

# Task S2.01. Basic SQL Notions

## Level 1

### Exercise 1:

From the attached documents (structure.data and data.enter), import the two tables. Shows the main characteristics of the created scheme and explains the different tables and variables that exist. Make sure to include a diagram that illustrates the relationship between the different tables and variables.

The screenshot displays the MySQL Workbench interface. The left sidebar shows the 'SCHEMAS' panel with a tree view containing 'sys', 'transactions', and 'company'. The main workspace is divided into two panes. The top pane shows the SQL editor with the following code:

```
1 -- Creamos la base de datos
2 *
3 CREATE DATABASE IF NOT EXISTS transactions;
4 USE transactions;
5
6 -- Creamos la tabla company
7 CREATE TABLE IF NOT EXISTS company (
8   id VARCHAR(10) PRIMARY KEY,
9   company_name VARCHAR(255),
10  phone VARCHAR(15),
11  email VARCHAR(100),
12  country VARCHAR(100),
13  website VARCHAR(255)
14 );
15
16 -- Creamos la tabla transaction
17 CREATE TABLE IF NOT EXISTS transaction (
18   id VARCHAR(255) PRIMARY KEY,
19   credit_card_id VARCHAR(10) REFERENCES credit_card(id),
20   company_id VARCHAR(10) REFERENCES company(id),
21   user_id INT REFERENCES user(id),
22   lot FLOAT,
23   timestamp TIMESTAMP,
24   amount DECIMAL(10, 2),
25   declined BOOLEAN,
26   FOREIGN KEY (company_id) REFERENCES company(id)
27 );
```

The bottom pane shows the 'Action Output' tab with a table of execution results. The table has columns: Time, Action, Response, and Duration / Fetch Time. The results show the successful execution of the CREATE DATABASE and CREATE TABLE statements.

Time	Action	Response	Duration / Fetch Time
22:23:53	INSERT INTO transaction (id, credit_card_id, company_id, user_id, lot, timestamp, amount, declined) VALUES ('F5A3C02C-CD64-40CB-BB82-C640...')	1 row(s) affected	0.00051 sec
22:23:53	INSERT INTO transaction (id, credit_card_id, company_id, user_id, lot, timestamp, amount, declined) VALUES ('3D9F4DD-49E2-4FC6-9FDC-89F5...')	1 row(s) affected	0.00044 sec
22:23:53	INSERT INTO transaction (id, credit_card_id, company_id, user_id, lot, timestamp, amount, declined) VALUES ('F0B40DD-D160-4A2E-AB44-E837...')	1 row(s) affected	0.00039 sec
22:23:53	INSERT INTO transaction (id, credit_card_id, company_id, user_id, lot, timestamp, amount, declined) VALUES ('F7B78C17-FC7B-4815-B488-32E5A...')	1 row(s) affected	0.00043 sec
22:23:53	INSERT INTO transaction (id, credit_card_id, company_id, user_id, lot, timestamp, amount, declined) VALUES ('E1B74F5E-D83C-45B1-B0B9-8B97B...')	1 row(s) affected	0.00043 sec
22:23:53	INSERT INTO transaction (id, credit_card_id, company_id, user_id, lot, timestamp, amount, declined) VALUES ('22D5B0E-0D08-4E8C-BE88-45A2E...')	1 row(s) affected	0.00043 sec
22:23:53	INSERT INTO transaction (id, credit_card_id, company_id, user_id, lot, timestamp, amount, declined) VALUES ('22D5B0E-0D08-4E8C-BE88-45A2E...')	1 row(s) affected	0.00043 sec

