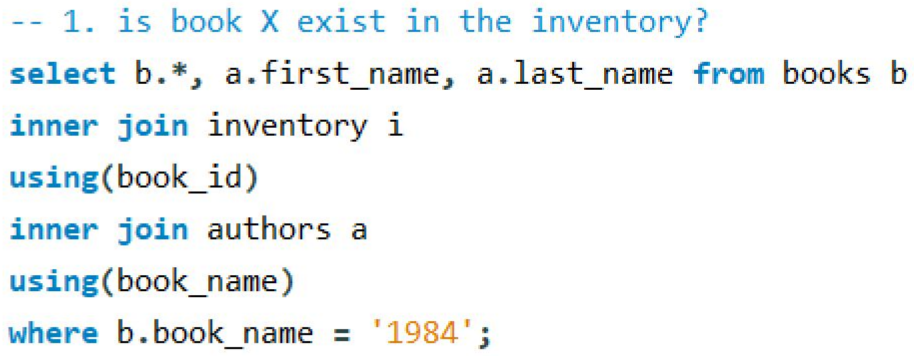
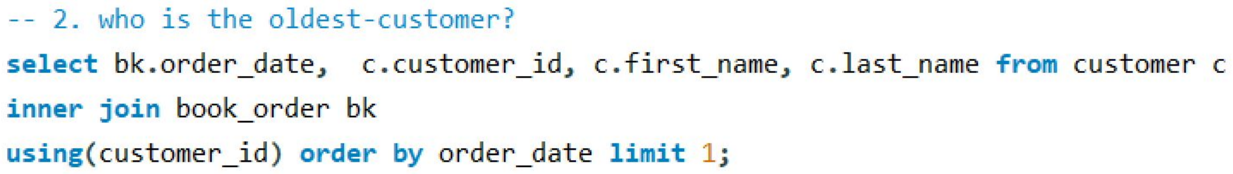
מסמך 7 - שאילתות SQL ואלגברת יחסים:

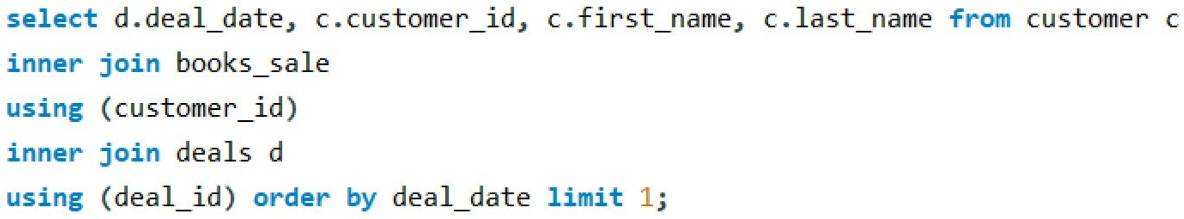


```
-- 1. is book X exist in the inventory?
select b.*, a.first_name, a.last_name from books b
inner join inventory i
using(book_id)
inner join authors a
using(book_name)
where b.book_name = '1984';
```

$\pi\ books.*,\ author.first\_name,\ author.last\_name\ (\ \sigma\ book\_name\ =\ `X'\ (inventory \bowtie books \bowtie author);$



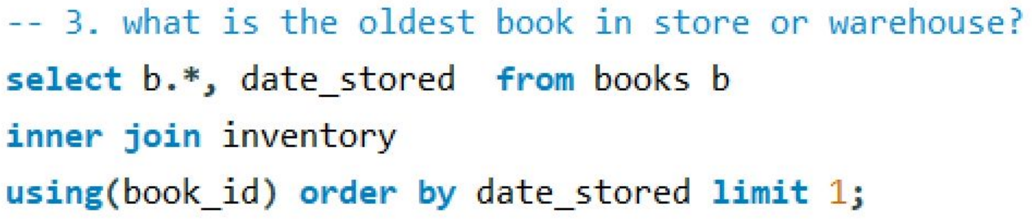
```
-- 2. who is the oldest-customer?
select bk.order_date,  c.customer_id, c.first_name, c.last_name from customer c
inner join book_order bk
using(customer_id) order by order_date limit 1;
```



```
select d.deal_date, c.customer_id, c.first_name, c.last_name from customer c
inner join books_sale
using (customer_id)
inner join deals d
using (deal_id) order by deal_date limit 1;
```

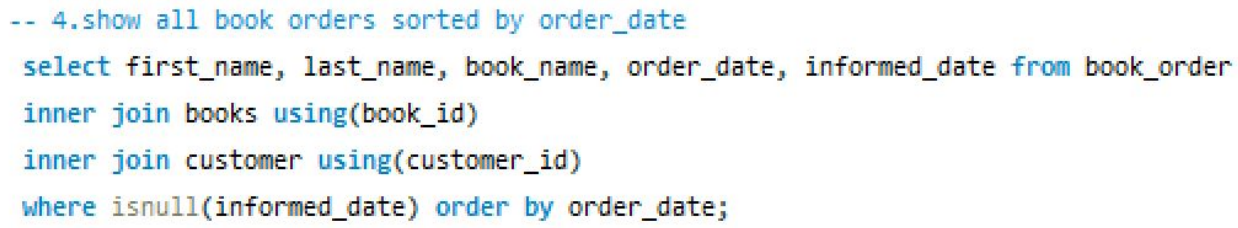
$\tau\ order\_date\ \pi\ customer.*,\ order\_date(customer \bowtie book\_order);$

