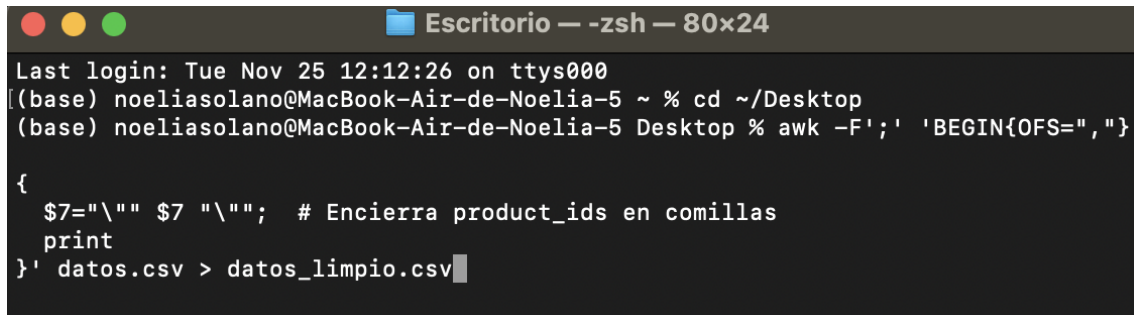


# SPRINT 4

## NIVELL 1

Descàrrega els arxius CSV, estudia'ls i dissenya una base de dades amb un esquema d'estrella que contingui, almenys 4 taules de les quals puguis realitzar les següents consultes:



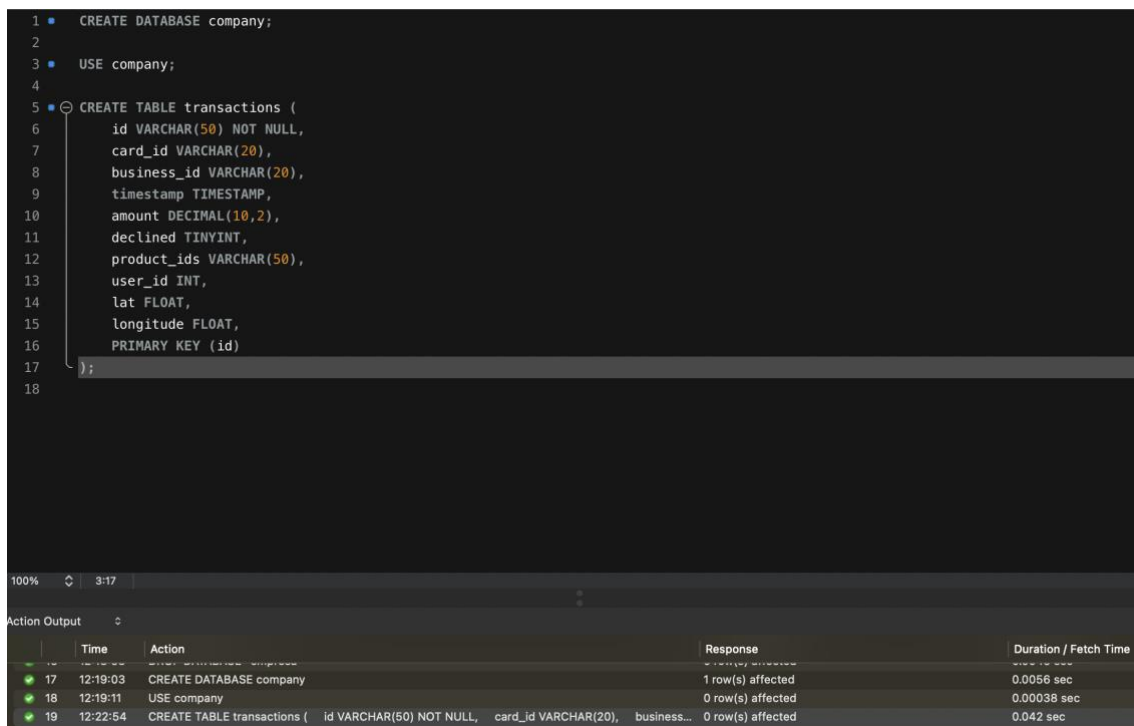
```

Escritorio — -zsh — 80x24

Last login: Tue Nov 25 12:12:26 on ttys000
[(base) noeliasolano@MacBook-Air-de-Noelia-5 ~ % cd ~/Desktop
(base) noeliasolano@MacBook-Air-de-Noelia-5 Desktop % awk -F';' 'BEGIN{OFS=","}

{
    $7="\" \"$7 \"\""; # Encierra product_ids en comillas
    print
}' datos.csv > datos_limpio.csv
  
```

Treballa en un Mac, això ha implicat fer algun canvi pel correcte reconeixement de les dades de l'arxiu CSV. A continuació, des de la terminal he ficat els product\_ids entre cometes per evitar una mala carrega de dades.



```

1 CREATE DATABASE company;
2
3 USE company;
4
5 CREATE TABLE transactions (
6     id VARCHAR(50) NOT NULL,
7     card_id VARCHAR(20),
8     business_id VARCHAR(20),
9     timestamp TIMESTAMP,
10    amount DECIMAL(10,2),
11    declined TINYINT,
12    product_ids VARCHAR(50),
13    user_id INT,
14    lat FLOAT,
15    longitude FLOAT,
16    PRIMARY KEY (id)
17 );
18
  
```

	Time	Action	Response	Duration / Fetch Time
17	12:19:03	CREATE DATABASE company	1 row(s) affected	0.0056 sec
18	12:19:11	USE company	0 row(s) affected	0.00038 sec
19	12:22:54	CREATE TABLE transactions ( id VARCHAR(50) NOT NULL, card_id VARCHAR(20), business...	0 row(s) affected	0.042 sec

```
19 LOAD DATA LOCAL INFILE '/Users/noeliasolano/Downloads/transactionsOK.csv'
20 INTO TABLE transactions
21 FIELDS TERMINATED BY ','
22 ENCLOSED BY '"'
23 LINES TERMINATED BY '\n'
24 IGNORE 1 ROWS;
25
```

100% 15:24

Action Output

	Time	Action	Response	Duration / Fetch Time
✓	18 12:19:11	USE company	0 row(s) affected	0.00038 sec
✓	19 12:22:54	CREATE TABLE transactions ( id VARCHAR(50) NOT NULL, card_id VARCHAR(20), business...	0 row(s) affected	0.042 sec
✗	20 12:25:46	LOAD DATA LOCAL INFILE '/Users/noeliasolano/Downloads/transactionsOK.csv' INTO TABLE transa...	Error Code: 3948. Loading local data is disabled; this...	0.0037 sec

Connection Remote Management System Profile

Connection Method: Standard (TCP/IP) Method to use to connect to the RDBMS

Parameters SSL Advanced

☐ Use compression protocol Select this option for WAN connections.