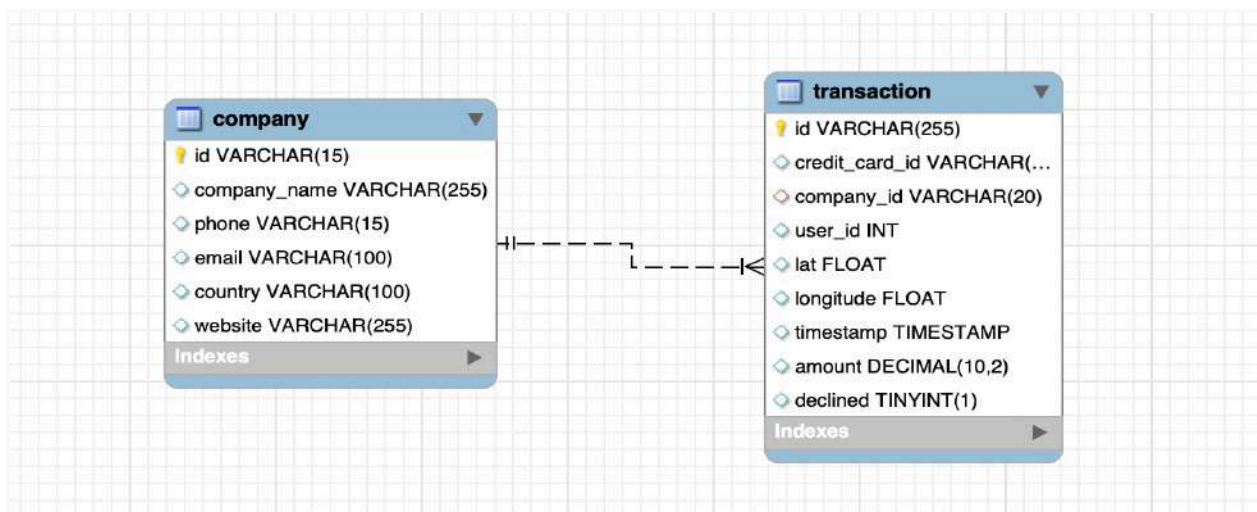
The scheme has two tables, which are the company and the transaction. The company table has 6 columns that store basic business information. The id column is the primary key for this table.

Column	Type	Default Value	Nullable	Character Set	Collation	Privileges	Extra
company_name	varchar(255)		YES	utf8mb4	utf8mb4_090...	select,insert,update,references	
country	varchar(100)		YES	utf8mb4	utf8mb4_090...	select,insert,update,references	
email	varchar(100)		YES	utf8mb4	utf8mb4_090...	select,insert,update,references	
id	varchar(15)		NO	utf8mb4	utf8mb4_090...	select,insert,update,references	
phone	varchar(15)		YES	utf8mb4	utf8mb4_090...	select,insert,update,references	
website	varchar(255)		YES	utf8mb4	utf8mb4_090...	select,insert,update,references	

The transaction table has 9 columns that record each transaction made by users using credit cards. The company\_id is associated with the id in the company table (foreign key).

Column	Type	Default Value	Nullable	Character Set	Collation	Privileges	Extra
amount	decimal(10,2)		YES			select,insert,update,references	
company_id	varchar(20)		YES	utf8mb4	utf8mb4_090...	select,insert,update,references	
credit_card_id	varchar(15)		YES	utf8mb4	utf8mb4_090...	select,insert,update,references	
declined	tinyint(1)		YES			select,insert,update,references	
id	varchar(255)		NO	utf8mb4	utf8mb4_090...	select,insert,update,references	
lat	float		YES			select,insert,update,references	
longitude	float		YES			select,insert,update,references	
timestamp	timestamp		YES			select,insert,update,references	
user_id	int		YES			select,insert,update,references	

- The transaction establishes a 1-to-N relationship with the company (there can be multiple transactions in a company).
- There are no user and credit\_card tables, but there are references to them.



## Exercise 2:

Using JOIN you will make the following queries:

-List of countries that are generating sales.

The screenshot shows a database query editor with the following tabs: `estructura datos*`, `company`, `transaction`, `transactions.transaction`, `transactions.company`, and `dades_introdui`. The query editor displays the following SQL query:

```
1 • SELECT DISTINCT country
2 FROM transactions.company;
```

The query is executed, and the results are shown in a table with the following data:

country
Germany
Australia
United States
New Zealand
Norway
United Kingdom
Italy
Belgium
Sweden
Ireland
China
Canada
France
Netherlands
Spain

-From how many countries sales are generated.

The screenshot shows a database query editor with the following tabs: `company` and `transaction`. The query editor displays the following SQL query:

```
1 • SELECT COUNT(DISTINCT country) AS Countries
2 FROM company;
3
4
5
```

The query is executed, and the results are shown in a table with the following data:

Countries
15

-It identifies the company with the highest average sales.