$\tau\ deal\_date\ \pi\ customer.*,\ deal\_date\ (customer \bowtie book\_sale \bowtie deals);$



```
-- 3. what is the oldest book in store or warehouse?
select b.*, date_stored  from books b
inner join inventory
using(book_id) order by date_stored limit 1;
```

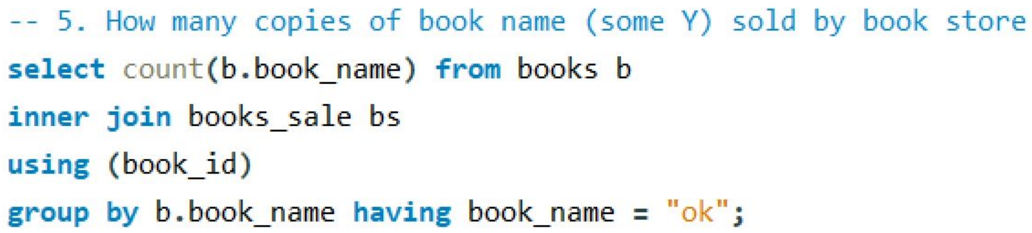
$\tau\ date\_stored\ \pi\ books.*,\ date\_stored\ (books \bowtie inventory);$



```
-- 4.show all book orders sorted by order_date
 select first_name, last_name, book_name, order_date, informed_date from book_order
 inner join books using(book_id)
 inner join customer using(customer_id)
 where isnull(informed_date) order by order_date;
```

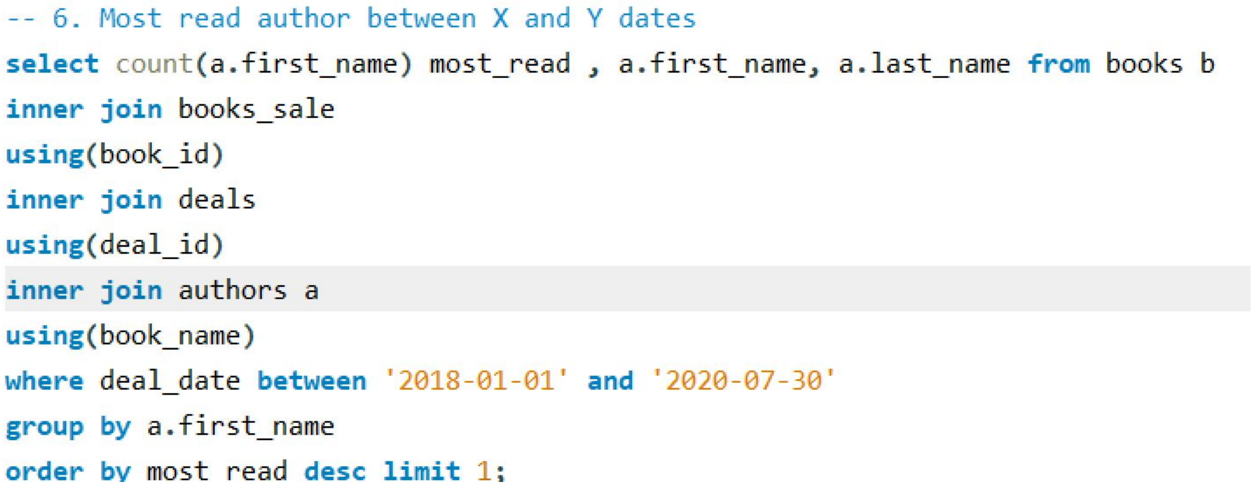
$\tau\ order\_date\ \pi\ first\_name,\ last\_name,\ book\_name,\ order\_date,\ informed\_date$

$\sigma(book\_order \bowtie books \bowtie customer);$



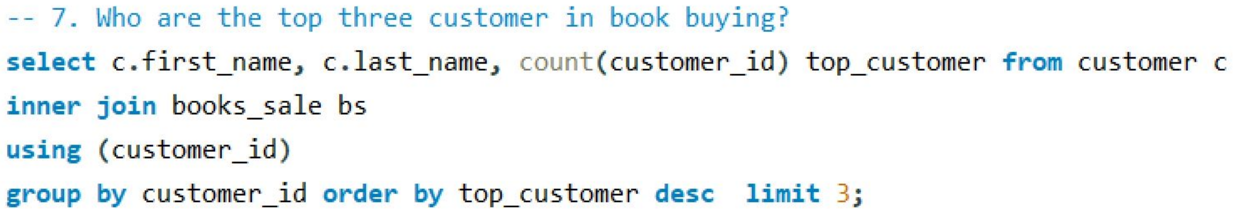
```
-- 5. How many copies of book name (some Y) sold by book store
select count(b.book_name) from books b
inner join books_sale bs
using (book_id)
group by b.book_name having book_name = "ok";
```

$\pi\ COUNT(book\_name)(\sigma\ book\_name = 'Y'\ (books \bowtie book\_sale))\ \ book\_name;$



```
-- 6. Most read author between X and Y dates
select count(a.first_name) most_read , a.first_name, a.last_name from books b
inner join books_sale
using(book_id)
inner join deals
using(deal_id)
inner join authors a
using(book_name)
where deal_date between '2018-01-01' and '2020-07-30'
group by a.first_name
order by most_read desc limit 1;
```

