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# Q no 1: Make a Data warehouse schema?

## Data Warehousing Schema

This appendix introduces a common schema (`Sales History`) that is used in this guide.

**Simple star schema:** This schema consists of four dimension tables and a single fact table (called `sales`) partitioned by month. The definitions of these tables follow:

```
CREATE TABLE times
(
  time_id          DATE,
  day_name        VARCHAR2(9)
  CONSTRAINT      tim_day_name_nn      NOT NULL,
  day_number_in_week NUMBER(1)
  CONSTRAINT      tim_day_in_week_nn   NOT NULL,
  day_number_in_month NUMBER(2)
  CONSTRAINT      tim_day_in_month_nn  NOT NULL,
  calendar_week_number NUMBER(2)
  CONSTRAINT      tim_cal_week_nn     NOT NULL,
  fiscal_week_number NUMBER(2)
  CONSTRAINT      tim_fis_week_nn     NOT NULL,
  week_ending_day DATE
  CONSTRAINT      tim_week_ending_day_nn NOT NULL,
  calendar_month_number NUMBER(2)
  CONSTRAINT      tim_cal_month_number_nn NOT NULL,
  fiscal_month_number NUMBER(2)
  CONSTRAINT      tim_fis_month_number_nn NOT NULL,
  calendar_month_desc VARCHAR2(8)
  CONSTRAINT      tim_cal_month_desc_nn NOT NULL,
  fiscal_month_desc VARCHAR2(8)
  CONSTRAINT      tim_fis_month_desc_nn NOT NULL,
  days_in_cal_month NUMBER
  CONSTRAINT      tim_days_cal_month_nn NOT NULL,
  days_in_fis_month NUMBER
  CONSTRAINT      tim_days_fis_month_nn NOT NULL,
  end_of_cal_month DATE
  CONSTRAINT      tim_end_of_cal_month_nn NOT NULL,
  end_of_fis_month DATE
  CONSTRAINT      tim_end_of_fis_month_nn NOT NULL,
  calendar_month_name VARCHAR2(9)
  CONSTRAINT      tim_cal_month_name_nn NOT NULL,
  fiscal_month_name VARCHAR2(9)
  CONSTRAINT      tim_fis_month_name_nn NOT NULL,
  calendar_quarter_desc CHAR(7)
  CONSTRAINT      tim_cal_quarter_desc_nn NOT NULL,
  fiscal_quarter_desc CHAR(7)
  CONSTRAINT      tim_fis_quarter_desc_nn NOT NULL,
  days_in_cal_quarter NUMBER
  CONSTRAINT      tim_days_cal_quarter_nn NOT NULL,
  days_in_fis_quarter NUMBER
  CONSTRAINT      tim_days_fis_quarter_nn NOT NULL,
```

```

end_of_cal_quarter      DATE
    CONSTRAINT          tim_end_of_cal_quarter_nn NOT NULL,
end_of_fis_quarter      DATE
    CONSTRAINT          tim_end_of_fis_quarter_nn NOT NULL,
calendar_quarter_number NUMBER(1)
    CONSTRAINT          tim_cal_quarter_number_nn NOT NULL,
fiscal_quarter_number   NUMBER(1)
    CONSTRAINT          tim_fis_quarter_number_nn NOT NULL,
calendar_year           NUMBER(4)
    CONSTRAINT          tim_cal_year_nn           NOT NULL,
fiscal_year             NUMBER(4)
    CONSTRAINT          tim_fis_year_nn          NOT NULL,
days_in_cal_year       NUMBER
    CONSTRAINT          tim_days_cal_year_nn     NOT NULL,
days_in_fis_year       NUMBER
    CONSTRAINT          tim_days_fis_year_nn     NOT NULL,
end_of_cal_year         DATE
    CONSTRAINT          tim_end_of_cal_year_nn   NOT NULL,
end_of_fis_year         DATE
    CONSTRAINT          tim_end_of_fis_year_nn   NOT NULL
);

REM creation of dimension table CHANNELS ...
CREATE TABLE channels
(
    channel_id          CHAR(1),
    channel_desc        VARCHAR2(20)
        CONSTRAINT     chan_desc_nn NOT NULL,
    channel_class       VARCHAR2(20)
);

REM creation of dimension table PROMOTIONS ...
CREATE TABLE promotions
(
    promo_id           NUMBER(6),
    promo_name         VARCHAR2(20)
        CONSTRAINT     promo_name_nn           NOT NULL,
    promo_subcategory  VARCHAR2(30)
        CONSTRAINT     promo_subcat_nn        NOT NULL,
    promo_category     VARCHAR2(30)
        CONSTRAINT     promo_cat_nn           NOT NULL,
    promo_cost         NUMBER(10,2)
        CONSTRAINT     promo_cost_nn          NOT NULL,
    promo_begin_date   DATE
        CONSTRAINT     promo_begin_date_nn    NOT NULL,
    promo_end_date     DATE
        CONSTRAINT     promo_end_date_nn      NOT NULL
);

REM creation of dimension table COUNTRIES ...
CREATE TABLE countries
(
    country_id         CHAR(2),
    country_name       VARCHAR2(40)
        CONSTRAINT     country_country_name_nn NOT NULL,
    country_subregion  VARCHAR2(30),
    country_region     VARCHAR2(20)
);

