מערכות קבצים ומסדי נתונים

פרויקט תכנות

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מגישים

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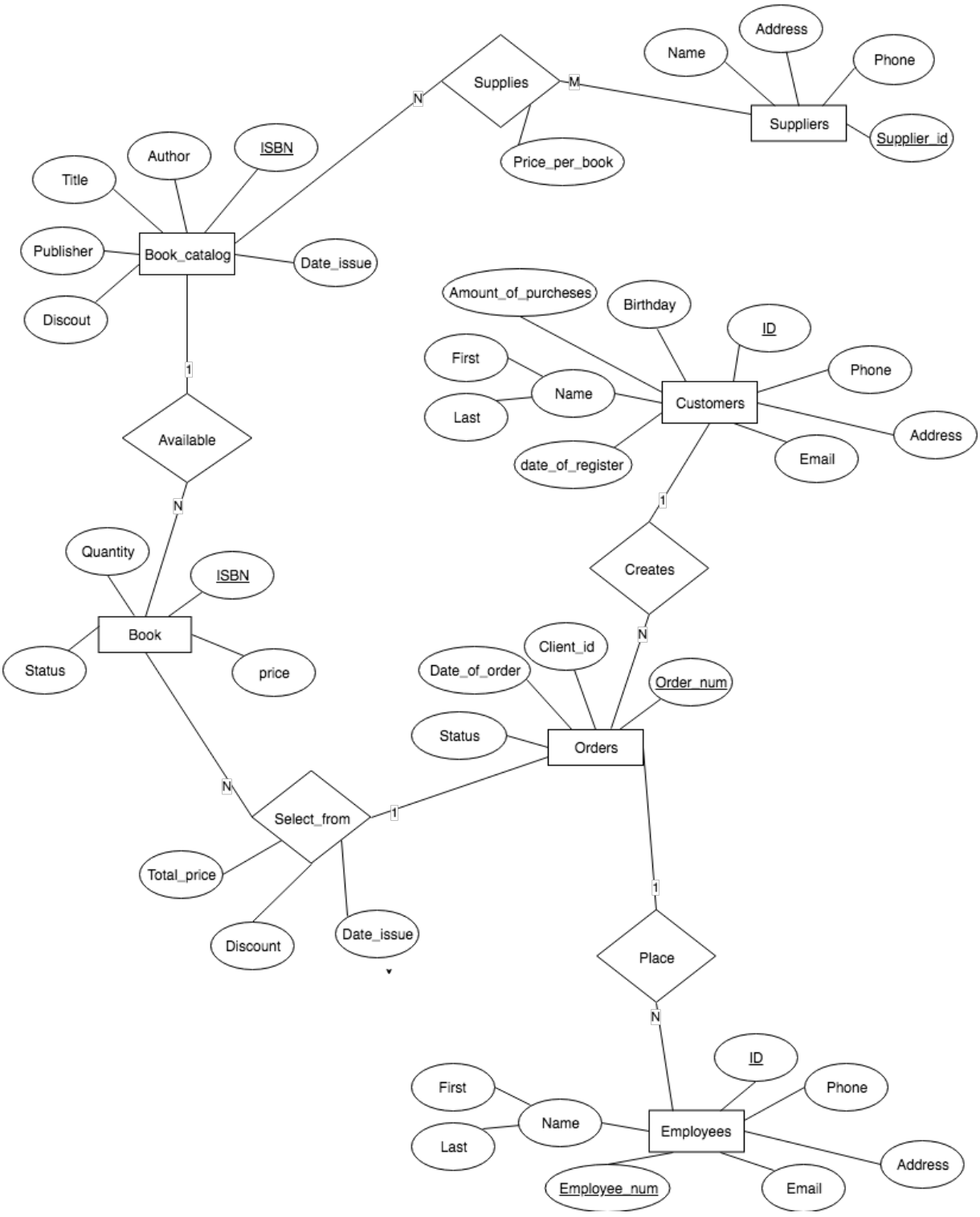
תוכן עניינים