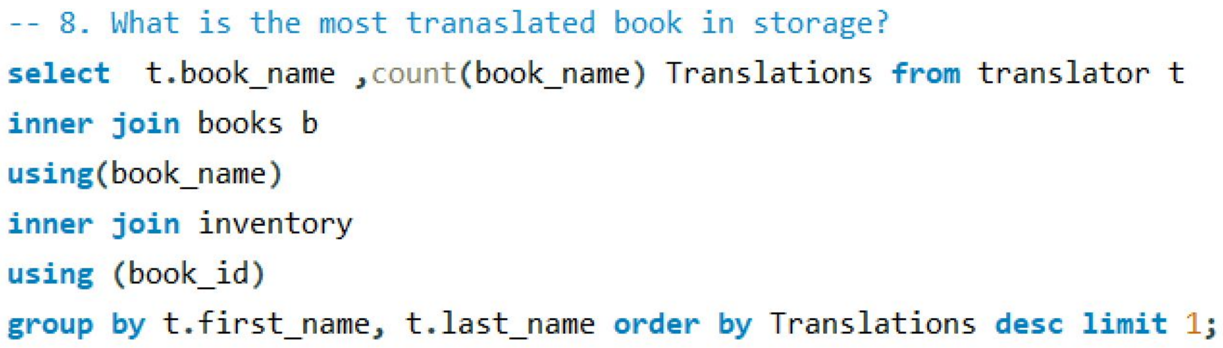
$\tau\ most\_read\ desc\ \pi\ count(author.first\_name)\ most\_read,\ author.first\_name,\ author.last\_name\ (\sigma\ deal\_date\ between\ (date1,\ date2)\ (books \bowtie books\_sale \bowtie deals \bowtie authors))\ \ author.first\_name;$



```
-- 7. Who are the top three customer in book buying?
select c.first_name, c.last_name, count(customer_id) top_customer from customer c
inner join books_sale bs
using (customer_id)
group by customer_id order by top_customer desc  limit 3;
```

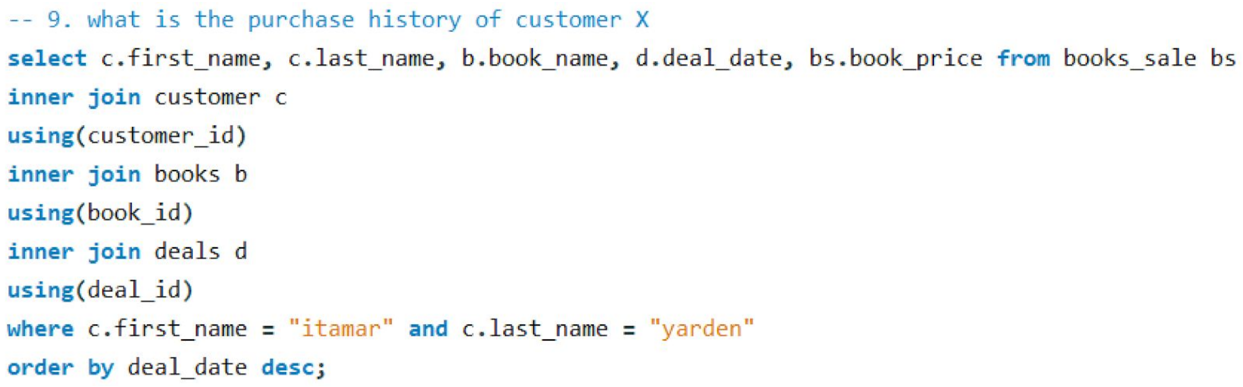
$\tau\ top\_customer\ desc\ \pi\ customer.first\_name,\ customer.last\_name,\ cont(customer\_id)\ top\_customer$

(customer ⋈ books_sale) customer_id;



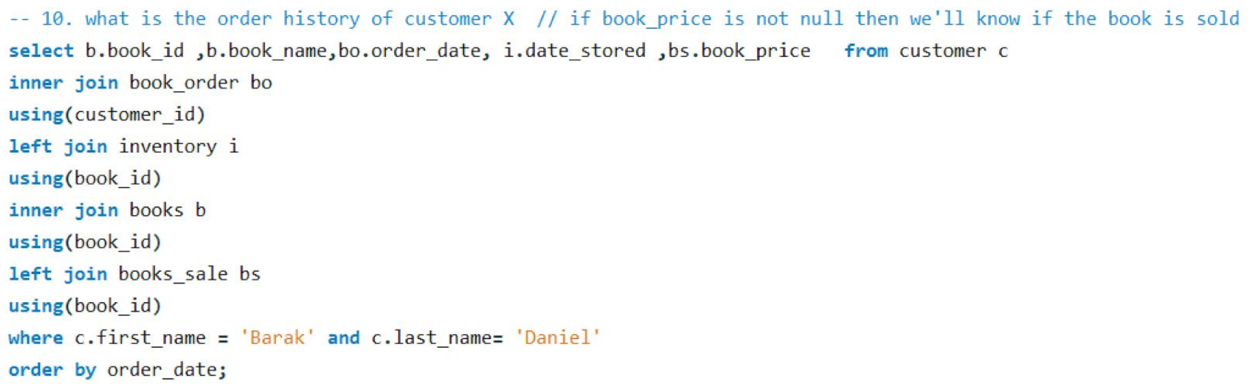
```sql
-- 8. What is the most tranaslated book in storage?
select  t.book_name ,count(book_name) Translations from translator t
inner join books b
using(book_name)
inner join inventory
using (book_id)
group by t.first_name, t.last_name order by Translations desc limit 1;
```