☐ Use ANSI quotes to quote If enabled this option overwrites the serverside settings.

☐ Enable Cleartext Send user password in cleartext. Required for some authentication methods.

Timeout: 60 Maximum time to wait before a connection is aborted.

SQL\_MODE: Override the default SQL\_MODE used by the server.

Others: DbSqlEditor.LastDefaultSchema=OPT\_LOCAL\_INFILE=1  
lastConnected=1764151579  
serverVersion=9.3.0

Duplicate Move Up Move Down Test Connection Close

```
19 LOAD DATA LOCAL INFILE '/Users/noeliasolano/Downloads/transactionsOK.csv'
20 INTO TABLE transactions
21 FIELDS TERMINATED BY ','
22 ENCLOSED BY '"'
23 LINES TERMINATED BY '\n'
24 IGNORE 1 ROWS;
25
26 SHOW VARIABLES LIKE 'local_infile';
27
28 SET GLOBAL local_infile = 1;
```

100% 15:24

Action Output

	Time	Action	Response	Duration / Fetch Time
✓	3 11:06:50	USE company	0 row(s) affected	0.00093 sec
✓	4 11:06:54	LOAD DATA LOCAL INFILE '/Users/noeliasolano/Downloads/transactionsOK.csv' INTO TABLE transactions FIELDS TERMINATED...	100000 row(s) affected Records: 100000 Deleted: 0...	1.403 sec

1 SELECT \* FROM company.transactions;

id	card_id	business_id	timestamp	amount	declined	product_ids	user_id	lat	longitude
00043A49-2949-494B-A5DD-ASBAE3BB19DD	CcS-9294	b-2458	2024-08-28 07:16:46	395.43	0	16, 26, 97, 87	4713	46.1999	1.43554
000447FE-B650-4DCF-85DE-C7ED0EE1CAAD	CcS-5019	b-2370	2016-12-21 20:07:18	155.63	0	66, 69, 87	438	41.5972	12.2218
00045D68-ED2E-4F2F-8186-CEE074D875D0	CcS-6699	b-2390	2020-07-14 15:37:45	326.01	0	30, 11, 16, 81	2118	29.7573	95.3796
000461C3-1C26-4FEF-834D-4CDD0E9049BD	CcS-6696	b-2230	2017-09-04 19:44:53	161.60	0	72	2115	53.5489	-113.503
00051AA4-9C9E-428B-B070-C38062A1B3E2	CcS-7800	b-2266	2017-01-05 18:19:25	148.91	0	18	3025	52.5084	8.88081
0008A312-EDFE-4A4F-BC99-EB0C92EC3CAAD	CcU-3358	b-2598	2023-09-23 04:51:43	294.59	0	35, 33, 19	215	53.5535	-113.499
0009A151-9BCF-4E31-9053-A468F77FAAB	CcS-7509	b-2546	2023-12-31 00:06:36	383.63	0	93, 55, 28, 91	2928	51.9362	5.34265
0009D494-6245-4DF9-955D-2C084191CFFB	CcS-8483	b-2526	2017-07-18 07:52:02	197.80	0	55, 8, 72	3902	45.492	-73.5706
000A1DEC-CDB6-4AB2-A619-71DAB8D4A262	CcS-6467	b-2558	2018-09-08 05:29:58	339.94	0	46, 56, 73	1886	55.7425	-3.30009
000A1E64-1414-40B0-9D92-5678A4D958E2	CcS-5966	b-2550	2022-09-17 04:02:19	369.71	0	6, 89, 19	1385	52.0821	5.28424

transactions 1

Action Output

Time	Action	Response	Duration / Fetch Time
11:06:54	LOAD DATA LOCAL INFILE '/Users/noeliasolano/Downloads/transactionsOK.csv' INTO TABLE transactions FIELDS TERMINATED BY ','	100000 row(s) affected Records: 100000 Deleted: 0...	1.403 sec
11:07:44	SELECT * FROM company.transactions	100000 row(s) returned	0.0015 sec / 0.164 sec

Problema solucionat, les dades s'han carregat correctament. Ara replicaré el procés adaptant-ho a les característiques de cada CSVs.

39 LOAD DATA LOCAL INFILE '/Users/noeliasolano/Downloads/credit\_cards.csv'

40 INTO TABLE credit\_cards

41 FIELDS TERMINATED BY ','

42 LINES TERMINATED BY '\n'

43 IGNORE 1 ROWS

44 (id, user\_id, iban, pan, pin, cvv, track1, track2, @expiring\_date) -- Cal especificar totes les columnes entre parentesis, és el ord

45 SET expiring\_date = STR\_TO\_DATE(@expiring\_date, '%m/%d/%y');

46

Action Output

Time	Action	Response	Duration / Fetch Time
12:09:08	CREATE TABLE credit_cards ( id VARCHAR(20) PRIMARY KEY, user_id INT, iban VARCHAR(50), pan VARCHAR(50), pin...	0 row(s) affected	0.0074 sec
12:09:43	LOAD DATA LOCAL INFILE '/Users/noeliasolano/Downloads/credit_cards.csv' INTO TABLE credit_cards FIELDS TERMINATED BY ','	5000 row(s) affected Records: 5000 Deleted: 0 Skip...	0.094 sec

19 CREATE TABLE credit\_cards (

20 id VARCHAR(20) PRIMARY KEY,

21 user\_id INT,

22 iban VARCHAR(50),

23 pan VARCHAR(50),

24 pin VARCHAR(10),

25 cvv VARCHAR(10), -- Millor fer servir varchar, un int eliminaria qualsevol 0 per davant.

