Assignment 1

Submission deadline: 27th January at 14:00

Objective:

The objective of this assignment is to become familiar with the basics of relational algebra, and databases and writing SQL queries through working with MariaDB and phpMyAdmin. For this assignment you can use XAMPP. It will help you to get experience in developing database applications implemented on top of MariaDB. Please contact the lecturer or the teaching assistants early to get assistance in installing or getting XAMPP/MariaDB up and running or in answering the questions.

Submission Requirements:

This is an individual assignment, and everyone should work independently.

Please upload the solutions to the tasks, in PDF, to Blackboard. It should contain the relational algebra expressions and the SQL queries you are asked to create in part one and two of the assignment.

****Consider the following Banking relational schema. You can create this database on your system by using phpMyAdmin to import the given assignment_1.sql file. Make sure that you are at the server level in phpMyAdmin and do not have any database selected (e.g., go to the Databases tab, but do not select any specific database, before going to the Import tab). ****

Given these sample tables:

Branch:

Name	City	Branch_code	Address	Manager
Gjøvik Branch	Gjøvik	b1	Storgata 55	Alexander Dahl
Trondheim Branch	Trondheim	b2	Strindvegen 7	Martina Jensen
Oslo Branch	Oslo	b3	Bromstadvegen 31	Tom Westin
Lillehammer Branch	Lillehammer	b4	Anders Tvereggens veg 12	John Smith
Hamar Branch	Hamar	b5	Lille Strandgate 2	Otto Roseth
Arendal Branch	Arendal	b6	Strandgata 71	Sofie Hovde

Customer:

Name	Customer_id	Gender	Birth_date	City	Address	Postal_code	Home_Phone	Mobile_phone	Email
Hildegunn Eggen	10003	F	2000-04-28	Gjøvik	Moholt alle 4	2816	59575468	39305691	hildegunn@realmail.no
Sofie Veierod	10005	F	1996-03-21	Trondheim	Frode Rinnans veg 27	7036	35904273	30254098	sofie@yahoo.com
Christoffer Sande	10009	M	1972-02-26	Lillehammer	Hans Baucks veg 48	2611	50742474	71218150	christoffer@yahoo.com
Erna Kaasa	10012	F	1978-05-20	Trondheim	Valentinlystvegen 43	7034	70536071	83358256	erna@yahoo.com
Benjamin Kringen	10013	M	1965-12-15	Oslo	Lidarende 33	0151	43828201	67896305	benjamin@realmail.no
Vivi Sando	10019	F	1958-07-29	Gjøvik	Astri Aasens veg 12	2821	35745929	78088625	vivi@realmail.no
Audun Owe	10020	M	1964-06-22	Trondheim	Frydenbergvegen 41	7026	84561135	25715331	audun@rocketmail.no
Markus Stenseth	10022	M	1950-04-26	Gjøvik	Kasper Andresens veg 45	2816	25200362	59268004	markus@realmail.no
Silje Henjum	10027	F	1983-06-03	Gjøvik	Sigurd Jorsalfars veg 28	2818	30420382	77112631	silje@realmail.no
Agnar Nielsen	10032	M	1980-05-19	Gjøvik	Herman Krags veg 21	2817	39585170	57974878	agnar@rocketmail.no
Monika Narum	10035	F	1958-07-29	Oslo	Jonsvannsveien 5	0259	87867556	23033394	monika@yahoo.com
Ina Huseby	10039	F	1984-01-09	Lillehammer	Nordre Eberg gate 55	2614	57612202	33548835	ina@rocketmail.no
Lillian Eriksen	10045	F	1997-09-15	Gjøvik	Kong Øysteins veg 8	2819	89078833	81098988	lillian@rocketmail.no
Ulrik Bergland	10061	M	1990-03-11	Trondheim	Jonsvannsveien 13	7028	50099414	26901503	ulrik@gmail.com
Audun Strand	10068	M	1999-02-28	Trondheim	Svalevegen 23	7017	46456081	81924867	audun@realmail.no

Account:

Account_number	Customer_id	Branch_code	Balance	Opening_date	Status
ac1055	10035	b3	16003	2018-12-31	Active
ac1103	10020	b2	18124	2015-08-02	Active
ac1114	10061	b2	12978	2020-10-06	Inactive
ac1118	10012	b2	15225	2015-06-11	Active
ac1135	10045	b1	8411	2019-06-02	Active
ac1157	10003	b1	18693	2016-09-21	Inactive
ac1163	10019	b1	18154	2020-02-23	Active
ac1183	10068	b2	14868	2016-01-29	Inactive
ac1194	10039	b4	11820	2019-03-22	Active
ac1224	10032	b1	9801	2018-10-19	Active
ac1230	10013	b3	17477	2017-09-25	Inactive
ac1234	10027	b1	13656	2018-03-07	Inactive
ac1238	10045	b1	11398	2017-01-14	Inactive
ac1259	10013	b3	18387	2019-10-18	Active
ac1267	10022	b1	17374	2015-11-24	Active
ac1327	10009	b4	10839	2019-10-27	Active
ac1452	10035	b3	19748	2017-11-04	Inactive
ac1458	10039	b4	11479	2017-02-21	Active
ac1470	10005	b2	11207	2015-03-26	Active
ac1471	10027	b1	9117	2018-03-05	Inactive