τ translations desc π translator.book_name, count(book_name) tranlations (translator ⋈ books ⋈ inventory) translator.first_name, translator.last_name;



```sql
-- 9. what is the purchase history of customer X
select c.first_name, c.last_name, b.book_name, d.deal_date, bs.book_price from books_sale bs
inner join customer c
using(customer_id)
inner join books b
using(book_id)
inner join deals d
using(deal_id)
where c.first_name = "itamar" and c.last_name = "yarden"
order by deal_date desc;
```

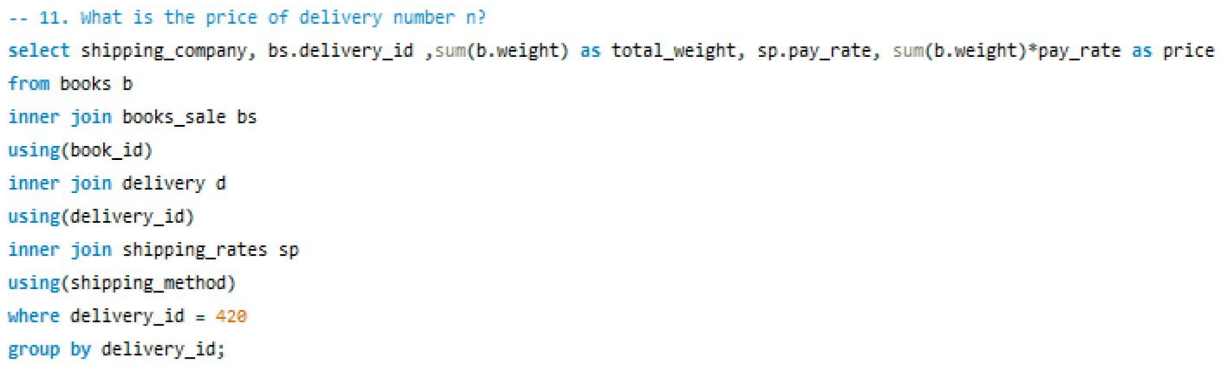
τ deal_date desc π customer.first_name, customer.last_name, books.book_name, deals.deal_date, books_sale.book_price (σ customer.first_name = ‘X’ ∧ customer.last_name = ‘Y’ (customer ⋈ books ⋈ books_sale ⋈ deals));



```sql
-- 10. what is the order history of customer X  // if book_price is not null then we'll know if the book is sold
select b.book_id ,b.book_name,bo.order_date, i.date_stored ,bs.book_price   from customer c
inner join book_order bo
using(customer_id)
left join inventory i
using(book_id)
inner join books b
using(book_id)
left join books_sale bs
using(book_id)
where c.first_name = 'Barak' and c.last_name= 'Daniel'
order by order_date;
```

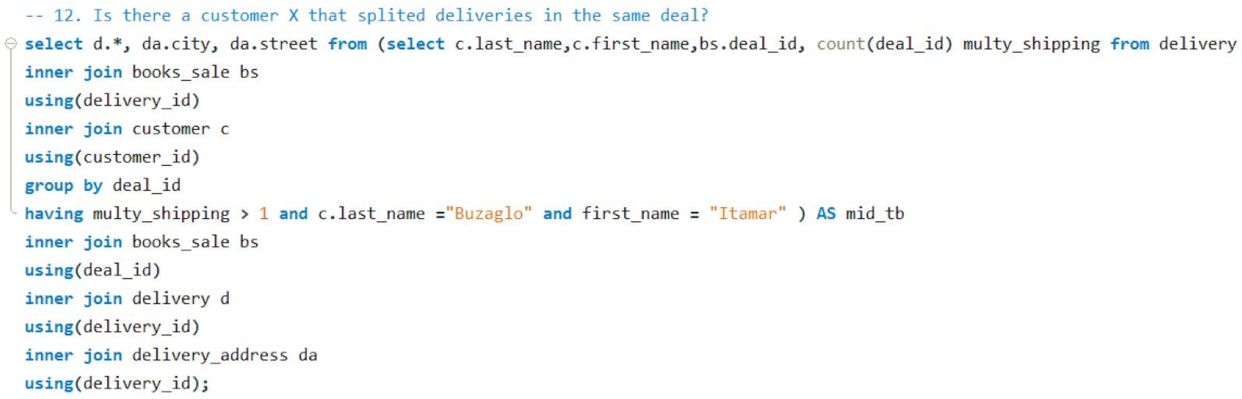
τ order_date π books.book_id, books.book_name, book_order.order_date, inventory.date_stored, books_sale.book_price (σ customer.first_name = 'X' ∧ customer.last_name = ‘Y’ (book_order ⋈

customer ⋈ inventory ⋈ books ⋈ books_sale));



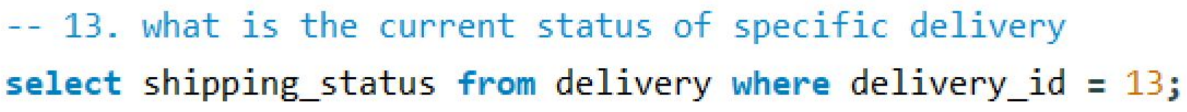
```sql
-- 11. What is the price of delivery number n?
select shipping_company, bs.delivery_id ,sum(b.weight) as total_weight, sp.pay_rate, sum(b.weight)*pay_rate as price
from books b
inner join books_sale bs
using(book_id)
inner join delivery d
using(delivery_id)
inner join shipping_rates sp
using(shipping_method)
where delivery_id = 420
group by delivery_id;
```