The screenshot shows a database query editor with the following SQL query:

```
1 • SELECT c.company_name,AVG(t.amount) AS avg_sales
2 FROM transactions.transaction AS t
3 JOIN transactions.company AS c
4 ON t.company_id = c.id
5 GROUP BY c.company_name
6 ORDER BY avg_sales DESC
7 LIMIT 1;
```

The query is executed, and the result grid shows the following data:

company_name	avg_sales
Ac Fermentum Incorporated	284.867160

### Exercise 3:

Using only subconsults (not using JOIN):

-Displays all transactions made by companies in Germany.

The screenshot shows a database query editor with the following SQL query:

```
1 • SELECT *
2 FROM transaction
3 WHERE company_id IN
4 (SELECT id
5 FROM company
6 WHERE country = "Germany");
```

The query is executed, and the result grid shows the following data:

id	credit_card...	company_id	user_id	lat	longitude	timestamp	amount	declined
00138D3B-206D-4C03-94B7-63A2678EB9B4	CcS-4899	b-2222	318	41.3781	12.447	2020-03-25 10:43:43	426.36	0
0013C1B6-3B84-4D6C-8154-E2B3FEB8A8E9	CcS-5070	b-2222	489	41.3814	2.18176	2020-12-17 18:15:37	316.90	0
00201A11-2E62-44C4-941D-198FC8DB77F0	CcU-3512	b-2222	193	55.5704	-3.85129	2021-01-22 23:44:27	453.04	0
00235618-0A5C-4D49-9DCB-B3A9405D8923	CcS-8137	b-2222	3556	59.8421	18.729	2020-09-09 15:43:19	263.14	0
005A5A7B-1F1A-4B6C-9B15-1625A78C9C38	CcS-8998	b-2222	4417	41.1591	-8.63905	2024-05-15 09:10:11	442.01	0
00687139-48B2-4FFA-8E73-B20376F04AB4	CcS-4870	b-2222	289	51.1966	10.4669	2019-03-09 19:37:49	524.84	0
0074F4DD-32F1-4827-8758-55896314623A	CcS-8081	b-2222	3500	39.7016	-8.50325	2016-12-26 23:06:57	491.90	0
00AAB9CD-39D6-4DCB-8A1D-13BE73DC90A9	CcS-6797	b-2222	2216	55.7652	-3.76245	2021-04-25 03:06:59	167.15	0
00BE09D4-692D-47D8-ABE8-325E2269829D	CcS-4983	b-2222	402	38.708	-9.12993	2019-02-27 15:25:16	141.66	0
00DA0383-E048-4577-8ED1-3C56C258FF2F	CcS-9223	b-2222	4642	51.1742	10.2027	2019-03-21 11:47:34	325.62	0
00DD11DE-ED01-48BD-93A0-174D183A59DF	CcS-7681	b-2222	3100	45.7565	4.83109	2024-01-28 18:20:49	242.53	0
01449CE0-98E9-4DE5-9810-728C6BA00E6F	CcS-5424	b-2222	843	47.0163	2.26064	2024-02-17 19:37:14	451.71	0
0175E8C7-241E-42DA-A8B9-9F246DBF4D2F	CcS-7510	b-2222	2929	52.0619	4.29464	2021-08-28 16:29:38	9.46	0
01ABDA88-06E2-4CA0-A131-AEE6FF11B749	CcS-5053	b-2222	472	51.7738	5.17479	2020-01-28 01:15:07	368.41	0
01F1C7ED-0823-442D-AE0E-3134D5004866	CcS-6776	b-2222	2195	59.6697	18.6697	2022-12-17 09:40:14	168.79	0
01FABC61-18C8-441B-987C-459AA3F06097	CcS-5531	b-2222	950	55.3405	-3.3863	2020-04-30 08:57:27	333.45	0
023B714C-DCC1-4B03-AD8E-29B3673F631B	CcS-5103	b-2222	522	55.3362	-2.99198	2018-04-14 18:52:13	155.29	0
024BB812-89F5-4B21-B8E9-E0D51800A679	CcS-9328	b-2222	4747	42.0816	12.8326	2016-07-01 01:33:41	268.23	0
02DF083C-E622-42E0-B75E-15BA39A27594	CcS-4859	b-2222	278	60.6186	18.5278	2021-02-03 14:12:33	127.23	0
031C28DE-F9A2-448A-92EE-8700DD86327C	CcU-3750	b-2222	159	55.355	-3.44811	2020-06-05 18:32:28	68.38	0
03217043-8465-46B4-9F2A-EDA02F6FFE1	CcS-4998	b-2222	417	39.3245	-8.58552	2022-03-16 03:39:15	589.15	0