Loan:

Loan_number	Customer_id	Branch_code	Loan_name	Loan_amount	Starting_Date	Loan_period	Interest_rate
lo1004	10013	b2	Personal	50000	2018-05-03	3	1.88%
lo1029	10027	b4	Car	100000	2020-09-27	10	2.49%
lo1031	10009	b1	Personal	50000	2018-12-27	3	1.88%
lo1044	10035	b2	Home	100000	2018-06-08	5	2.13%
lo1062	10020	b3	Car	50000	2020-07-26	3	1.88%
lo1065	10039	b3	Personal	20000	2018-08-29	3	1.88%
lo1075	10012	b4	Personal	30000	2019-09-02	3	1.88%
lo1131	10061	b2	Home	200000	2019-07-30	10	2.49%
lo1135	10032	b4	Car	100000	2020-01-15	5	2.13%
lo1141	10027	b3	Personal	25000	2020-07-05	3	1.88%
lo1185	10039	b3	Personal	50000	2018-08-10	3	1.88%
lo1210	10005	b4	Home	100000	2020-12-30	5	2.13%
lo1275	10068	b1	Personal	*NULL*	2018-09-02	*NULL*	1.88%
lo1285	10032	b2	Personal	30000	2019-12-29	3	1.88%
lo1286	10020	b4	Personal	*NULL*	2018-04-09	*NULL*	1.88%

Depositor:

Transaction_id	Customer_id	Account_number	Amount	Date
tr1239	10013	ac1259	450	2020-05-13
tr1244	10068	ac1183	400	2020-10-13
tr1271	10035	ac1452	1000	2020-08-04
tr1290	10013	ac1230	1150	2019-07-08
tr1296	10009	ac1327	2500	2019-08-22
tr1311	10019	ac1163	200	2020-06-14
tr1317	10009	ac1327	1200	2020-09-15
tr1325	10009	ac1327	300	2019-03-20
tr1328	10039	ac1194	250	2019-05-04
tr1332	10019	ac1163	600	2019-04-19
tr1344	10012	ac1118	450	2019-04-14
tr1345	10061	ac1114	250	2019-07-08
tr1346	10013	ac1259	1000	2019-04-04
tr1352	10013	ac1230	300	2020-12-30
tr1369	10039	ac1194	400	2020-02-01
tr1398	10005	ac1470	500	2020-05-14
tr1405	10022	ac1267	1100	2020-03-17
tr1407	10061	ac1114	1200	2020-12-15
tr1418	10020	ac1103	850	2019-03-09
tr1421	10005	ac1470	1300	2020-03-14

Part 1 - Algebra Queries:

Write relational algebra expressions that will produce a relation containing:

- Q1: Loan number with value over $1000.
- Q2: Customers' name and email with the amount of their loan (the amount of loan should be NULL if a customer does not have any loan)
- Q3: Retrieve the number of transactions per each account.
- Q4: Retrieve all the customers having their account in "active" state.

Part 2 - SQL Queries:

Write a SQL command for the following:

- Q1: Retrieve the customers who are living in "Trondheim" (Returns 5 records)
- Q2: Retrieve the customers who have their email address under the commercial internet domain (.com) (Returns 5 records)

- Q3: Retrieve the information of loans given to the customers in each branch between 2019-06-01 and 2020-06-01. (Returns 4 records)
- Q4: Retrieve the youngest customer who has taken a loan. (Returns 1 record)
- Q5: Write a SQL query that retrieves customers without any loans. (Returns 4 records)
- Q6: Retrieve the number of transactions for each account during the year 2019 (Returns 8 records)
- Q7: Add a new customer with information below then open an inactive account in the given branch:

  - Name: Ryan Ishus o Address o City : Trondheim o Street: Bakkegata o No: 15 o Postal_code: 7049 o Home_Phone : 75432103 o Mobile_phone: 45464783 o Email : ryan00@realmail.no o Customer_id: 10016 o Gender: Male o Birth_date: 1991-01-10 o Branch: b2 o Account_number=ac1001 o Balance=$1000 o Opening_date= 2021-01-18
  - Status= Inactive

- Q8: Update the “Status” of account of customer Ryan Ishus to “Active”.
- Q9: Delete the loans which their loan period is NULL.