π shipping_company, books_sale.delivery_id, sum(books.weight) total_weight, shpping_rates.pay_rate sum(books.weight)*pay_rate price (σ delivery_id = 'X' (books ⋈ books_sale ⋈ delivery ⋈ shipping_rates)) γ delivery_id;



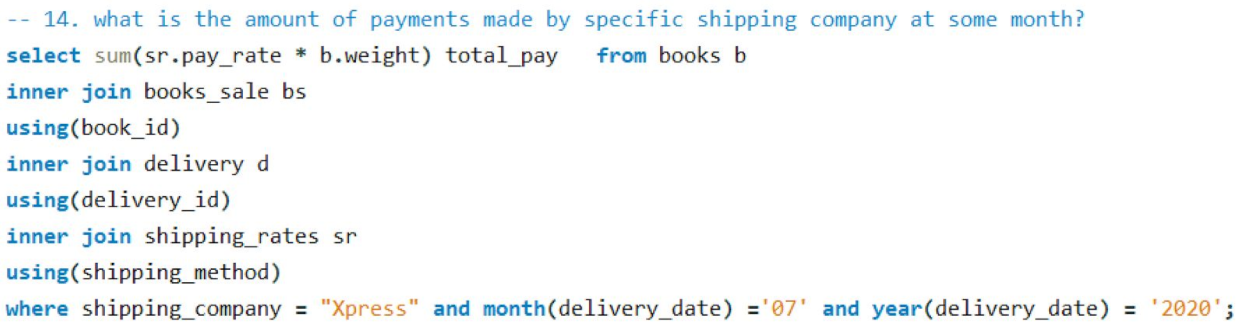
```sql
-- 12. Is there a customer X that splited deliveries in the same deal?
select d.*, da.city, da.street from (select c.last_name,c.first_name,bs.deal_id, count(deal_id) multy_shipping from delivery
inner join books_sale bs
using(delivery_id)
inner join customer c
using(customer_id)
group by deal_id
having multy_shipping > 1 and c.last_name ="Buzaglo" and first_name = "Itamar" ) AS mid_tb
inner join books_sale bs
using(deal_id)
inner join delivery d
using(delivery_id)
inner join delivery_address da
using(delivery_id);
```

π delivery.*, delivery_address.city, delivery_address.street ((π customer.last_name, customer.first_name, books_sale.deal_id, count(deal_id) multi_shipping (σ multi_shipping > 1 ∧ customer.last_name = 'X' ∧ customer.first_name = 'Y') deal_id ⋈ books_sale ⋈ delivery ⋈ delivery_address);



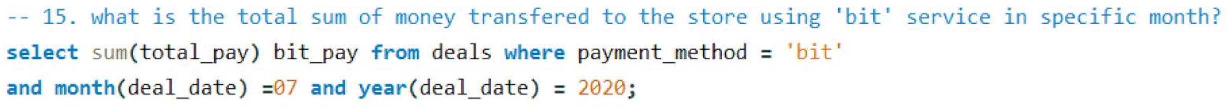
```sql
-- 13. what is the current status of specific delivery
select shipping_status from delivery where delivery_id = 13;
```

π shipping_status (σ delivery_id = 'X' (delivery));



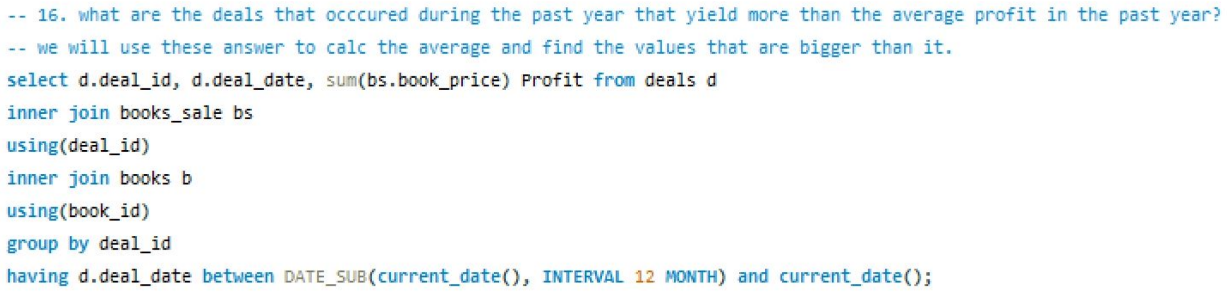
```
-- 14. what is the amount of payments made by specific shipping company at some month?
select sum(sr.pay_rate * b.weight) total_pay   from books b
inner join books_sale bs
using(book_id)
inner join delivery d
using(delivery_id)
inner join shipping_rates sr
using(shipping_method)
where shipping_company = "Xpress" and month(delivery_date) ='07' and year(delivery_date) = '2020';
```

π *SUM*(*shipping_rates.pay_rate* ∗ *books.weight*) *total_pay* (σ *shipping_company* = ‘*Xpress*’ ∧ *month*(*delivery_date*) = ‘*X*’ ∧ *year*(*deal_date*) = ‘*Y*’ (*books* ⋈ *books_sale* ⋈ *delivery* ⋈ *shipping_rates*)));



