**ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS**

**MSc in Data Science   
2018 - 2020**

**Course: Data and Transaction processing**

**Set of Exercises  
15/11/2018**

**Name:**

**Surname:**

**Student Id:**

**For exercises 1 to 10, suppose the following E/R diagram:**

Product

Purchase

Store

Company

Client

made-by

model

name

price

id

name

id

made-in

id

name

address

buys

products

id

name

surname

address

birth date

quantity

price

date

discount price

The relational schema that corresponds to the above E/R diagram is the following:

CREATE TABLE Clients (

id INTEGER,

tax\_number NUMERIC(10),

name VARCHAR(150) NOT NULL,

surname VARCHAR(300) NOT NULL,

birthdate DATE,

PRIMARY KEY(id),

UNIQUE (tax\_number)

);

CREATE TABLE Stores (

id INTEGER,

name VARCHAR(450) NOT NULL,

address VARCHAR(300) NOT NULL,

PRIMARY KEY(id)

);

CREATE TABLE Companies (

id INTEGER,

name VARCHAR(450) NOT NULL,

PRIMARY KEY(id)

);

CREATE TABLE Products (

model VARCHAR(100),

name VARCHAR(450) NOT NULL,

price NUMERIC(10, 2) NOT NULL,

discount\_price NUMERIC(10, 2),

company\_id INTEGER ,

PRIMARY KEY(model),

FOREIGN KEY(company\_id) REFERENCES Companies(id),

CHECK (discount\_price<price)

);

CREATE TABLE Purchases(

id INTEGER,

date DATE NOT NULL,

client\_id INTEGER NOT NULL,

store\_id INTEGER NOT NULL,

PRIMARY KEY(id),

FOREIGN KEY(client\_id) REFERENCES Clients(id),

FOREIGN KEY(store\_id) REFERENCES Stores(id)

);

CREATE TABLE PurchaseProducts (

product\_model VARCHAR(100),

purchase\_id INTEGER,

quantity INTEGER NOT NULL DEFAULT 1,

price NUMERIC(10, 2) NOT NULL,

PRIMARY KEY(product\_model, purchase\_id),

FOREIGN KEY(product\_model) REFERENCES Products(model),

FOREIGN KEY(purchase\_id) REFERENCES Purchases(id)

);

Relation companies has the following tuples:

insert into companies (id, name) values (1, 'Toshiba');

insert into companies (id, name) values (2, 'HP');

Relation products has the following tuples:

insert into products (model, name, price, discount\_price, company\_id) values ('T855U44', 'Satellite P855', 800.00, 700.00, 1);

insert into products (model, name, price, discount\_price, company\_id) values ('HP6950T87', 'OfficeJet 6950', 85.00, null, 2);

insert into products (model, name, price, discount\_price, company\_id) values ('HP255G6-231', 'HP 255 G6', 369.00, 320.00, 2);

insert into products (model, name, price, discount\_price, company\_id) values ('T255G6-433', 'Portege 13.3', 1299.00, 1100.00, 1);

insert into products (model, name, price, discount\_price, company\_id) values ('MULTI PART CUSTOM A1', 'Custom Desktop', 1199.00, 1000.00, NULL);

Relation stores has the following tuples:

insert into stores (id, name, address) values (1, 'Public Γλυφάδα', 'Σ. Καράγιωργα 4 & Λαζαράκη, T.K. 16675, Γλυφάδα');

insert into stores (id, name, address) values (2, 'Public Κόρινθος', 'Δαμασκηνού 45, T.K. 20100, Κόρινθος');

insert into stores (id, name, address) values (3, 'Public Σύνταγμα', 'Καραγεώργη Σερβίας 1, T.K. 10563, Αθήνα');

Relations Clients, Purchases and PurchaseProducts are not empty, but their instances are not given here. Suppose that can explore their content using SQL and that you have full permissions to database.

**Exercise 1 (10%):** Give the SQL statements that modify the instance of the database to represent the following event:

Client Eleni Grigoriadou who is not willing to give more personal data (such as tax\_number or tax\_number) visits store Public Γλυφάδα at 22/11/2018 and buys two items, a laptop with model number HP255G6-231 and two printers with model number HP6950T87. The client has a special 10% discount on top of the default discount prices.

**Exercise 2 (10%):** Give the SQL statement that modifies the instance of the database to represent the following event: It is decided that all prices and discount prices of all products of HP are increased by 10%.

**Exercise 3 (10%):** Give the SQL statement to answer the query: return a list of all stores of Athens (Αθήνα).

**Exercise 4 (10%):** Give the SQL statement to answer the query: return a list of all purchases (id, date, store name, client and and surname) done in 2017. The list should be sorted from the oldest to then newest.

**Exercise 5 (10%):** Give the SQL statement to answer the query: return all products whose discount price is less that their price by at least 100 €

**Exercise 6 (10%):** Give the SQL statement to answer the query: How many clients are younger than 30?

**Exercise 7 (10%):** Give the SQL statement to answer the query: How many clients are younger than 30?

**Exercise 8 (10%):** Give the SQL statement to answer the query: How many products of model ‘T255G6-433’ have been sold;

**Exercise 9 (10%):** Give the SQL statement to answer the query: Give a list of the purchases (id, date, store name, client and and surname), their total number of product models (how many different product models each purchase included) and their total number of item units (how many product items each purchase included).

**Exercise 10 (10%):** Give the SQL statement to answer the query: return a list of all clients that have not bought anything so far

**Exercise 11 (50%):**

Suppose you are given the following requirements for a simple database for the Local

Football League (LFL):

• there are many teams,

• each team has a name, a city and a set of players,

• each player belongs to only one team,

• each player has a name, a position and a skill level

• a game has a date and a city. Two teams participate in each game. For each team participating in a game, its score is stored.

1. Design an E/R diagram that accurately reflects the requirements.
2. Define the corresponding relational schema using SQL statements