26 track1 VARCHAR(50),

27 track2 VARCHAR(50),

28 expiring\_date VARCHAR(20)

29 );

30

Action Output

Time	Action	Response	Duration / Fetch Time
11:07:44	SELECT * FROM company.transactions	100000 row(s) returned	0.0015 sec / 0.164 sec
11:49:53	CREATE TABLE credit_cards ( id VARCHAR(20) PRIMARY KEY, user_id INT, iban VARCHAR(50), pan VARCHAR(50), pin...	0 row(s) affected	0.085 sec

62 LOAD DATA LOCAL INFILE '/Users/noeliasolano/Downloads/companies.csv'

63 INTO TABLE companies

64 FIELDS TERMINATED BY ','

65 LINES TERMINATED BY '\n'

66 IGNORE 1 ROWS;

67

Action Output

Time	Action	Response	Duration / Fetch Time
13:17:17	CREATE TABLE companies ( company_id VARCHAR(15) PRIMARY KEY, company_name VARCHAR(50), phone VARCHAR(15...	0 row(s) affected	0.080 sec
13:19:08	LOAD DATA LOCAL INFILE '/Users/noeliasolano/Downloads/companies.csv' INTO TABLE companies FIELDS TERMINATED BY ','	100 row(s) affected Records: 100 Deleted: 0 Skipped...	0.0098 sec

```

31 CREATE TABLE companies (
32     company_id VARCHAR(15) PRIMARY KEY,
33     company_name VARCHAR(50),
34     phone VARCHAR(15),
35     email VARCHAR(50),
36     country VARCHAR(20),
37     website VARCHAR(100)
38 );
39

```

Time	Action	Response	Duration / Fetch Time
12-12-18	SELECT * FROM company.credit_cards	5000 row(s) returned	0.00081 sec / 0.0091
13-17-17	CREATE TABLE companies ( company_id VARCHAR(15) PRIMARY KEY, company_name VARCHAR(50), phone VARCHAR(15), email VARCHAR(50), country VARCHAR(20), website VARCHAR(100)	0 row(s) affected	0.080 sec

Analitzant els CSVs observem que existeixen american\_users i european\_users amb mateixa estructura de dades i IDs únics que no se solapen entre si, sinó que es concatenen entre les dues taules. Donada la situació, he pres la decisió de carregar i unir el contingut dels arxius CSV d'american\_users i european\_users en una sola taula per poder optimitzar les consultes relatives a usuaris-transaccions o altres menesters.

OPCIONAL: Per no perdre informació he decidit crear una columna extra anomenada continent on s'indica si és "america" o "europe".

```

40 CREATE TABLE users (
41     id INT PRIMARY KEY,
42     name VARCHAR(20),
43     surname VARCHAR(20),
44     phone VARCHAR(15),
45     email VARCHAR(50),
46     birth_date DATE,
47     country VARCHAR(20),
48     city VARCHAR(20),
49     postal_code VARCHAR(15),
50     address VARCHAR(50),
51     continent VARCHAR(15)
52 );
53

```

Time	Action	Response	Duration / Fetch Time
14-27-28	CREATE TABLE users ( id INT PRIMARY KEY, name VARCHAR(20), surname VARCHAR(20), phone VARCHAR(15), email...	0 row(s) affected	0.028 sec

```

81 LOAD DATA LOCAL INFILE '/Users/noeliasolano/Downloads/american_users.csv'
82 INTO TABLE users
83 FIELDS TERMINATED BY ','
84 ENCLOSED BY '"' -- La data de naixement esta entre cometes.
85 LINES TERMINATED BY '\n'
86 IGNORE 1 ROWS
87 (id, name, surname, phone, email, @birth_date, country, city, postal_code, address)
88 SET
89     birth_date = STR_TO_DATE(@birth_date, '%b %d, %Y'),
90     continent = 'America';
91
92 LOAD DATA LOCAL INFILE '/Users/noeliasolano/Downloads/european_users.csv'
93 INTO TABLE users
94 FIELDS TERMINATED BY ','
95 ENCLOSED BY '"'
96 LINES TERMINATED BY '\n'
97 IGNORE 1 ROWS
98 (id, name, surname, phone, email, @birth_date, country, city, postal_code, address)
99 SET
100     birth_date = STR_TO_DATE(@birth_date, '%b %d, %Y'),
101     continent = 'Europe';

```

Time	Action	Response	Duration / Fetch Time
14-27-28	CREATE TABLE users ( id INT PRIMARY KEY, name VARCHAR(20), surname VARCHAR(20), phone VARCHAR(15), email...	0 row(s) affected	0.028 sec
14-28-08	LOAD DATA LOCAL INFILE '/Users/noeliasolano/Downloads/american_users.csv' INTO TABLE users FIELDS TERMINATED BY ',' E...	1010 row(s) affected Records: 1010 Deleted: 0 Skipp...	0.042 sec
14-28-18	LOAD DATA LOCAL INFILE '/Users/noeliasolano/Downloads/european_users.csv' INTO TABLE users FIELDS TERMINATED BY ',' E...	3990 row(s) affected Records: 3990 Deleted: 0 Skip...	0.092 sec

```
CREATE TABLE products (  
  id INT PRIMARY KEY,  
  product_name VARCHAR(50),  
  price DECIMAL(10,2),  
  colour CHAR(7), -- codis de colors hexadecimals (longitud fixa - CHAR)  
  weight DECIMAL(10,2),  
  warehouse_id VARCHAR(10)  
);
```

62  
63 -- Abans de carregar dades es important que local\_infile sigui actiu.

3:61

Action Output

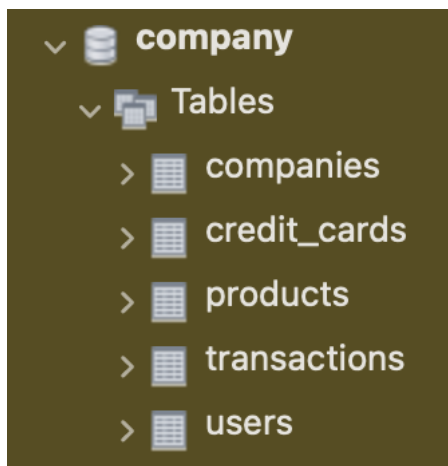
	Time	Action	Response	Duration / Fetch Time
1	14:45:46	CREATE TABLE products ( id INT PRIMARY KEY, product_name VARCHAR(50), price DECIMAL(10,2), colour CHAR(7), --...	0 row(s) affected	0.0074 sec

```
112 LOAD DATA LOCAL INFILE '/Users/noeliasolano/Downloads/products.csv'  
113 INTO TABLE products  
114 FIELDS TERMINATED BY ','  
115 LINES TERMINATED BY '\n'  
116 IGNORE 1 ROWS  
117 (id, product_name, @price, colour, weight, warehouse_id)  
118 SET price = REPLACE(@price, '$', '');  
119
```