-List the companies that have made transactions for a higher amount than the average of all transactions.

```
1 • SELECT company_name
2 FROM company
3 WHERE id IN
4     (SELECT company_id
5      FROM transaction
6      WHERE amount > (SELECT AVG(amount)
7                      FROM transaction)
8     );
```

Result Grid

company_name
Ac Fermentum Incorporated
Magna A Neque Industries
Fusce Corp.
Conwallis In Incorporated
Ante Iaculis Nec Foundation
Donec Ltd
Sed Nunc Ltd
Amet Nulla Donec Corporation
Nascetur Ridiculus Mus Inc.
Vestibulum Lorem PC
Gravida Sagittis LLP
Mus Aenean Eget Foundation
Dis Parturient Institute
Sed LLC
Arcu LLP
Prolium Neque Corp.
Fringilla LLC
Quisque Libero LLC
Auctor Mauris Vel LLP
Elit Etiam Laoreet Associates
Nunc Interdum Incorporated
Augue Foundation
Non Magna LLC
A Institute

-They will remove from the system the companies that do not have registered transactions, deliver the list of these companies.

```
1 • SELECT *
2 FROM company
3 WHERE id NOT IN (
4     SELECT DISTINCT company_id
5     FROM transaction
6     WHERE company_id IS NOT NULL
7 );
```

Result Grid

id	company_name	phone	email	country	website
NULL	NULL	NULL	NULL	NULL	NULL

## Level 2

### Exercise 1:

It identifies the five days that the largest amount of income was generated in the company by sales. Display the date of each transaction along with the total sales.

The screenshot shows a database query editor with a SQL query that joins the 'company' and 'transaction' tables, groups by transaction date, and orders by total sale amount in descending order, limiting the results to 5 rows.

```
1 • SELECT c.company_name,  
2       DATE(t.timestamp) AS transaction_date,  
3       SUM(t.amount) AS total_sale  
4 FROM transaction AS t  
5 JOIN company AS c  
6 ON t.company_id = c.id  
7 GROUP BY DATE(t.timestamp), c.company_name  
8 ORDER BY total_sale DESC  
9 LIMIT 5;  
10  
11
```

The result grid displays the following data:

company_name	transaction_date	total_sale
Eget Ipsum Ltd	2024-12-02	3398.40
Ac Fermentum Incorporated	2019-03-19	3149.04
Nulla Integer Vulputate Corp.	2017-12-20	2774.04
Viverra Donec Foundation	2017-12-20	2773.35
Ac Fermentum Incorporated	2020-12-11	2717.76

**Exercise 2:** What is the average sales per country? It presents the results ordered from highest to lowest average.

The screenshot shows a database query editor with a SQL query that joins the 'company' and 'transaction' tables, groups by country, and orders by average sales in descending order.

```
1 • SELECT DISTINCT c.country, AVG(t.amount) AS avg_sales  
2 FROM company AS c  
3 JOIN transaction AS t  
4 ON c.id = t.company_id  
5 GROUP BY c.country  
6 ORDER BY avg_sales DESC ;  
7  
8  
9
```

The result grid displays the following data:

country	avg_sales
Australia	265.190742
United States	264.977877
Belgium	261.153042
Germany	260.841391
Ireland	260.644761
Spain	260.468125
France	259.979185
New Zealand	259.586176
Norway	259.375337
Netherlands	258.436128
Italy	258.272740
Sweden	257.437949
Canada	257.431229
United King...	256.759607
China	252.422260

### Exercise 3:

In your company, a new project is proposed to launch some advertising campaigns to make competition to the company "Non Institute". To do this, they ask you for the list of all the transactions carried out by companies that are located in the same country as this company.

-Display the list by applying JOIN and subconsults.