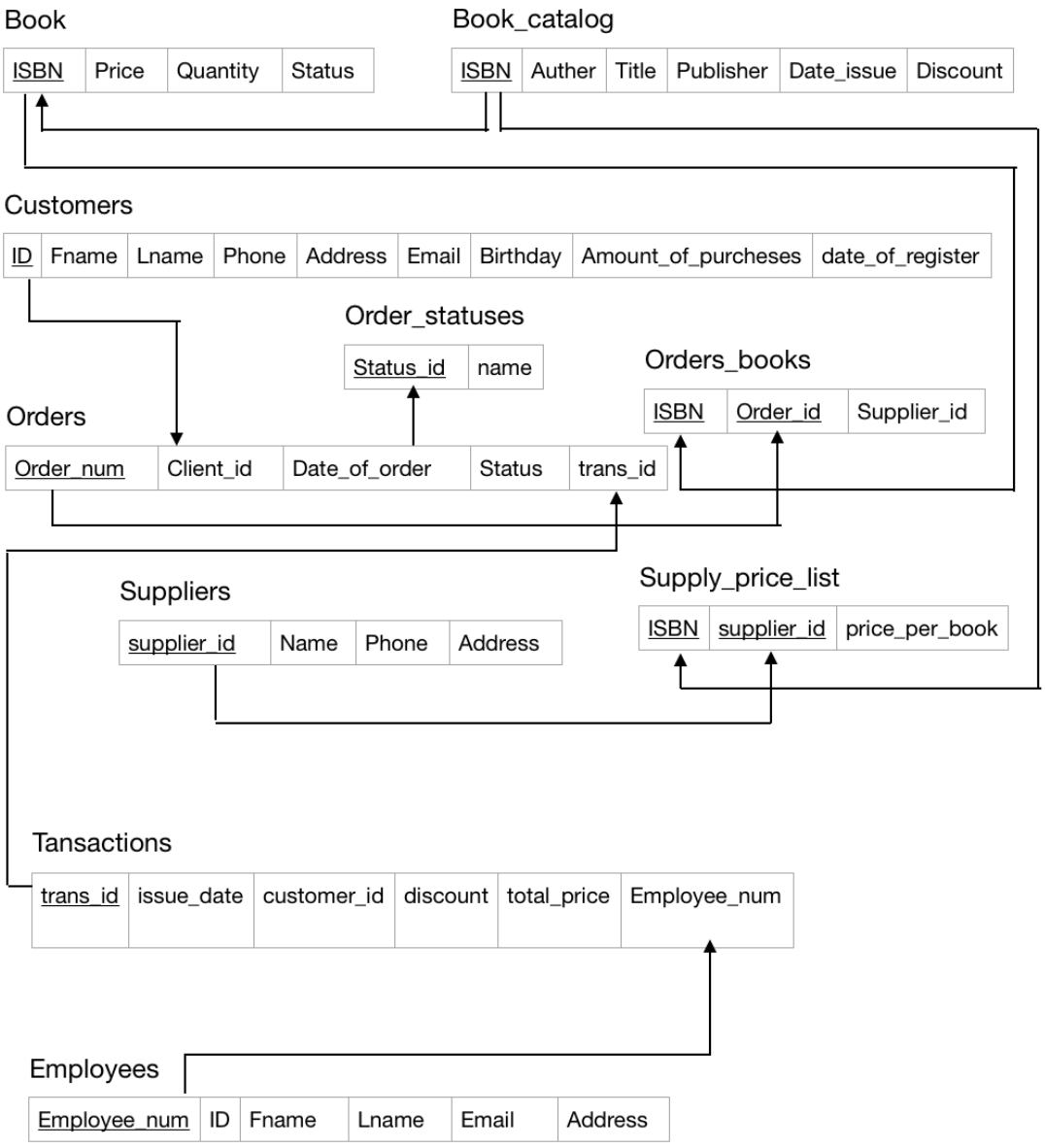
1. תרשים ERD



<u>הנחות</u>

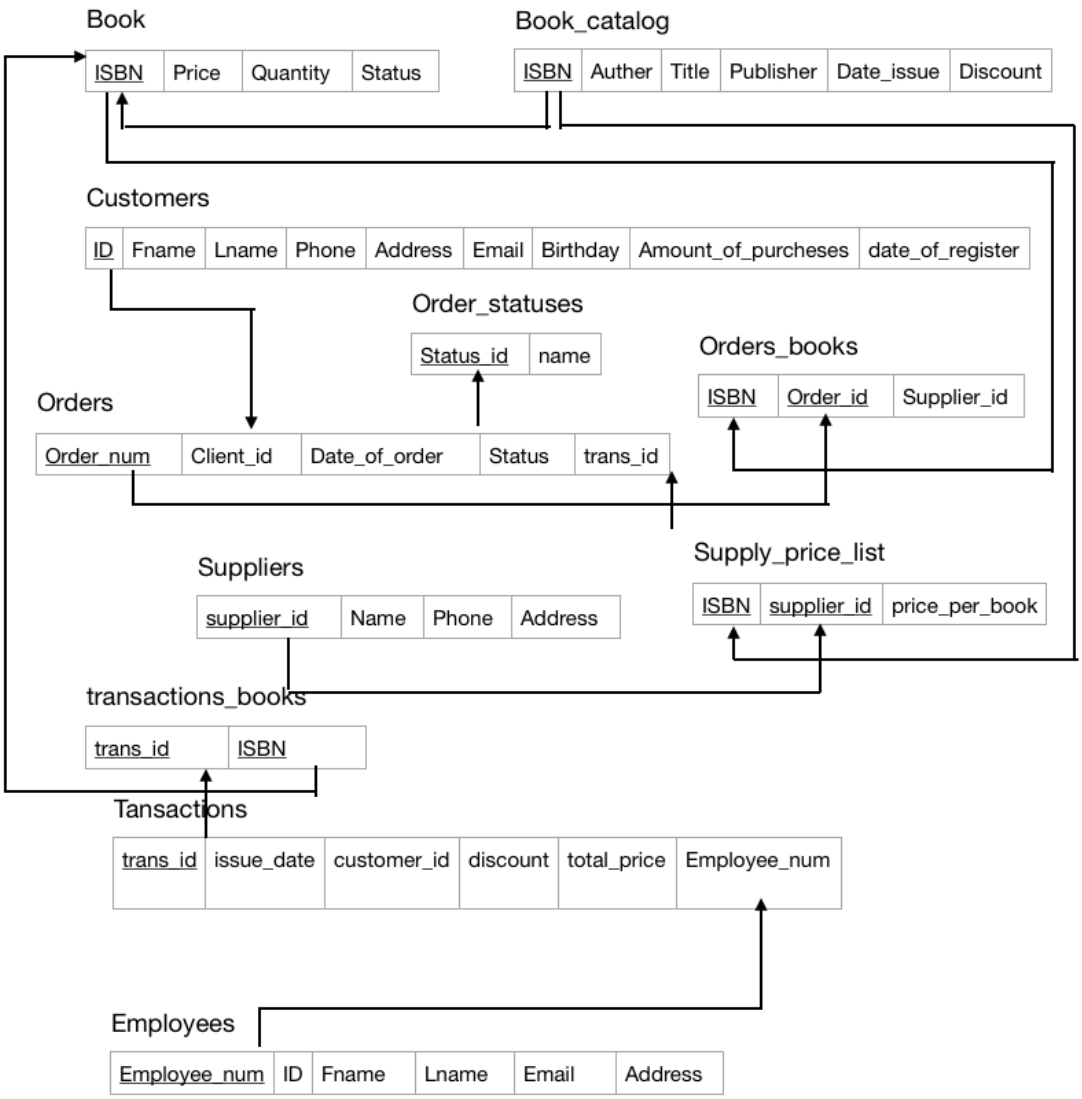
1. קיימת אפשרות לכפל הנחות
2. לכל ספק/ עובד/ לקוח ניתן לשמור מספר טלפון אחד
3. "ספק" מתייחס לחברה ולא לאינדיוידואל

2. סכימת בסיס הנתונים הראשונית לאחר הפעלת אלגוריתם המיפוי



3. נרמול בסיס הנתונים

לאחר שנמצאה תלות חלקית בטבלת orders נוספה טבלה חדשה המחברת בין orders לtransactions. טבלה- transactions_books



4. מימוש הפעולות

1. הצגת כל הספרים הנמצאים במלאי

אלגברת יחסים:

$$\rho_{(ISBN, title, author, publisher, quantity, discount, price)} (\pi_{book\_catalog.ISBN, book\_catalog.ISBN, book\_catalog.title, book\_catalog.author, book\_catalog.publisher, book.quantity, book.discount, book.price} (\sigma_{book.quantity>0} (book\_catalog \bowtie_{book\_catalog.ISBN = book.ISBN} book)$$

שאילתת SQL:

```
SELECT book_catalog.ISBN as ISBN, book_catalog.title as title, book_catalog.author as author,
book_catalog.publisher as publisher, book.quantity as quantity, book.discount as discount,
book.price as price FROM book_catalog INNER JOIN book on book_catalog.ISBN = book.ISBN
WHERE book.quantity > 0
```

2. הצגת כל ההזמנות (הפתוחות) לספרים

אלגברת יחסים:

$$\rho_{(status<-order\_statuses.name)} (\pi_{orders.order\_num, orders.Client\_id, orders.date\_of\_order, order\_statuses.name} (\sigma_{orders.status<>4} (orders \bowtie_{orders.statuses= order\_statuses.status\_id} order\_statuses)$$