38:118

Action Output

	Time	Action	Response	Duration / Fetch Time
1	14:45:46	CREATE TABLE products ( id INT PRIMARY KEY, product_name VARCHAR(50), price DECIMAL(10,2), colour CHAR(7), --...	0 row(s) affected	0.0074 sec
2	14:46:12	LOAD DATA LOCAL INFILE '/Users/noeliasolano/Downloads/products.csv' INTO TABLE products FIELDS TERMINATED BY ',' LINE...	100 row(s) affected Records: 100 Deleted: 0 Skippe...	0.011 sec





Aquest és el primer esborrany de com es podrien connectar les taules formant un diagrama en forma d'estrella. La taula transactions quedaria com la taula de fets atès que exemplifica les mètriques numèriques relatives al procés comercial. La resta de les taules contenen atributs per tant es relacionaran com a dimensions de la mateixa.

A primera observació, hi ha camps la denominació dels quals no encaixa ni exemplifica la relació entre taules, per exemple, transactions.business\_id i companies.company\_id. Ho resoldrem a continuació amb un RENAME.

Una altra dada per resoldre serà com relacionar la taula products atès que la taula transactions, columna product\_ids pot tenir més d'un valor per registre.

```

127 -- Relacionem taules
128 • ALTER TABLE transactions
129   ADD CONSTRAINT fk_transactions_users FOREIGN KEY(user_id) REFERENCES users(id);
130
131 • ALTER TABLE transactions
132   ADD CONSTRAINT fk_transactions_credit_cards FOREIGN KEY(card_id) REFERENCES credit_cards(id);
133
134 • ALTER TABLE transactions
135   ADD CONSTRAINT fk_transactions_companies FOREIGN KEY(business_id) REFERENCES companies(id);
  
```

	Time	Action	Response	Duration / Fetch Time
9	11:30:33	ALTER TABLE transactions ADD CONSTRAINT fk_transactions_users FOREIGN KEY(user_id) REFERENCES users(id)	100000 row(s) affected Records: 100000 Duplicates:...	1.302 sec
10	11:30:38	ALTER TABLE transactions ADD CONSTRAINT fk_transactions_credit_cards FOREIGN KEY(card_id) REFERENCES credit_cards(id)	100000 row(s) affected Records: 100000 Duplicates:...	1.643 sec
11	11:30:42	ALTER TABLE transactions ADD CONSTRAINT fk_transactions_companies FOREIGN KEY(business_id) REFERENCES companies(id)	100000 row(s) affected Records: 100000 Duplicates:...	1.740 sec



```

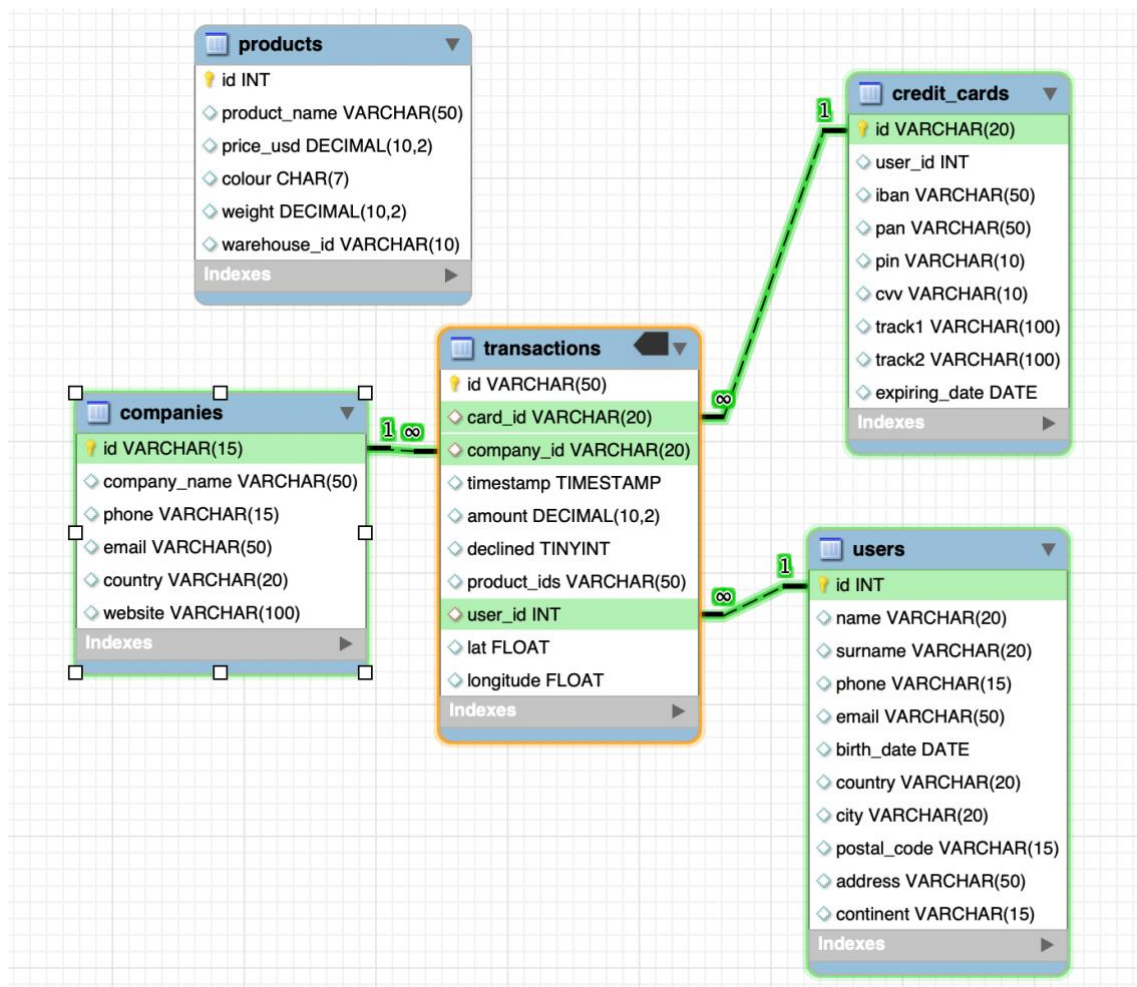
120 -- Correccions de les taules
121 • ALTER TABLE products
122   RENAME COLUMN price TO price_usd;
123
124 • ALTER TABLE companies
125   RENAME COLUMN company_id TO id;
126
127 • ALTER TABLE transactions
128   RENAME COLUMN business_id TO company_id;