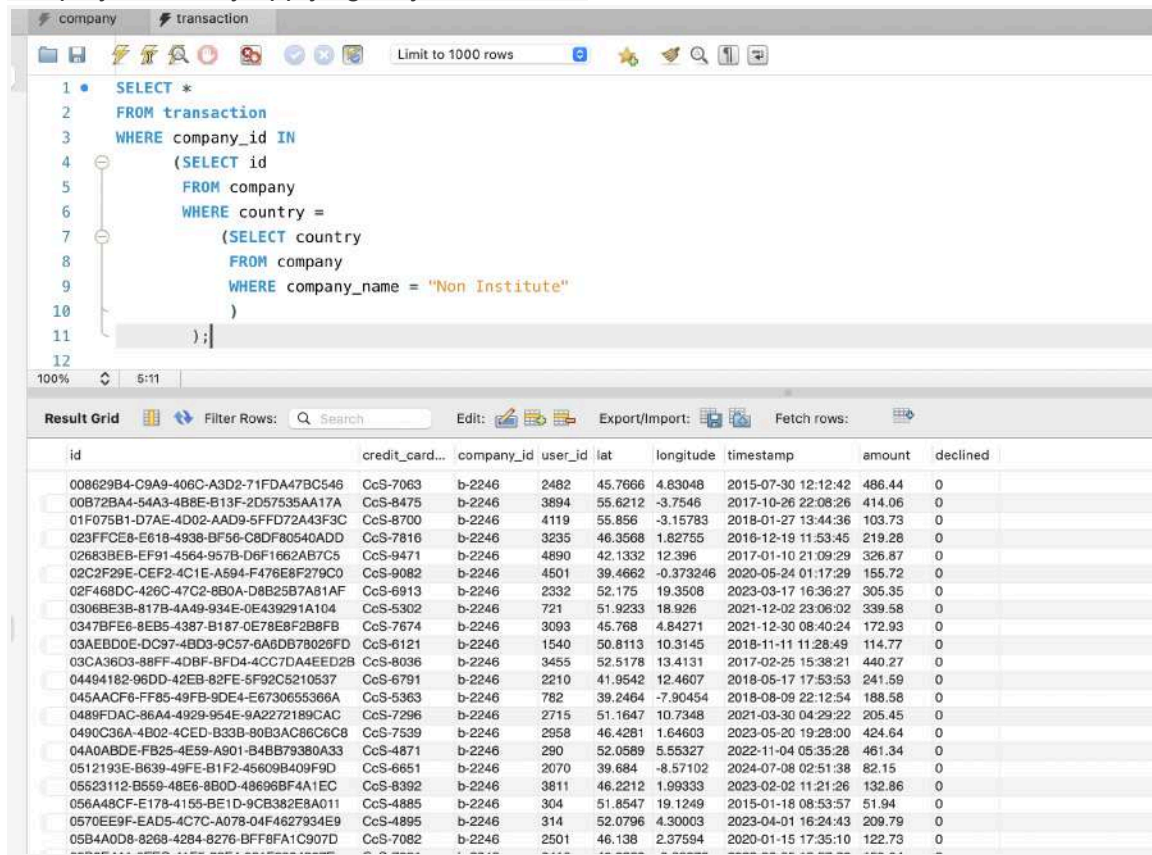
The screenshot shows a database management tool interface. At the top, there are tabs for 'company' and 'transaction'. Below the tabs, there is a toolbar with various icons and a 'Limit to 1000 rows' dropdown. The main area displays a SQL query:

```
1 • SELECT t.*
2 FROM transaction AS t
3 JOIN company AS c
4 ON t.company_id = c.id
5 WHERE c.country = (
6     SELECT country
7     FROM company
8     WHERE company_name = "Non Institute"
9 );
10
```

Below the query, there is a 'Result Grid' section. It includes a search bar, an 'Export' button, and a 'Fetch rows' button. The results are displayed in a table with the following columns: id, credit\_card..., company\_id, user\_id, lat, longitude, timestamp, amount, and declined. The table contains 20 rows of data.