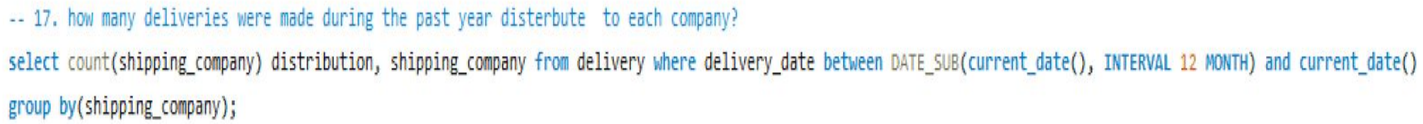
```
-- 15. what is the total sum of money transfered to the store using 'bit' service in specific month?
select sum(total_pay) bit_pay from deals where payment_method = 'bit'
and month(deal_date) =07 and year(deal_date) = 2020;
```

π *sum*(*total_pay*) *bit_pay* (σ *payment_method* = ‘*bit*’ ∧ *month*(*deal_date*) = ‘*X*’ ∧ *year*(*deal_date*) = ‘*Y*’ (*deals*));



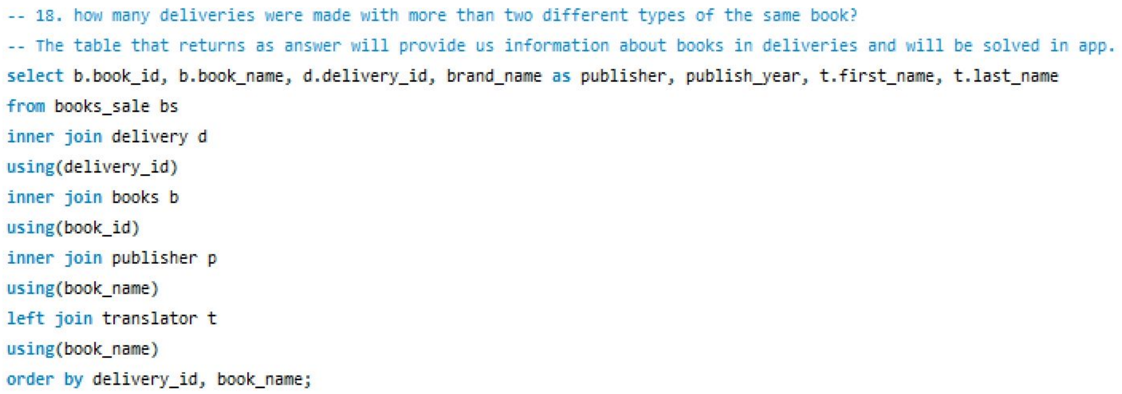
```
-- 16. what are the deals that occcured during the past year that yield more than the average profit in the past year?
-- we will use these answer to calc the average and find the values that are bigger than it.
select d.deal_id, d.deal_date, sum(bs.book_price) Profit from deals d
inner join books_sale bs
using(deal_id)
inner join books b
using(book_id)
group by deal_id
having d.deal_date between DATE_SUB(current_date(), INTERVAL 12 MONTH) and current_date();
```

π *deals.deal_id*, *deals.deal_date*, *sum*(*books_sale.book_price*) *profit* (σ *deals.deal_date*) *between* ((*current_date*(), *interval*(12 *months*), *current_date*()) (*deals* ⋈ *books_sale* ⋈ *books*));



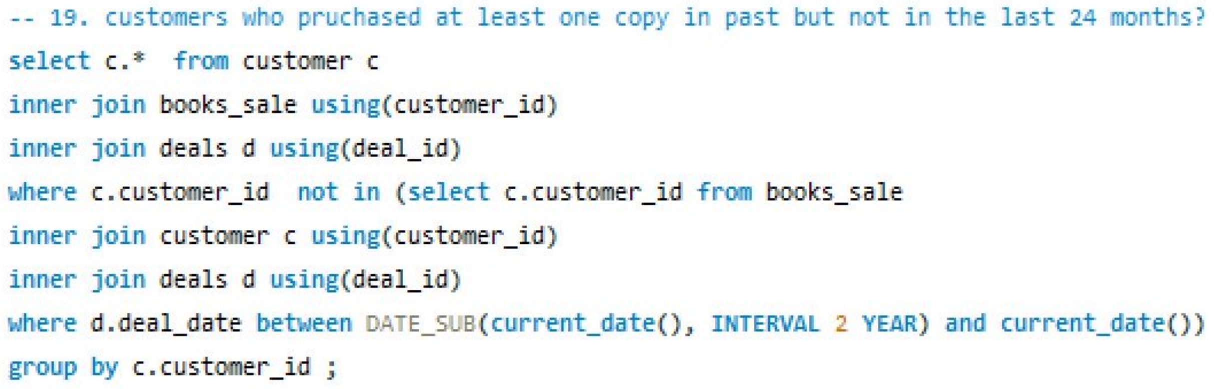
```
-- 17. how many deliveries were made during the past year disterbute  to each company?
select count(shipping_company) distribution, shipping_company from delivery where delivery_date between DATE_SUB(current_date(), INTERVAL 12 MONTH) and current_date()
group by(shipping_company);
```

π *count*(*shipping_company*) *distribution*, *shipping_company* (σ *delivery_date between*((*current_date*, *interval*(12 *months*)), *current_date*()) (*delivery*)) *shipping_company*;