```

41:128

Time	Action	Response	Duration / Fetch Time
16 12:50:03	ALTER TABLE transactions RENAME COLUMN business_id TO company_id	0 row(s) affected Records: 0 Duplicates: 0 Warnings...	0.099 sec

Diagrama:



## EXERCICI 1

```

146
147 -- Exercici 1: Mostra usuaris amb més de 80 transaccions utilitzant almenys 2 taules. Fes una subconsulta
148
149 SELECT *
150 FROM users u
151 WHERE EXISTS(
152     SELECT 1
153     FROM transactions t
154     WHERE t.user_id = u.id AND declined=0
155     GROUP BY t.user_id
156     HAVING COUNT(t.id) > 80
157 );

```

100% 3:157

Result Grid

id	name	surname	phone	email	birth_date	country	city	postal_code	address	continent
185	Molly	Gilliam	0800 120 8023	donec@outlook.co.uk	1993-12-21	United Kingdom	London	EC1A 1BB	P.O. Box 202, 5638 Mi Rd.	Europe
289	Dxwgi	Hwcru	+98-309-8797	dxwgi.hwcru@example.com	1976-08-20	Germany	Stuttgart	70173	82 Hwcru Street	Europe
318	Bnyr	Astuw	+33-120-9644	bnyr.astuw@example.com	1974-05-03	Italy	Genoa	16100	53 Astuw Street	Europe

users 48

Action Output

	Time	Action	Response	Duration / Fetch Time
121	13:52:07	SELECT * FROM users u WHERE EXISTS( SELECT 1 FROM transactions t WHERE t.user_id = u.id AND declined=0 -- REEM...	3 row(s) returned	0.300 sec / 0.000012...
122	13:52:29	SELECT * FROM users u WHERE EXISTS( SELECT 1 FROM transactions t WHERE t.user_id = u.id AND declined=0 GROU...	3 row(s) returned	0.300 sec / 0.000042...

## EXERCICI 2

```

163
164 -- Exercici 2: Mostra la mitjana d'amount per IBAN de les targetes de crèdit a la companyia Donec Ltd, utilitza almenys 2 taules.
165
166 SELECT c.company_name, cc.iban, AVG(t.amount) AS amount
167 FROM transactions t
168 JOIN companies c ON c.id=t.company_id
169 JOIN credit_cards cc ON cc.id=t.card_id
170 WHERE c.company_name='Donec Ltd'
171 GROUP BY c.id, cc.iban;

```

100% 24:171

Result Grid

company_name	iban	amount
Donec Ltd	XX911406401125586307586805	356.246667
Donec Ltd	SK9446370242474562577506	142.960000
Donec Ltd	XX776752917845952975555640	257.370000

Result 30

Action Output

	Time	Action	Response	Duration / Fetch Time
74	12:05:21	SELECT c.company_name, cc.iban, AVG(t.amount) AS amount FROM transactions t JOIN companies c ON c.id=t.company_id JOI...	371 row(s) returned	0.021 sec / 0.000060...

## NIVELL 2

```

163
164 -- NIVELL 2
165 -- Nova taula d'estat de les targetes: si les tres últimes transaccions han estat declinades = inactiu, si almenys una no és rebutjada = actiu
166
167 -- Utilitzem una window function: ROW_NUMBER() que ordena i numera
168 CREATE TABLE status_cards AS
169 SELECT
170     x.card_id,
171     CASE
172         WHEN SUM(declined) = 3
173         THEN 'inactive'
174         ELSE 'active'
175     END AS status -- Hem creat un sumatori
176 FROM(
177     SELECT t.*,
178     ROW_NUMBER() OVER (PARTITION BY t.card_id ORDER BY t.timestamp DESC) AS rn
179     FROM transactions t
180 ) x
181 WHERE rn <= 3
182 GROUP BY x.card_id;

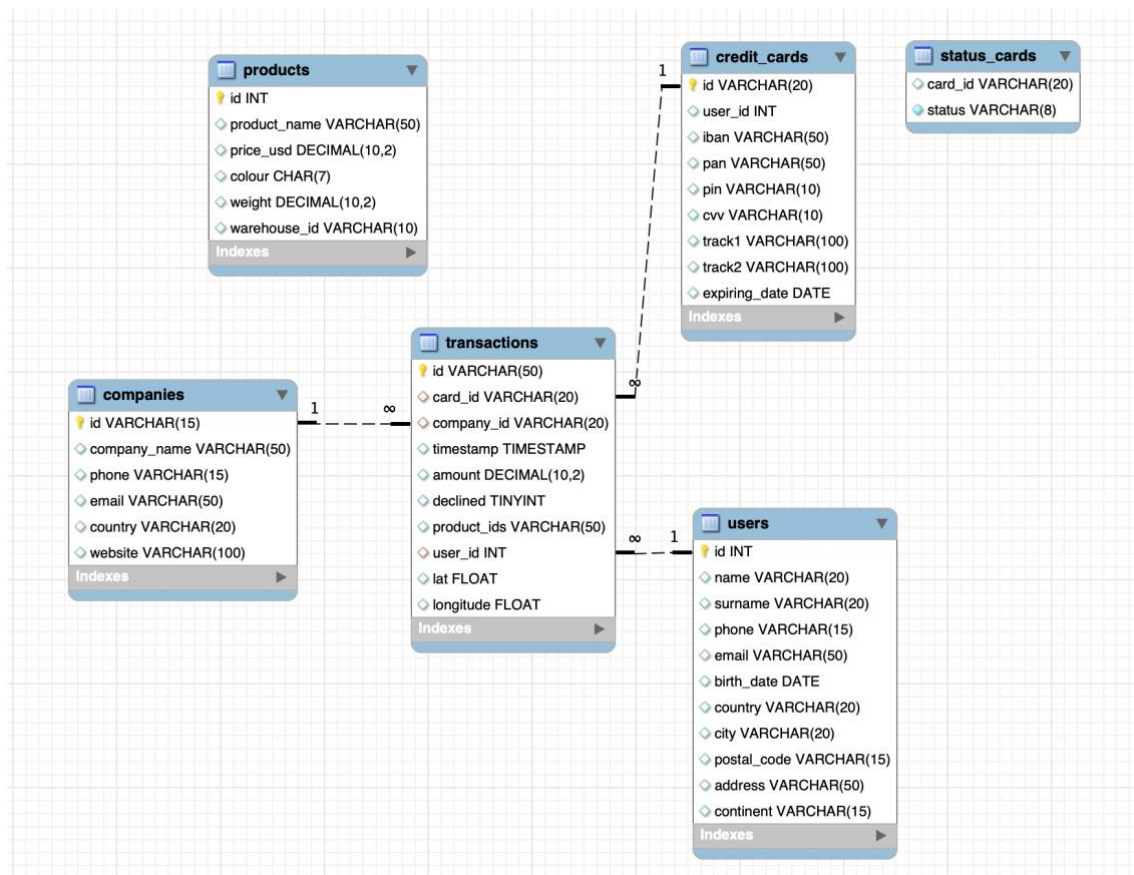
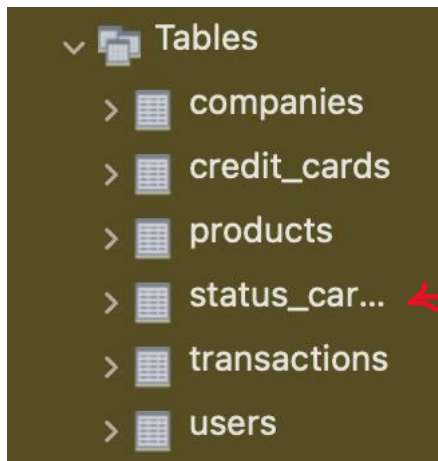
```

