROM StagingDatabase.staging.temp_f_sales;
```

```
-- Update last update table with the newest date
UPDATE StagingDatabase.staging.LastUpdate
SET lastUpdate = GETDATE()
WHERE lastUpdate = @LAST_UPDATE;

DELETE FROM StagingDatabase.staging.temp_f_sales
```