שאילתת SQL:

```
SELECT orders.order_num, orders.Client_id, orders.date_of_order, order_statuses.name
as status FROM orders INNER JOIN order_statuses ON orders.status =
order_statuses.status_id where orders.status<> 4
```

3. הצגת רשימת כל הלקוחות (בצעו לפחות הזמנה אחת)

אלגברת יחסים:

$$(\sigma_{amount\_of\_purcheses > 0} (customers))$$

שאילתת SQL:

```
SELECT * FROM customers where amount_of_purcheses > 0
```

4. הצגת רשימת כל הספקים

אלגברת יחסים:

σ_{true} (suppliers)

שאילתת SQL:

SELECT * FROM suppliers

5. הצגת כל העסקאות בין תאריך ??? לבין תאריך ???

אלגברת יחסים:

$\sigma_{date\_of\_order<=? \wedge date\_of\_order<?}$ (orders)

שאילתת SQL:

SELECT * FROM orders where date_of_order >= ? AND date_of_order <= ?

6. הצגת כל הספרים המוצעים בהנחה (גלובלית. לא ללקוח ספציפי)

אלגברת יחסים:

$\rho_{(ISBN, title, author, publisher, quantity, discount, price)}$ ($\pi_{book\_catalog.ISBN,}$

book_catalog.ISBN, book_catalog.title, book_catalog.author, book_catalog.publisher, book.quantity, book.discount, book.price ($\sigma_{book\_catalig.discount>0}$ (book_catalog $\bowtie_{book\_catalog.ISBN = book.ISBN}$ book))

שאילתת SQL:

SELECT book_catalog.ISBN as ISBN, book_catalog.title as title, book_catalog.author as author, book_catalog.publisher as publisher, book.quantity as quantity, book_catalog.discount as discount, book.price as price FROM book_catalog INNER JOIN book on book_catalog.ISBN = book.ISBN WHERE book_catalog.discount > 0;

7. בדיקה האם ספר X קיים כרגע במלאי בחנות

אלגברת יחסים:

π_{ISBN} $\sigma_{title=? \wedge autjer=?}$ (orders)

σ_{ISBN} (orders)

שאילתת SQL:

SELECT ISBN FROM book_catalog WHERE title = ? AND author = ?
SELECT quantity FROM book WHERE ISBN = ?

8. רשימת כל הספקים של ספר X.

אלגברת יחסים:

$\pi_{suppliers.name}$($\sigma_{supply\_price\_list.ISBN=?}$(supply_price_list $\bowtie$

supply_price_list.supplier_id = suppliers.supplier_id suppliers))

שאילתת SQL:

```
SELECT suppliers.name FROM supply_price_list INNER JOIN suppliers ON
supply_price_list.supplier_id = suppliers.supplier_id WHERE supply_price_list.ISBN = ?
```

9. כמה עותקים של ספר X נמכרו מאז Y.

אלגברת יחסים:

$$\pi_{trans\_id}(\sigma_{issue\_date>='y'}(transactions))$$

$$\sigma_{trans\_id=? \wedge ISBN=?}(transactions)$$

שאילתת SQL:

```
SELECT trans_id FROM transactions where issue_date >= 'Y'
SELECT * FROM transactions_books WHERE trans_id = ? AND ISBN = ?
```

10. כמה ספרים בסה"כ מאז Y רכש לקוח Z.

אלגברת יחסים:

$$\pi_{trans\_id}(\sigma_{issue\_date>'y' \wedge customer\_id='z'}(transactions))$$

$$\rho_{(counter)}(\pi_{COUNT(ISBN)}(\sigma_{trans\_id=?}(transactions\_books)$$

שאילתת SQL:

```
SELECT trans_id FROM transactions WHERE issue_date > ? AND customer_id = ?
SELECT COUNT(ISBN) as counter FROM transactions_books WHERE trans_id = ?
```

11. פרטי הלקוח שרכש הכי הרבה ספרים בחנות מאז Y.

אלגברת יחסים:

$$\pi_{trans\_id,\ customer\_id}(\sigma_{issue\_date>'y'}(transactions))$$

$$\rho_{(count)}(\pi_{COUNT(trans\_id)}(\sigma_{trans\_id=?}(transactions\_books)$$

שאילתת SQL:

```
SELECT trans_id, customer_id FROM transactions WHERE issue_date >= ?
SELECT COUNT(trans_id) as count FROM transactions_books WHERE trans_id = ?
```

12. פרטי הספק ממנו הוזמנו מאז Y הכי הרבה ספרים.