100% 20:182

Action Output

	Time	Action	Response	Duration / Fetch Time
65	11:14:10	CREATE TABLE status_cards AS SELECT x.card_id, CASE WHEN SUM(declined) = 3 THEN 'inactive' ELSE 'active' END AS s...	5000 row(s) affected Records: 5000 Duplicates: 0...	0.569 sec





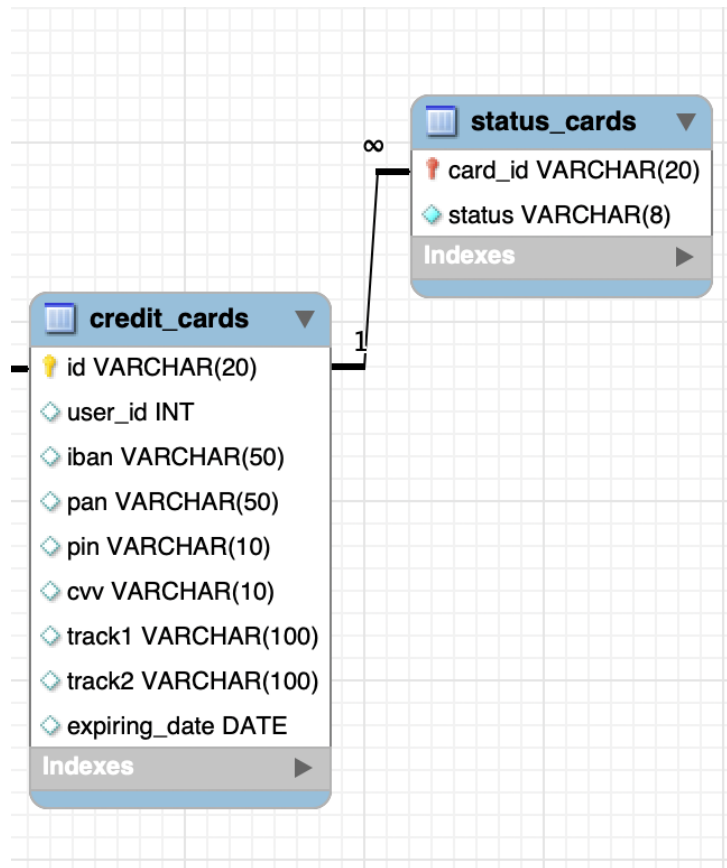
Mysql marca l'atribut status en blau perquè creu que està indexada, falta definir Primary Key i Foreign Key.

```

189 -- Relacionem la taula
190 ALTER TABLE status_cards
191 ADD CONSTRAINT pk_status_cards PRIMARY KEY (card_id);
192
193 ALTER TABLE status_cards
194 ADD CONSTRAINT fk_status_cards_credit_cards FOREIGN KEY (card_id) REFERENCES credit_cards(id);
195
100% 95:194

```

	Time	Action	Response	Duration / Fetch Time
108	11:08:54	ALTER TABLE status_cards ADD CONSTRAINT pk_status_cards PRIMARY KEY (card_id)	0 row(s) affected Records: 0 Duplicates: 0 Warnings: 0	0.051 sec
109	11:08:57	ALTER TABLE status_cards ADD CONSTRAINT fk_status_cards_credit_cards FOREIGN KEY (card_id) REFERENCES credit_cards(id)	5000 row(s) affected Records: 5000 Duplicates: 0 Warnings: 0	0.072 sec



**CORRECCIÓ:** Ara la card\_id es una Primary Key i una Foreign Key al mateix cop. La línia continua relacional entre les taules indica una relació exclusiva i obligatòria entre les taules.

## NIVELL 2

```

184
185 -- Exercici 1: Quantes targetes estan actives?
186
187 SELECT COUNT(sc.status)
188 FROM status_cards sc
189 WHERE sc.status = 'active';
  
```

COUNT(sc.statu...)
4995

Result 27

Action Output

Time	Action	Response	Duration / Fetch Time
67	11:32:33	SELECT COUNT(sc.status) FROM status_cards sc WHERE sc.status = 'active'	1 row(s) returned 0.0058 sec / 0.0000...

JSON: Degut a que aquest format reconeix el conjunt de valors per registre com un array, es possible fer una tabla intermitja sense problemes relacionals.