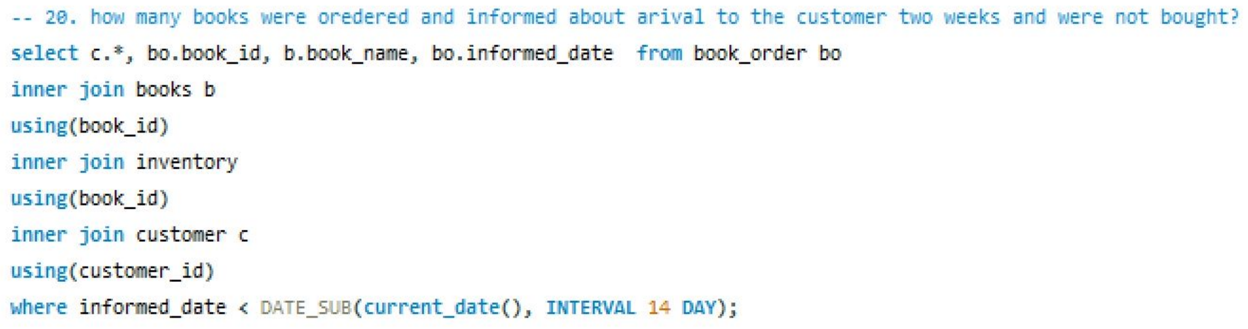
```
-- 18. how many deliveries were made with more than two different types of the same book?
-- The table that returns as answer will provide us information about books in deliveries and will be solved in app.
select b.book_id, b.book_name, d.delivery_id, brand_name as publisher, publish_year, t.first_name, t.last_name
from books_sale bs
inner join delivery d
using(delivery_id)
inner join books b
using(book_id)
inner join publisher p
using(book_name)
left join translator t
using(book_name)
order by delivery_id, book_name;
```

$\tau\ delivery\_id,\ book\_name\ \pi\ books.book\_id,\ books.book\_name,\ delivery.delivery\_id,\ brand\_name\ publisher, publish\_year,\ translator.first\_name,\ translator.last\_name\ (books\_sale \bowtie delivery \bowtie books \bowtie publisher \bowtie translator);$



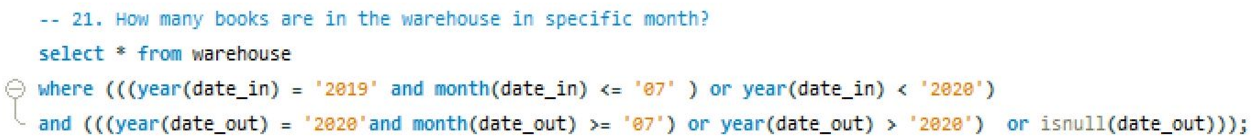
```
-- 19. customers who pruchased at least one copy in past but not in the last 24 months?
select c.*  from customer c
inner join books_sale using(customer_id)
inner join deals d using(deal_id)
where c.customer_id  not in (select c.customer_id from books_sale
inner join customer c using(customer_id)
inner join deals d using(deal_id)
where d.deal_date between DATE_SUB(current_date(), INTERVAL 2 YEAR) and current_date())
group by c.customer_id ;
```

$\pi\ customer.*\ \ ((\pi\ customer.customer\_id\ (\sigma\ deals.deal\_date\ between\ ((current\_date(),\ interval(2\ year)),\ current\_date())\ customer - (customer \bowtie books\_sale \bowtie deals)))\ \ customer.customer\_id;$



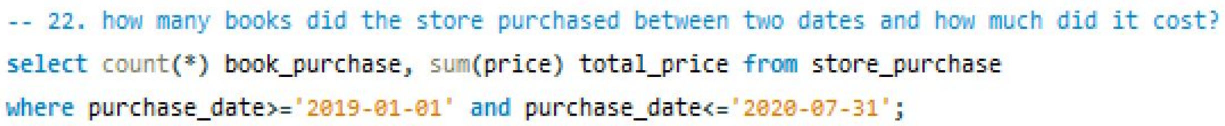
```
-- 20. how many books were oredered and informed about arival to the customer two weeks and were not bought?
select c.*, bo.book_id, b.book_name, bo.informed_date  from book_order bo
inner join books b
using(book_id)
inner join inventory
using(book_id)
inner join customer c
using(customer_id)
where informed_date < DATE_SUB(current_date(), INTERVAL 14 DAY);
```

$\pi\ customer.*,\ book\_order.book\_id,\ bookd.book\_name,\ book\_order.informed\_date\ (\sigma\ informed\_date < \ (current\_date(),\ interval(14\ day))\ (book\_order \bowtie books \bowtie inventory \bowtie customer));$



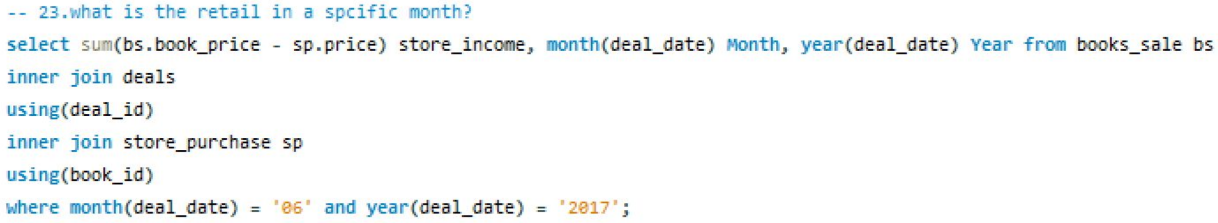
```
-- 21. How many books are in the warehouse in specific month?
select * from warehouse
where (((year(date_in) = '2019' and month(date_in) <= '07' ) or year(date_in) < '2020')
and (((year(date_out) = '2020'and month(date_out) >= '07') or year(date_out) > '2020')  or isnull(date_out)));
```