אלגברת יחסים:

$$\pi_{order\_num}\sigma_{date\_of\_order>=?}\ T_{date\_of\_order}(orders)$$

$$\rho_{(value\_occurrence<-\ COUNT(supplier\_id))}\pi_{supplier\_id,COUNT(supplier\_id)}(\sigma_{order\_id>=?}$$
$$F_{supplier\_id}\ T_{alue\_occurrence\ DESC}(orders\_books)$$

שאילתת SQL:

```
SELECT order_num FROM orders WHERE date_of_order >= ? ORDER BY date_of_order ASC
LIMIT 1
SELECT supplier_id, COUNT(supplier_id) AS value_occurrence FROM orders_books WHERE
order_id >= ? GROUP BY supplier_id ORDER BY value_occurrence DESC LIMIT 1
```

13. כמספר כל כמה ההזמנות לספרים שבוצעו בין תאריך ??? לבין תאריך ???.

אלגברת יחסים:

$$\rho_{(ISBN,\ title,\ author,\ publisher,\ quantity,\ discount,\ price)}\ (\pi_{book\_catalog.ISBN,}$$

$$book\_catalog.ISBN,\ book\_catalog.title,\ book\_catalog.author,\ book\_catalog.publisher,$$

$$book.quantity,\ book.discount,\ book.price\ (\sigma_{book\_catalig.discount>0}\ (book\_catalog$$

$$\bowtie_{book\_catalog.ISBN\ =\ book.ISBN}\ book))$$

שאילתת SQL:

```
SELECT transactions.trans_id, transactions.issue_date, transactions.customer_id,
transactions.discount, transactions.total_price, order_statuses.name as status FROM
transactions INNER JOIN order_statuses ON transactions.status =
order_statuses.status_id where issue_date >= ? AND issue_date <= ?
```

14. מספר כל כמה ההזמנות לספרים בין תאריך ??? לבין תאריך ??? שהפכו לבסוף למכירות.

אלגברת יחסים:

$$\rho_{(amount)}\ (\pi_{COUNT(order\_num)}\ (\sigma_{date\_of\_order>=?\ \wedge\ date\_of\_order<=?\ \wedge\ status=6}$$

$$(orders))$$

שאילתת SQL:

```
SELECT COUNT(order_num) as amount FROM orders where date_of_order >= ? AND
date_of_order <= ? AND status=6
```

15. מה סה"כ ההנחה שקיבל לקוח Z מאז Y

אלגברת יחסים:

$$\rho_{(sum)}\ (\pi_{SUM((discount*100)/total\_price)}\ (\sigma_{cusumer\_id='z'\ \wedge}$$

$$issue\_date>='y'}\ (transactions)$$

שאילתת SQL:

```
SELECT SUM((discount * 100) / total_price) as sum FROM bookstore.transactions
WHERE customer_id = ? AND issue_date >= ?
```

16. סך ההכנסות של החנות במהלך רבעון Q1, Q2, Q3 ו- Q4 בשנה x

אלגברת יחסים:

$\rho_{(q1\_profit)} (\pi_{SUM(total\_price)} (\sigma_{cissue\_date>='x\text{-}01\text{-}01' \wedge issue\_date<'x\text{-}03\text{-}31'} (transactions))$

$\rho_{(q2\_profit)} (\pi_{SUM(total\_price)} (\sigma_{cissue\_date>='x\text{-}04\text{-}01' \wedge issue\_date<'x\text{-}06\text{-}30'} (transactions))$

$\rho_{(q3\_profit)} (\pi_{SUM(total\_price)} (\sigma_{cissue\_date>='x\text{-}07\text{-}01' \wedge issue\_date<'x\text{-}09\text{-}30'} (transactions))$

$\rho_{(q4\_profit)} (\pi_{SUM(total\_price)} (\sigma_{cissue\_date>='x\text{-}10\text{-}01' \wedge issue\_date<'x\text{-}12\text{-}31'} (transactions))$

שאילתת SQL:

```
SELECT SUM(total_price) as q1_profit FROM transactions WHERE issue_date >= ? AND issue_date < ?
SELECT SUM(total_price) as q2_profit FROM transactions WHERE issue_date >= ? AND issue_date < ?
SELECT SUM(total_price) as q3_profit FROM transactions WHERE issue_date >= ? AND issue_date < ?
SELECT SUM(total_price) as q4_profit FROM transactions WHERE issue_date >= ? AND issue_date < ?
```