## NIVELL 3

```

194 -- Nivell 3
195 -- Crea una taula amb la qual puguem unir les dades del nou arxiu products.csv amb la base de dades creada, tenint en compte que des de transaction tens product_ids
196
197
198 -- Product_ids passa de VARCHAR a ser tipus JSON
199 UPDATE transactions
200 SET product_ids = CONCAT('[', REPLACE(product_ids, ',', ','), ']') -- Treiem els espais
201 LIMIT 99999999;
202

```

Action Output

	Time	Action	Response	Duration / Fetch Time
83	14:20:27	UPDATE transactions SET product_ids = CONCAT('[', REPLACE(product_ids, ',', ','), ']') -- Treiem els espais LIMIT 99999999	100000 row(s) affected Rows matched: 100000 Cha...	1.634 sec

En aquest cas afegim LIMIT per solucionar el següent error:

Error Code: 1175. You are using safe update mode and you tried to update a table without a WHERE that uses a KEY column. To disable safe mode, toggle the option in Preferences -> SQL Editor and reconnect

Error típic de MySQL, Safe Mode Update sempre exigeix aplicar un filtre selectiu per fer un Update per no actualitzar tota la taula.

```

1 SELECT * FROM company.transactions;

```

Result Grid

id	card_id	company_id	timestamp	amount	declined	product_ids	user_id	lat	longitude
0003A49-2949-4949-A5D0-A58A-38819DU	CcS-9284	b-2458	2024-05-28 07:16:45	395.45	0	[18,26,37,87]	4713	46.1999	1.43554
000447FE-B650-4DCF-85DE-C7ED0EETCAAD	CcS-5019	b-2370	2016-12-21 20:07:18	155.53	0	[66,68,87]	438	41.5972	12.2218
00045D6B-ED2E-4F2F-8186-CEE074D875D0	CcS-6689	b-2390	2020-07-14 15:37:45	326.01	0	[30,11,16,81]	2118	29.7573	-95.3796
000481C3-CC26-4FEF-83A0-4C0EB004BBD	CcS-6686	b-2230	2017-09-04 19:44:53	161.60	0	[72]	2115	53.5489	-113.503
00051AA4-9CBE-4268-B070-C38062A1B3E2	CcS-7606	b-2266	2017-01-05 18:19:25	148.91	0	[18]	3025	52.2084	5.69081
0008A312-EDFE-4A4F-BC99-EBC92EC3CA4D	CcU-3358	b-2598	2023-09-23 04:51:43	294.59	0	[35,35,19]	215	53.5535	-113.499
0009A151-8D0F-4E31-9053-4A68FF77FAA0	CcS-7509	b-2546	2023-12-31 00:06:36	583.53	0	[93,55,28,91]	2958	51.9362	5.34265
0009D494-6245-4DF9-955D-2C084191CFFB	CcS-8483	b-2526	2017-07-18 07:52:02	197.80	0	[55,8,72]	3902	45.492	-73.5706

transactions 1

Action Output

	Time	Action	Response	Duration / Fetch Time
84	14:28:19	SELECT * FROM company.transactions	100000 row(s) returned	0.0085 sec / 0.144 sec

```

203 -- Creació de la taula
204 CREATE TABLE transactions_products AS
205 SELECT t.id AS transaction_id, jt.product_id
206 FROM transactions t
207 JOIN JSON_TABLE( -- Taula temporal
208     t.product_ids,
209     '$[*]' COLUMNS(
210         product_id INT PATH '$' -- Definició del nom i tipus
211     )
212 ) AS jt
213 ORDER BY transaction_id;
214

```

Action Output

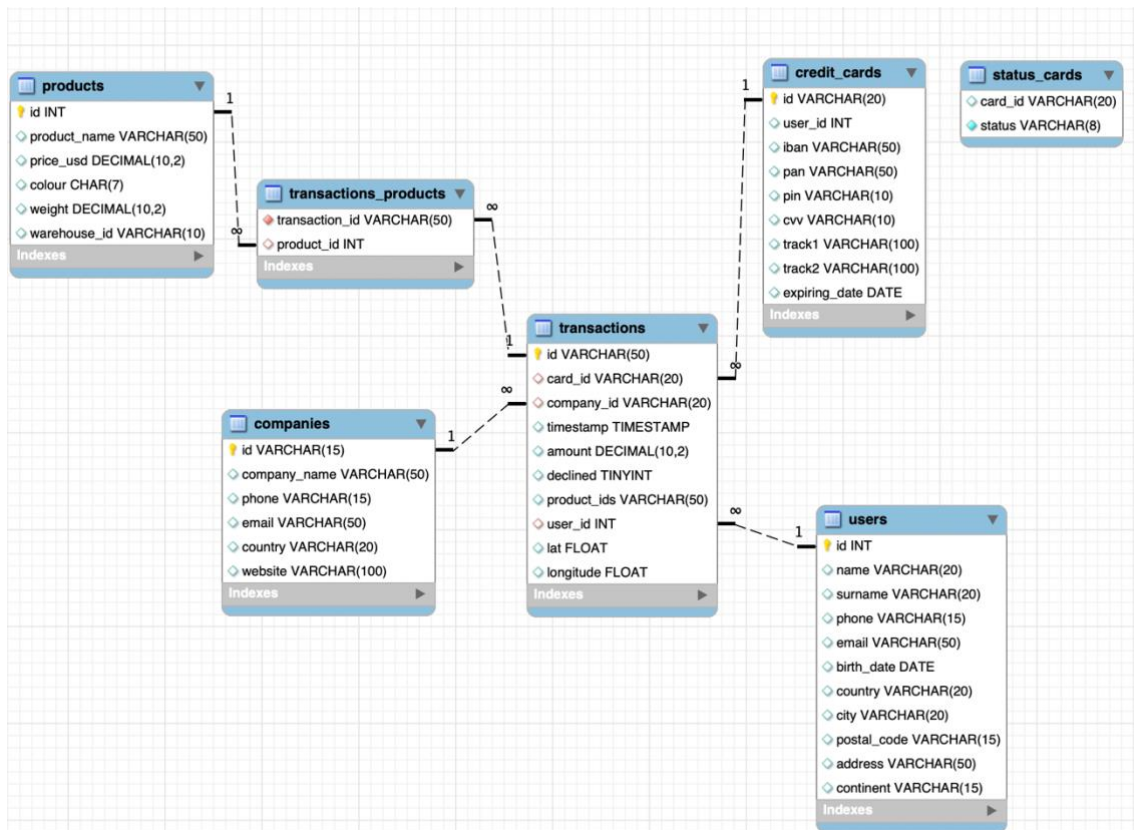
	Time	Action	Response	Duration / Fetch Time
97	12:22:04	CREATE TABLE transactions_products AS SELECT t.id AS transaction_id, jt.product_id FROM transactions t JOIN JSON_TABLE(...	253391 row(s) affected Records: 253391 Duplicates:...	1.487 sec

```

215 -- Relacionem la taula
216 ALTER TABLE transactions_products
217 ADD CONSTRAINT fk_tp_transactions FOREIGN KEY (transaction_id) REFERENCES transactions(id);
218
219 ALTER TABLE transactions_products
220 ADD CONSTRAINT fk_tp_products FOREIGN KEY (product_id) REFERENCES products(id);
221
100% 60:220

