Task 10.3
a)

Types:

CREATE TYPE address_t AS OBJECT (  
    street varchar2(100),  
    city varchar2(100),  
    zip integer
);

CREATE TYPE person_t AS OBJECT (  
    name varchar2(100),  
    has_address address_t
) NOT FINAL;

CREATE TYPE producer_t UNDER person_t (style varchar2(100));

CREATE TYPE instruments_t AS TABLE of varchar2(100);

CREATE TYPE performer_t UNDER person_t (instruments instruments_t);

CREATE TYPE performers_t AS TABLE OF REF performer_t;

CREATE TYPE song_t AS OBJECT (  
    title varchar2(100),  
    length integer,  
    performed_by performers_t
);

CREATE TYPE songs_t AS TABLE OF REF song_t;
CREATE TYPE album_t AS OBJECT (  
genre varchar2(100),  
title varchar2(100),  
publication_date date,  
produced_by REF producer_t,  
contains songs_t)
);

Object Tables:

CREATE TABLE person OF person_t;
CREATE TABLE producer OF producer_t;
CREATE TABLE performer OF performer_t  
NESTED TABLE instruments STORE AS instruments_nt;
CREATE TABLE song OF song_t  
NESTED TABLE performed_by STORE AS performers_nt;
ALTER TABLE performers_nt ADD (SCOPE FOR (COLUMN_VALUE) IS performer);
CREATE TABLE album OF album_t  
NESTED TABLE contains STORE AS songs_nt;
ALTER TABLE album ADD (SCOPE FOR (produced_by) IS producer);
ALTER TABLE songs_nt ADD (SCOPE FOR (COLUMN_VALUE) IS song);
b)

**create a producer:**
INSERT INTO producer VALUES (  
  'John Smith',
  address_t('Black Avenue', 'New York', 70),
  'Heavy Metal Producer'
);

**create a performer:**
INSERT INTO performer VALUES (  
  'Metallica',
  address_t('Metal Street', 'Miami', 32),
  instruments_t('Guitar', 'Drums', 'Bass')
);

**create a song:**
INSERT INTO song VALUES (  
  'One',
  460,
  performers_t((SELECT REF(p) FROM performer p  
    WHERE p.name='Metallica'))
);

**create an album:**
INSERT INTO album VALUES (  
  'Heavy Metal',
  'And Justice For All',
  cast('4-Jul-1988' as date),
  (SELECT REF(p) FROM producer p WHERE p.name= 'John Smith'),
  songs_t((SELECT REF(s) FROM song s WHERE s.title= 'One'))
);