17. כמה לקוחות חדשים התווספו מאז Y

אלגברת יחסים:

$\rho_{(count)} (\pi_{COUNT(id)} (\sigma_{date\_of\_register>='y'}(customers))$

שאילתת SQL:

```
SELECT COUNT(id) as count FROM customers WHERE date_of_register >= ?
```

18. סך הרכישות (בש"ח) מספק ... בין ??? ל- ??? (ספק מזוהה על ידי מספר ספק)

אלגברת יחסים:

$(\pi_{COUNT(id)} (\sigma_{date\_of\_register>='y'}(customers))$

שאילתת SQL:

```
SELECT * FROM orders WHERE date_of_order >= ? AND date_of_order <= ?
```

19. מה סך המכירות של מוכר ... בחנות בין תאריך ??? לבין ??? (מוכר בחנות מזוהה על ידי שם ו/או מספר עובד)

אלגברת יחסים:

$\pi_{trans\_id} (\sigma_{employee\_num=? \wedge issue\_date>=? \wedge issue\_date<=?}(transactions))$

שאילתת SQL:

SELECT trans_id FROM transactions WHERE employee_num = ? AND issue_date >= ? AND issue_date <= ?

20. רשימת 10 הספרים הנמכרים ביותר בין תאריך ??? לבין תאריך ???

אלגברת יחסים:

$$\rho_{(amount,\ title)}\pi_{COUNT(transactions\_books.ISBN),\ book\_catalog.title}(\sigma_{transactions.issue\_date >= ?\ \wedge\ ransactions.issue\_date <= ?}(transactions \bowtie_{transactions.trans\_id = transactions\_books.trans\_id} transactions\_books))$$

$$F_{transactions\_books.ISBN}\ T_{top\ 10\ amount\ DESC}\ (orders\_books)$$

שאילתת SQL:

SELECT COUNT(transactions_books.ISBN) as amount, book_catalog.title as title FROM transactions INNER JOIN transactions_books ON transactions.trans_id = transactions_books.trans_id INNER JOIN book_catalog ON transactions_books.ISBN = book_catalog.ISBN WHERE transactions.issue_date >= ? AND transactions.issue_date <= ? GROUP BY transactions_books.ISBN ORDER BY amount DESC LIMIT 10

5. טבלאות

orders_books.xml

order_id	ISBN	supplier_id
2	40	2
1	1	1
5	3	2
3	5	1
4	7	1

orders_statuses.xml

status_id	name
1	Orderd
2	Arrived
3	Customer notified
4	Complete
5	Canceled
6	Turn into sale

orders.xml

order_num	Client_id	date_of_order	status
1	439739068	2016-01-20	1
2	206986762	2016-07-23	4
3	317444565	2017-03-09	4
4	868671267	2017-05-30	4
5	868671267	2018-01-12	6