id	credit_card...	company_id	user_id	lat	longitude	timestamp	amount	declined
008629B4-C9A9-406C-A3D2-71FDA47BC546	CcS-7063	b-2246	2482	45.7666	4.83048	2015-07-30 12:12:42	486.44	0
00B72BA4-54A3-4B8E-B13F-2D57535AA17A	CcS-8475	b-2246	3894	55.6212	-3.7546	2017-10-26 22:08:26	414.06	0
01F075B1-D7AE-4D02-AAD9-5FFD72A43F3C	CcS-8700	b-2246	4119	55.856	-3.15783	2018-01-27 13:44:36	103.73	0
023FFCE8-E618-4938-BF56-C8DF80540ADD	CcS-7816	b-2246	3235	46.3568	1.82755	2016-12-19 11:53:45	219.28	0
02683BEB-EF91-4564-957B-D6F1662AB7C5	CcS-9471	b-2246	4890	42.1332	12.396	2017-01-10 21:09:29	326.87	0
02C2F29E-CEF2-4C1E-A594-F476E8F279C0	CcS-9082	b-2246	4501	39.4662	-0.373246	2020-05-24 01:17:29	155.72	0
02F468DC-426C-47C2-8B0A-D8B25B7A81AF	CcS-6913	b-2246	2332	52.175	19.3508	2023-03-17 16:36:27	305.35	0
03068E3B-817B-4A49-934E-0E439291A104	CcS-5302	b-2246	721	51.9233	18.926	2021-12-02 23:06:02	339.58	0
0347BFE6-8EB5-4387-B187-0E78E8F2B8FB	CcS-7674	b-2246	3093	45.768	4.84271	2021-12-30 08:40:24	172.93	0
03AEBD0E-DC97-4BD3-9C57-6A6DB78026FD	CcS-6121	b-2246	1540	50.8113	10.3145	2018-11-11 11:28:49	114.77	0
03CA36D3-88FF-4DBF-BFD4-4CC7DA4EED2B	CcS-8036	b-2246	3455	52.5178	13.4131	2017-02-25 15:38:21	440.27	0
04494182-96DD-42EB-82FE-5F92C5210537	CcS-6791	b-2246	2210	41.9542	12.4607	2018-05-17 17:53:53	241.59	0
045AACF6-FF85-49FB-8DE4-E6730655366A	CcS-5363	b-2246	782	39.2464	-7.90454	2018-08-09 22:12:54	188.58	0
0489FDAC-86A4-4929-954E-9A2272189CAC	CcS-7296	b-2246	2715	51.1647	10.7348	2021-03-30 04:29:22	205.45	0
0490C36A-4B02-4CED-B33B-80B3AC86C6C8	CcS-7539	b-2246	2958	46.4281	1.64603	2023-05-20 19:28:00	424.64	0
04A0ABDE-FB25-4E59-A901-B4BB79380A33	CcS-4871	b-2246	290	52.0589	5.55327	2022-11-04 05:35:28	461.34	0
0512193E-B639-49FE-B1F2-45609B409F9D	CcS-6651	b-2246	2070	39.684	-8.57102	2024-07-08 02:51:38	82.15	0
05523112-B559-48E6-8B0D-48696BF4A1EC	CcS-8392	b-2246	3811	46.2212	1.99333	2023-02-02 11:21:26	132.86	0
056A48CF-E178-4155-BE1D-9CB382E8A011	CcS-4885	b-2246	304	51.8547	19.1249	2015-01-18 08:53:57	51.94	0
0570EE9F-EAD5-4C7C-A078-04F4627934E9	CcS-4895	b-2246	314	52.0796	4.30003	2023-04-01 16:24:43	209.79	0
05B4A0D8-8268-4284-8276-BFF8FA1C907D	CcS-7082	b-2246	2501	46.138	2.37594	2020-01-15 17:35:10	122.73	0
05B8E441-6FEC-41F5-86F4-061F0034367E	CcS-7991	b-2246	3410	40.3368	-3.26072	2023-08-05 18:57:23	159.04	0
06002FEA-C7B0-4B7D-97FE-A93B1AD99153	CcS-6071	b-2246	1490	52.3959	19.5064	2020-12-03 20:04:59	114.09	0
06249924-FD42-49AF-9EF5-6AED20BE725B	CcS-6676	b-2246	2095	55.0364	-3.92437	2015-03-17 23:10:56	535.77	0

-Display the list by applying only subconsults



The screenshot shows a database query editor with a SQL query and its results in a grid. The query is as follows:

```
1 SELECT *
2 FROM transaction
3 WHERE company_id IN
4     (SELECT id
5      FROM company
6      WHERE country =
7          (SELECT country
8           FROM company
9           WHERE company_name = "Non Institute")
10    )
11 ;
```