```

```

CREATE TABLE customers
(
  cust_id          NUMBER,
  cust_first_name  VARCHAR2(20)
    CONSTRAINT customer_fname_nn NOT NULL,
  cust_last_name   VARCHAR2(40)
    CONSTRAINT customer_lname_nn NOT NULL,
  cust_gender      CHAR(1),
  cust_year_of_birth NUMBER(4),
  cust_marital_status VARCHAR2(20),
  cust_street_address VARCHAR2(40)
    CONSTRAINT customer_st_addr_nn NOT NULL,
  cust_postal_code VARCHAR2(10)
    CONSTRAINT customer_pcode_nn NOT NULL,
  cust_city        VARCHAR2(30)
    CONSTRAINT customer_city_nn NOT NULL,
  cust_state_province VARCHAR2(40),
  country_id       CHAR(2)
    CONSTRAINT customer_country_id_nn NOT NULL,
  cust_main_phone_number VARCHAR2(25),
  cust_income_level VARCHAR2(30),
  cust_credit_limit NUMBER,
  cust_email       VARCHAR2(30)
);

```

REM creation of dimension table PRODUCTS ...

```

CREATE TABLE products
(
  prod_id          NUMBER(6),
  prod_name        VARCHAR2(50)
    CONSTRAINT products_prod_name_nn NOT NULL,
  prod_desc        VARCHAR2(4000)
    CONSTRAINT products_prod_desc_nn NOT NULL,
  prod_subcategory VARCHAR2(50)
    CONSTRAINT products_prod_subcat_nn NOT NULL,
  prod_subcat_desc VARCHAR2(2000)
    CONSTRAINT products_prod_subcatd_nn NOT NULL,
  prod_category    VARCHAR2(50)
    CONSTRAINT products_prod_cat_nn NOT NULL,
  prod_cat_desc    VARCHAR2(2000)
    CONSTRAINT products_prod_catd_nn NOT NULL,
  prod_weight_class NUMBER(2),
  prod_unit_of_measure VARCHAR2(20),
  prod_pack_size   VARCHAR2(30),
  supplier_id      NUMBER(6),
  prod_status      VARCHAR2(20)
    CONSTRAINT products_prod_stat_nn NOT NULL,
  prod_list_price  NUMBER(8,2)
    CONSTRAINT products_prod_list_price_nn NOT NULL,
  prod_min_price   NUMBER(8,2)
    CONSTRAINT products_prod_min_price_nn NOT NULL
);

```

REM creation of fact table SALES ...

```

CREATE TABLE sales
(

```

```

prod_id          NUMBER(6)
  CONSTRAINT     sales_product_nn    NOT NULL,
cust_id          NUMBER
  CONSTRAINT     sales_customer_nn   NOT NULL,
time_id         DATE
  CONSTRAINT     sales_time_nn       NOT NULL,
channel_id       CHAR(1)
  CONSTRAINT     sales_channel_nn    NOT NULL,
promo_id        NUMBER(6),
quantity_sold    NUMBER(3)
  CONSTRAINT     sales_quantity_nn   NOT NULL,
amount          NUMBER(10,2)
  CONSTRAINT     sales_amount_nn     NOT NULL,
cost            NUMBER(10,2)
  CONSTRAINT     sales_cost_nn       NOT NULL
)

PARTITION BY RANGE (time_id)
(PARTITION Q1_1998 VALUES LESS THAN (TO_DATE('01-APR-1998', 'DD-MON-YYYY')),
PARTITION Q2_1998 VALUES LESS THAN (TO_DATE('01-JUL-1998', 'DD-MON-YYYY')),
PARTITION Q3_1998 VALUES LESS THAN (TO_DATE('01-OCT-1998', 'DD-MON-YYYY')),
PARTITION Q4_1998 VALUES LESS THAN (TO_DATE('01-JAN-1999', 'DD-MON-YYYY')),
PARTITION Q1_1999 VALUES LESS THAN (TO_DATE('01-APR-1999', 'DD-MON-YYYY')),
PARTITION Q2_1999 VALUES LESS THAN (TO_DATE('01-JUL-1999', 'DD-MON-YYYY')),
PARTITION Q3_1999 VALUES LESS THAN (TO_DATE('01-OCT-1999', 'DD-MON-YYYY')),
PARTITION Q4_1999 VALUES LESS THAN (TO_DATE('01-JAN-2000', 'DD-MON-YYYY')),
PARTITION Q1_2000 VALUES LESS THAN (TO_DATE('01-APR-2000', 'DD-MON-YYYY')),
PARTITION Q2_2000 VALUES LESS THAN (TO_DATE('01-JUL-2000', 'DD-MON-YYYY')),
PARTITION Q3_2000 VALUES LESS THAN (TO_DATE('01-OCT-2000', 'DD-MON-YYYY')),
PARTITION Q4_2000 VALUES LESS THAN (MAXVALUE))
;

REM A foreign-key relationship between SALES and PROMOTIONS is
REM intentionally omitted to demonstrate more sophisticated query
REM rewrite mechanisms

ALTER TABLE sales
ADD ( CONSTRAINT sales_product_fk
      FOREIGN KEY (prod_id)
      REFERENCES products,
      CONSTRAINT sales_customer_fk
      FOREIGN KEY (cust_id)
      REFERENCES customers,
      CONSTRAINT sales_time_fk
      FOREIGN KEY (time_id)
      REFERENCES times,
      CONSTRAINT sales_channel_fk
      FOREIGN KEY (channel_id)
      REFERENCES channels
    );
COMMIT;

```