customers.xml

d	fname	lname	phone	address	email	birthday	amo	date_of_reg
113650174	Chadd	Henriet	8168544175	6 Prairieview Junc	chenrieto@linkedin.com	1970-01-19	1	2016-01-01
131108649	Barris	Josefowicz	3123027923	193 Sutherland Te	bjosefowicz1d@merriam-v	1972-09-26	0	2016-02-01
137911773	Aurthur	Arkley	2712340096	3051 Bartillon Par	aarkleyu@salon.com	2001-03-25	2	2016-03-01
138560604	Daniel	Mawby	8244387754	359 Derek Junctic	dmawbyt@yolasite.com	1975-09-20	0	2016-01-02
196348605	Siouxie	Isles	8169264022	4 Linden Center	sislesj@sina.com.cn	1989-10-20	0	2016-02-02
206986762	Floris	Hubbins	5730623919	3772 Hollow Ridg	fhubbins6@canalblog.com	1975-11-26	0	2016-03-02
217726316	Dorene	Coase	1420004604	74 Debra Hill	dcoase16@google.es	1961-04-07	0	2016-01-03
219433739	Carleen	Beeke	8463207101	643 Jay Plaza	cbeekem@bluehost.com	2001-05-05	2	2016-02-03
224603773	Adham	Leggitt	2444785115	140 Scoville Trail	aleggittl@quantcast.com	2007-11-08	1	2016-03-03
243022245	Simona	Sawnwy	9742080272	3 Trailsway Lane	ssawnwy10@nasa.gov	2012-10-11	0	2016-01-04
255099087	Deana	Lissenden	1655560596	2636 Ilene Junctic	dlissenden0@house.gov	2016-05-11	0	2016-02-04
287473264	Yvonne	Caplin	4651554541	7455 Lunder Drive	ycaplinc@photobucket.co	1968-04-18	0	2016-03-04
306466242	Alfie	Corballis	2643698459	9 Karstens Trail	acorballisq@unc.edu	1996-01-03	1	2016-01-05
312927923	Malorie	Wix	1879824875	0 Stang Pass	mwixd@drupal.org	1994-11-20	0	2016-02-05
317444565	Dee	Ludgate	7995133260	8468 Northridge D	dludgateg@umich.edu	1984-04-24	0	2016-03-05
343140116	Cristiano	Mewburn	2663574753	48 Namekagon Al	cmewburn2@symantec.co	2007-09-24	0	2016-01-06
378075469	Leonhard	Renahan	2816895426	82652 Miller Drive	lrenahanw@networkadver	1996-01-24	0	2016-02-06
397281560	Rufus	Ravilious	1837243559	79 Granby Lane	rravilious1a@rambler.ru	2000-02-01	0	2016-03-06
405695663	Kissie	Lantaff	4497257253	95212 Graedel Ju	klantaffp@intel.com	1961-01-29	0	2016-01-07
439739068	Mariquilla	Huntingdon	2486626603	414 Bay Avenue	mhuntingdon13@earthlink	2011-12-18	0	2016-02-07
461080892	Reggie	Legion	3753773636	149 Bowman Plaz	rlegione@amazon.co.uk	2000-02-07	0	2016-03-07
476859360	Cleopatra	Pollins	2748469713	27 Lawn Terrace	cpollins8@51.la	1971-03-24	0	2016-01-08
500435524	Teena	Schiell	4058371090	303 Prairieview La	tschiellf@multiply.com	1982-12-28	0	2016-02-08
502514682	Jacquenette	Ruit	6021840609	9 Myrtle Drive	jruit12@digg.com	1978-04-22	0	2016-03-08
531618814	Emlyn	Binford	1590148238	4570 Knutson Par	ebinford9@nydailynews.co	1977-10-09	0	2016-01-09
619890399	Grete	Botcherby	8457367302	39957 Reindahl Tr	gbotcherby14@army.mil	1985-06-06	0	2016-02-09
642264726	Vale	Wallicker	9752100773	433 Mayer Rossi	vwallicker19@wufoo.com	2003-12-30	0	2016-03-09
661677449	Frederico	Baudone	6123422895	05218 Pond Junc	fbaudone17@un.org	1967-07-25	0	2016-01-10
665645697	Grata	Wooffitt	3090685718	044 Ludington Str	gwooffitty@blinklist.com	2008-11-13	0	2016-02-10

book.xml

ISBN	price	quantity	status
1	78	7	NULL
2	52	14	NULL
3	79	8	NULL
4	98	5	NULL
5	60	0	NULL
6	68	13	NULL
7	65	15	NULL
8	30	6	NULL
9	41	12	NULL
10	62	0	NULL
11	91	0	NULL
12	77	12	NULL
13	61	9	NULL
14	82	12	NULL
15	75	5	NULL
16	34	0	NULL
17	79	12	NULL
18	64	8	NULL
19	43	8	NULL
20	58	11	NULL
21	40	8	NULL
22	58	9	NULL
23	97	14	NULL
24	63	6	NULL
25	79	13	NULL
26	58	9	NULL
27	93	6	NULL
28	99	0	NULL
29	79	15	NULL
30	71	8	NULL
31	58	0	NULL
32	43	9	NULL
33	92	7	NULL
34	91	0	NULL
35	38	15	NULL
36	61	15	NULL
37	34	0	NULL

suppliers.xml

supplier_id	name	phone	address
1	Kutar 1	502777111	Ben gurion 20, tel-aviv
2	Eli Books	39500382	Hatamar 19, Rishon Lezion
3	Crown books	774030268	Hanarkis 9, Ramat Hasharon

supply_price_list.xml

supplier_id	name	phone	address
1	Kutar 1	502777111	Ben gurion 20, tel-aviv
2	Eli Books	39500382	Hatamar 19, Rishon Lezion
3	Crown books	774030268	Hanarkis 9, Ramat Hasharon

transactions.xml

trans_id	issue_date	customer_id	discount	total_price	status
1	2018-03-08	137911773	0	224	4
2	2017-09-09	219433739	20	144	5
3	2017-12-27	306466242	17	57	4
4	2017-03-09	219433739	10	93	4
5	2017-12-30	137911773	10	93	4
6	2017-01-01	137911773	0	93	4