```

	Time	Action	Response	Duration / Fetch Time
99	12:24:57	ALTER TABLE transactions_products ADD CONSTRAINT fk_tp_transactions FOREIGN KEY (transaction_id) REFERENCES transa...	253391 row(s) affected Records: 253391 Duplicates:...	2.060 sec
100	12:25:01	ALTER TABLE transactions_products ADD CONSTRAINT fk_tp_products FOREIGN KEY (product_id) REFERENCES products(id)	253391 row(s) affected Records: 253391 Duplicates:...	1.757 sec



MySQL ha interpretat per defecte com a Primary Key (PK) transaction\_id, això pot generar problemes ja que no un valor únic i la nostra relació entre taules no és 1:N sinó N:M. Per això, faré servir una PK combinada:

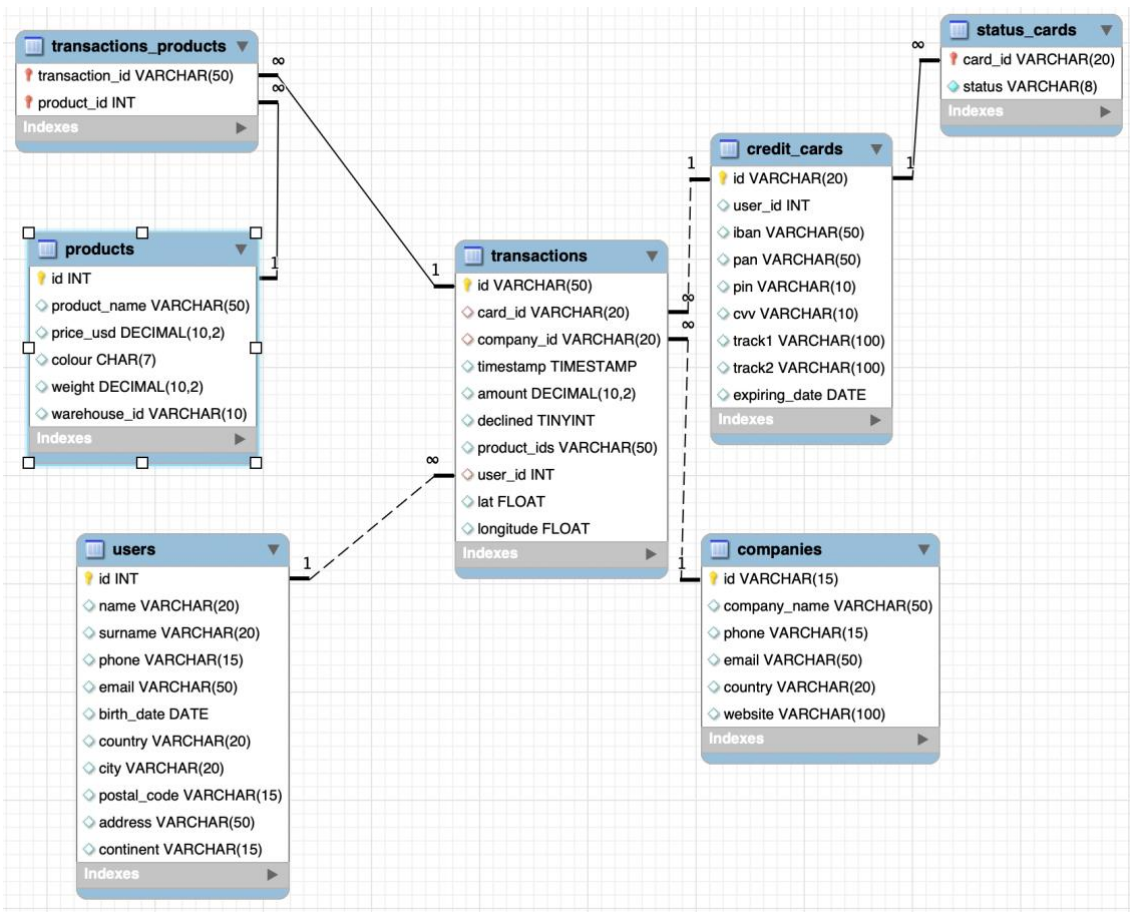
```

222 ALTER TABLE transactions_products
223 ADD PRIMARY KEY (transaction_id, product_id);
224
100% 46:223

```

	Time	Action	Response	Duration / Fetch Time
100	12:25:01	ALTER TABLE transactions_products ADD CONSTRAINT fk_tp_products FOREIGN KEY (product_id) REFERENCES products(id)	253391 row(s) affected Records: 253391 Duplicates:...	1.757 sec
101	12:43:13	ALTER TABLE transactions_products ADD PRIMARY KEY (transaction_id, product_id)	0 row(s) affected Records: 0 Duplicates: 0 Warnings:...	0.776 sec

Diagrama Final:



Les línies contínues ens indiquen una relació de les dades de transactions\_products depenent exclusiva i obligatòria de registres en les altres dues taules, no té cap variable no dependent d'aquestes.

## EXERCICI 1

```

234 --
235 -- Exercici 1: Necessitem conèixer el nombre de vegades que s'ha venut cada producte.
236
237 SELECT ts.product_id, COUNT(ts.transaction_id) AS Sales
238 FROM transactions_products ts
239 GROUP BY ts.product_id
240 ORDER BY product_id ASC;
  
```

product_id	Sales
1	2498
2	2573
3	2528

Result 50

Action Output

Time	Action	Response	Duration / Fetch Time
123 14:02:15	SELECT COUNT(ts.transaction_id) AS Sales, ts.product_id FROM transactions_products ts GROUP BY ts.product_id ORDER BY...	100 row(s) returned	0.098 sec / 0.00028...
124 14:02:44	SELECT ts.product_id, COUNT(ts.transaction_id) AS Sales FROM transactions_products ts GROUP BY ts.product_id ORDER BY...	100 row(s) returned	0.060 sec / 0.00017...

Comentaris de millora Peer-to-Peer aplicats:

- Utilitzar EXISTS en lloc de IN en les subconsultes
- Afegir declined=0 si consultem transaccions