π customer. ∗, book_order.book_id, bookd.book_name, book_order.informed_date (σ informed_date < (current_date(), interval(14 day)) (book_order ⋈ books ⋈ inventory ⋈ customer));



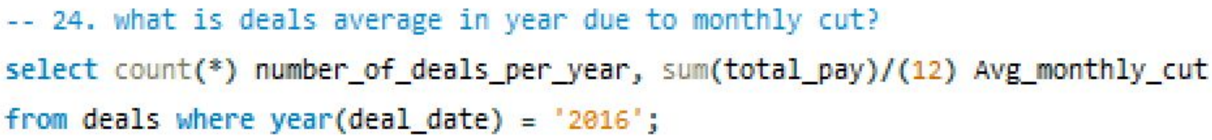
```
-- 22. how many books did the store purchased between two dates and how much did it cost?
select count(*) book_purchase, sum(price) total_price from store_purchase
where purchase_date>='2019-01-01' and purchase_date<='2020-07-31';
```

π count(∗) book_purchase, sum(price) total_price (σ purchase_date >= 'X' ∧ purchase_date <= 'Y');



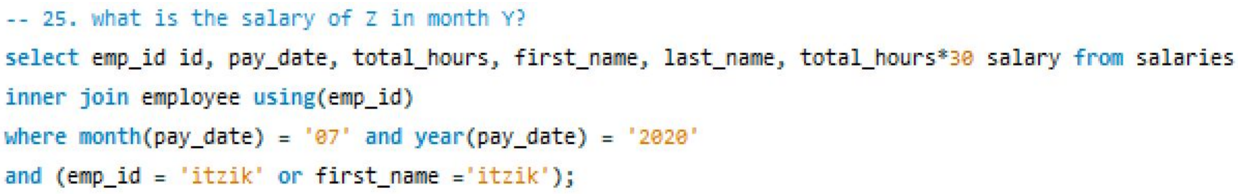
```
-- 23.what is the retail in a spcific month?
select sum(bs.book_price - sp.price) store_income, month(deal_date) Month, year(deal_date) Year from books_sale bs
inner join deals
using(deal_id)
inner join store_purchase sp
using(book_id)
where month(deal_date) = '06' and year(deal_date) = '2017';
```

π sum(books_sale.book_price – store_purchase.price) store_income, month(deal_date) month, year(deal_date) year (σ month(deal_date) = 'X' ∧ year(deal_date) = 'Y') (books_sale ⋈ deals ⋈ store_purchase));



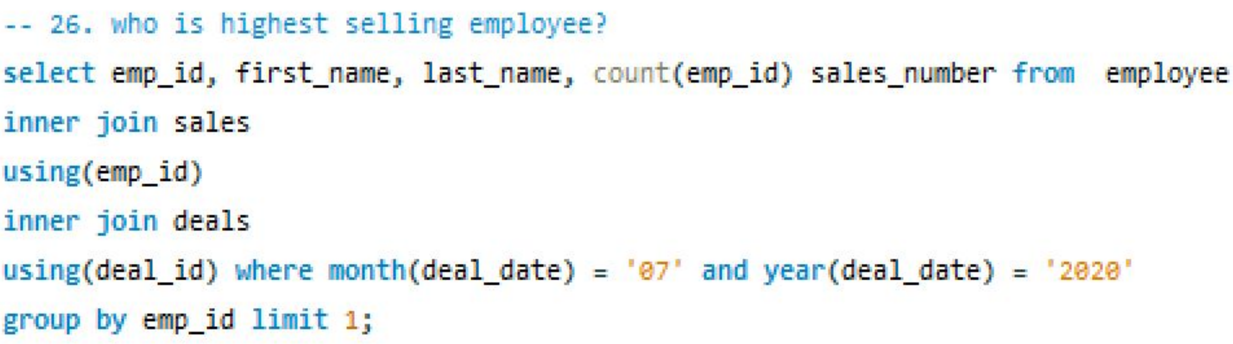
```
-- 24. what is deals average in year due to monthly cut?
select count(*) number_of_deals_per_year, sum(total_pay)/(12) Avg_monthly_cut
from deals where year(deal_date) = '2016';
```

π count(∗) number_of_deals_per_year, sum(total_pay)/12 avg_monthly_cut (σ year(deal_date) = 'X' (deals));



```
-- 25. what is the salary of Z in month Y?
select emp_id id, pay_date, total_hours, first_name, last_name, total_hours*30 salary from salaries
inner join employee using(emp_id)
where month(pay_date) = '07' and year(pay_date) = '2020'
and (emp_id = 'itzik' or first_name ='itzik');
```

π *emp_id*, *pay_date*, *total_hours*, *first_name*, *last_name*, *total_hours* ∗ 30 *salary* (σ *month*(*pay_date*) = ’*X*’ ∧ *year*(*pay_date*) = ‘*Y*’ ∧ (*emp_id* = ‘*Z*’ *V* *first_name* = ‘*W*’) (*salaries* ⋈ *employee*));



```
-- 26. who is highest selling employee?
select emp_id, first_name, last_name, count(emp_id) sales_number from  employee
inner join sales
using(emp_id)
inner join deals
using(deal_id) where month(deal_date) = '07' and year(deal_date) = '2020'
group by emp_id limit 1;
```

π *emp_id*, *first_name*, *last_name*, *count*(*emp_id*) *sales_number* (σ *month*(*deal_date*) = ‘*X*’ *year*(*deal_date*) = ‘*Y*’ (*employee* ⋈ *sales* ⋈ *deals*)) *emp_id*;