transactions_booksx

trans_id	ISBN
1	3
1	2
1	27
2	14
2	10
3	44
4	27
5	27
6	27

bookcatalog.xml

ISBN	author	title	publisher	issue_date	discour
1	Osmund Stickles	Multi-lateral	Hammes, Wyman and Brue	1977-07-19	NULL
2	Tarrah Llorens	Intuitive 24 hour project	Swaniawski, Schumm and	1967-05-20	NULL
3	Laureen Albertsc	Inverse explicit artificial intelli	Baumbach LLC	2015-06-13	4
4	Erik Antoniottii	Public-key even-keeled syste	Osinski-Hilpert	1956-07-20	NULL
5	Viviyan Stocky	Upgradable logistical definitic	Bayer-Feest	1942-12-18	NULL
6	Brigitta Arling	Integrated well-modulated em	Harvey, Torphy and Zulauf	2008-06-02	NULL
7	Fanya Pawelec	Seamless actuating encoding	Bartell, Marvin and Becker	1979-02-28	4
8	Kip Shepherd	Open-source 3rd generation c	Fahey, Goodwin and Wolff	1983-03-21	NULL
9	Jamal Reye	Implemented bi-directional pr	Kertzmann, Renner and Yo	2005-02-18	NULL
10	Corissa Frawley	Future-proofed high-level tim	Harber, Bins and Bogisich	1967-10-21	NULL
11	Felicity Bourthou	Fully-configurable backgroun	Schneider LLC	2007-12-31	NULL
12	Ora Kubalek	Pre-emptive responsive hiera	Beer, Hartmann and Wunsc	2005-10-05	NULL
13	Lonna Rechert	Reactive secondary attitude	Hansen, Upton and Schinn	2006-03-08	4
14	Elroy Grimsell	Implemented well-modulated	Hayes LLC	2001-03-04	NULL
15	Zeb Effemy	Managed analyzing focus gro	Greenholt, Schuster and Fu	1966-01-31	NULL
16	Franz Bellfield	Phased client-server Graphic	Cummings, Gerhold and Sp	1931-01-03	NULL
17	Tilda Brimicomb	Organized static synergy	Hettinger Inc	1934-01-28	NULL
18	Korella Halt	Customizable hybrid installati	Batz, Dicki and Gorczany	1953-08-24	NULL
19	Vickie Gibbetts	Polarised background array	O'Connell Group	2013-02-09	NULL
20	Ros Beecroft	Re-contextualized scalable in	Hoeger-Ward	1975-08-18	5
21	Maryjo Lamborn	Extended bandwidth-monitor	Crona-Rodriguez	1999-04-05	NULL
22	Osmund	Object-based discrete data-w	Pouros, Carter and VonRue	2001-09-09	NULL
23	Hayes Benesevic	Public-key hybrid application	Sawayn Inc	1938-08-01	NULL
24	Josepha Greenh	Re-contextualized 5th genera	Wisozk-Nikolaus	1957-08-01	NULL
25	Foss Cheak	Triple-buffered upward-trendi	Hagenes LLC	1954-07-05	NULL
26	Georges Jennaw	Cloned 5th generation contin	Dibbert and Sons	1975-11-21	NULL
27	Juliet Le Galle	Face to face contextually-bas	Gusikowski and Sons	1999-01-28	NULL
28	Myrah O'Nion	Adaptive national emulation	Streich, Treutel and Harber	1979-06-29	NULL
29	Angele Dudley	Reverse-engineered actuating	Emard LLC	1994-04-26	NULL
30	Weber Coite	Enhanced client-server produ	Lesch, Beer and Luettgen	1987-03-06	NULL
31	Ileane Woolgar	Upgradable 24/7 time-frame	Stokes Group	1940-08-11	NULL
32	Barbara Natalie	Exclusive human-resource lev	Emmerich LLC	1971-12-26	NULL
33	Gabi Castell	Focused homogeneous proce	Schultz-Hane	2007-08-04	12
34	Caren Maynell	Pre-emptive heuristic benchm	Borer-Botsford	1941-11-05	NULL
35	Faustine Melvin	User-centric content-based lo	Simonis and Sons	1955-12-16	NULL
36	Marjie Geale	Networked cohesive monitori	Kshlerin, Davis and Torphy	1934-01-15	NULL
37	Urbano Thomass	Expanded secondary encrypt	Luettgen LLC	1932-03-13	NULL