The results grid displays the following data:

id	credit_card...	company_id	user_id	lat	longitude	timestamp	amount	declined
008629B4-C9A9-406C-A3D2-71FDA47BC546	CcS-7063	b-2246	2482	45.7666	4.83048	2015-07-30 12:12:42	486.44	0
00B72BA4-54A3-488E-B13F-2D57535AA17A	CcS-8475	b-2246	3894	55.6212	-3.7546	2017-10-26 22:08:26	414.06	0
01F075B1-D7AE-4D02-AAD9-5FD72A43F3C	CcS-8700	b-2246	4119	55.856	-3.15783	2018-01-27 13:44:36	103.73	0
023FFCE8-E618-4938-BF56-C8DF80540ADD	CcS-7816	b-2246	3235	46.3568	1.82755	2016-12-19 11:53:45	219.28	0
02683BEB-EF91-4564-957B-D6F1662AB7C5	CcS-9471	b-2246	4890	42.1332	12.396	2017-01-10 21:09:29	326.87	0
02C2F29E-CEF2-4C1E-A594-F476E8F279C0	CcS-9082	b-2246	4501	39.4662	-0.373246	2020-05-24 01:17:29	155.72	0
02F468DC-426C-47C2-8B0A-D8B25B7A81AF	CcS-6913	b-2246	2332	52.175	19.3508	2023-03-17 16:38:27	305.35	0
0306BE3B-817B-4A49-934E-0E439291A104	CcS-5302	b-2246	721	51.9233	18.926	2021-12-02 23:06:02	339.58	0
0347BFE6-8EB5-4387-B187-0E78E8F2B8FB	CcS-7674	b-2246	3093	45.768	4.84271	2021-12-30 08:40:24	172.93	0
03AEBDDE-DC97-4BD3-9C57-6A6DB78026FD	CcS-6121	b-2246	1540	50.8113	10.3145	2018-11-11 11:28:49	114.77	0
03CA36D3-88FF-4DBF-BFD4-4CC7DA4EED2B	CcS-8036	b-2246	3455	52.5178	13.4131	2017-02-25 15:38:21	440.27	0
04494182-96DD-42EB-82FE-5F92C5210537	CcS-6791	b-2246	2210	41.9542	12.4607	2018-05-17 17:53:53	241.59	0
045AACF6-FF85-49FB-9DE4-E6730655366A	CcS-5363	b-2246	782	39.2464	-7.90454	2018-08-09 22:12:54	188.58	0
0489FDAC-86A4-4929-954E-9A2272189CAC	CcS-7296	b-2246	2715	51.1647	10.7348	2021-03-30 04:29:22	205.45	0
0490C36A-4B02-4CED-B33B-80B3AC66C6C8	CcS-7539	b-2246	2958	46.4281	1.64603	2023-05-20 19:28:00	424.64	0
04A0ABDE-FB25-4E59-A901-B48B79380A33	CcS-4871	b-2246	290	52.0589	5.55327	2022-11-04 05:35:28	461.34	0
0512193E-8639-49FE-B1F2-456098409F9D	CcS-6651	b-2246	2070	39.684	-8.57102	2024-07-08 02:51:38	82.15	0
05523112-B559-48E6-8B0D-48696BF4A1EC	CcS-8392	b-2246	3811	46.2212	1.99333	2023-02-02 11:21:26	132.86	0
056A48CF-E178-4155-BE1D-9CB382E8A011	CcS-4885	b-2246	304	51.8547	19.1249	2015-01-18 08:53:57	51.94	0
0570EE9F-EAD5-4C7C-A078-04F4627934E9	CcS-4895	b-2246	314	52.0796	4.30003	2023-04-01 16:24:43	209.79	0
05B4A0D8-8268-4284-8276-BFF8FA1C907D	CcS-7082	b-2246	2501	46.138	2.37594	2020-01-15 17:35:10	122.73	0

## Level 3

### Exercise 1:

It presents the name, telephone, country, date and amount of those companies that made transactions with a value between 350 and 400 euros and on any of these dates: April 29, 2015, July 20, 2018 and March 13, 2024. Sort results from highest to lowest quantity.



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## Exercise 2:

We need to optimize the allocation of resources and it will depend on the operational capacity that is required, so they ask you for information about the amount of transactions carried out by companies, but the human resources department is demanding and wants a list of companies where you specify if they have more than 400 transactions or less.

-List of companies that have more than 400 transactions

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-List of companies that have less than 400 transactions

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