Assignment 1 : Suggested Solutions

Part 1 - Algebra Queries:

- Q1: Loan number with value over $1000.
- Q2: Customers' id having a loan and an account.
- Q3: 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)
- Q4: branches (Name, Branch_code, City) which has loan with Loan_period more than three years.
- Q5: Retrieve the number of transactions per each account.
- Q6: Retrieve all the customers having their account in "active" state.

Part 1 - Solutions:

Q1:

$\pi_{Loan\_number}(\sigma_{Loan\_amount > 1000} (Loan))$

Q2:

$\pi_{Customer\_id} (Loan) \cap \pi_{Customer\_id} (Account)$

Q3:

$\pi_{Name,\ email,\ Loan\_amount} (Customer ⟕_{customer\_id= customer\_id} Loan)$

Q4:

$\pi_{Name,\ Branch\_code,\ City} (\sigma_{Loan\_period > 3} (Branch \bowtie_{Branch\_code=Branch\_code} Loan))$

Q5:

$COUNT_{Account\_number} (Account \bowtie_{Account\_number= Account\_number} Depositor)$

Q6:

$\pi_{Name,Address,\ ...,\ email} (\sigma_{status=\text{"active"}} (Customer ⟕_{customer\_id= customer\_id} Account))$

Part 2 - SQL Queries:

- 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 loans where their “Loan_period” and “Loan_amount” fields are NULL. (Returns 2 records)
- Q5: Retrieve the youngest customer who has taken a loan. (Returns 1 record)
- Q6: Retrieve the personal information of the customers who opened an account during the year 2019 (Returns 4 records)
- Q7: Write a SQL query that retrieves all customers with their Loan_amount.
- Q8: Write a SQL query that retrieves customers without any loans. (Returns 4 records)
- Q9: Retrieve the names of branches that have not given out any loans yet (Returns 2 records)
- Q10: Retrieve the number of transactions for each account during the year 2019 (Returns 8 records)
- Q11: Add a new customer with information below then open an inactive account in the given branch:
  - Name: Ryan Ishus
  - Address
  - City : Trondheim
  - Street: Bakkegata
  - No: 15
  - Postal_code: 7049
  - Home_Phone : 75432103
  - Mobile_phone: 45464783
  - Email : ryan00@realmail.no
  - Customer_id: 10016
  - Gender: Male
  - Birth_date: 1991-01-10
  - Branch: b2
  - Account_number=ac1001
  - Balance=$1000
  - Opening_date= 2021-01-18
  - Status= Inactive
- Q12: Update the “Status” of account of customer Ryan Ishus to “Active”.
- Q13: Delete the loans which their loan period is NULL.

Part 2 - Solutions:

```
1. SELECT * FROM `customer` WHERE `customer`.`City`  ='Trondheim';

2. SELECT * FROM `customer` WHERE `Email` LIKE '%.com';

3. SELECT * FROM `loan` WHERE `Starting_Date` BETWEEN '2019-06-01' AND
   '2020-06-01';

4. SELECT * FROM `loan` WHERE `loan`.`Loan_amount` IS NULL AND
   `loan`.`Loan_period` IS NULL;

5. SELECT c.Name, c.Birth_date FROM customer c INNER JOIN loan l on
   c.Customer_id=l.Customer_id WHERE c.Birth_date = (SELECT MAX(
   c.Birth_date) FROM customer c INNER JOIN loan l on
   c.Customer_id=l.Customer_id);

6. SELECT `customer`.* FROM `customer` INNER JOIN `account` on
   `customer`.`Customer_id`  =`account`.`Customer_id`  WHERE
   year(`account`.`Opening_date` ) = 2019;


7. SELECT  A.`Name` ,  B.`Loan_amount`
   FROM `customer` AS A
   LEFT JOIN `loan` AS B
   ON B.`Customer_id` = A.`Customer_id`;


8. Method 1:
   SELECT  A.`Name`
   FROM `customer` AS A
   LEFT JOIN `loan` AS B
   ON B.`Customer_id` = A.`Customer_id`
   WHERE `Loan_number` IS  NULL;

   Method 2:
   SELECT `customer`.`Name` FROM `customer`
   WHERE `customer`.`Customer_id` NOT IN(
   SELECT `Customer_id`  FROM `loan`);



9. SELECT  A.`Name`
   FROM `branch` AS A
   LEFT JOIN `loan` AS B
   ON B.`Branch_code` = A.`Branch_code`
   WHERE `Loan_number` IS  NULL;

10. SELECT `Account_number`, COUNT(`Transaction_id`) FROM depositor WHERE
   `Date` BETWEEN '2019-01-01' AND '2019-12-31' GROUP BY `Account_number`;


11.  Part one:  INSERT INTO `customer`(`Name`, `Customer_id`, `Gender`,
    `Birth_date`, `City`, `Address`, `Postal_code`, `Home_Phone`,
`Mobile_phone`, `Email`) VALUES ('Ryan Ishus','10016','M', '1991-01-10'
,'Trondheim','Bakkegata 15 No 15','7049'
,'75432103','45464783','ryan00@realmail.no');
```

Part two:

```
INSERT INTO `account`(`Account_number`, `Customer_id`,
      `Branch_code`, `Balance`, `Opening_date`, `Status`) VALUES
('ac1001','10016', 'b2', '1000', '2021-01-18','Inactive' );
```

12.

```
UPDATE `account` SET `Status` ='Active' WHERE
`Account_number`='ac1001';
```

13.

```
DELETE FROM `loan` WHERE `Loan_period` IS NULL;
```