$\sigma_{quantity>0}(book)$ (1)

$\sigma(orders)$ (2)

$\sigma(customer)$ (3)

$\sigma(supplier)$ (4)

$\sigma_{purchase\_date>='2018-07-04' \wedge purchase\_date<='2018-07-24'}(purchase)$ (5)

$\sigma_{on\_sale=1}(sales)$ (6)

$\sigma_{title='Math' \wedge quantity>0}(book)$ (7)

$\sigma_{supplier\_id=67252}(provider\_stock)$ (8)

$G_{sum\ pd.quantity}(\sigma[\rho_p(purchase) \bowtie \rho_{pd}(purchase\_details)])$ (10)

$p.purchase\_id=pd.purchase\_id \wedge p.customer\_id=304 \wedge p.purchase\_date>='2018-07-01'$

$G_{sum\ pd.quantity}\sigma_{p.purchase\_id=pd.purchase\_id \wedge pd.book\_id=12 \wedge p.purchase\_date>='2018-04-02'}(\rho_p(purchase), \rho_{pd}(purchase\_details))$ (9)

$\Pi_{c.customer\_id, c.purchase\_date}(\sigma_{c)\infty}(\Pi_{ppurchase\_date, p.customer\_id, SumQuanGsum(pd.quantity)}(\rho_p(purchase) \bowtie_{pd.purchase\_id=ppurchase\_id, \tau p.customer\_id}(\rho_p(purchase))$ (11)

$* c.purchase\_date>='2017-07-25' \vee SumQuan\ (UNE\ 1)$

$\sigma_{o.provider\_id, sumQuan\ Gsum\ o.quantity}[\rho_o(orders)\ o.orders.date>='2018-07-07'\ \forall o.provider\_id, \tau SumQuan(UNIT\ 1)]$ (12)

$\sigma[SumQuan\ Gsum\ o.quantity)\ o.order\_date>='2018-07-07' \wedge o.order\_date<='2018-07-2$ (13)
$[\rho_o(orders)]$

$G_{count(is\_arrived)}\ is\_arrived=1 \wedge order\_date>='2018-07-1' \wedge order\_date<='2018-08-1'$ (14)
Π_T [orders]

π

σ first_name, last_name σ join_date >= '2018-07-20' [customer] (17)

π [illegible]

(15)

π t.customer_id, Gsum(s.sale_price * t.quantity) (σ s.book_id=t.book_id ∧ s.on_sale=1
γ t.customer_id [ρs(sales) ▷◁ ρt(π p.customer_id, purchase_id, pd.book_id, pd.quantity
(σ [illegible] ρpd(purchase_details) ▷◁ ρp
(π [illegible] (σ ρpd(purchase_details) ▷◁ pd.purchase_id=p.purchase_id
[ρp(purchase)])))])

(16)

π ρQ(QUARTER(p.purchase_date), Gsum(y.sum_purchase)
(σ p.purchase_id=y.purchase_id γQ (ρp(purchase) ▷◁ ρy(... →
→ (π pd.purchase_id, ρsum_purchase(Gsum(pd.quantity * b.price))
(σ pd.book_id=b.book_id γ pd.purchase_id [ρpd(purchase_details), ρb(books)])

(18)

π o.provider, ρtotal(Gsum(t.sumAll)) (σ t.order_date >= '2018-01-10' ∧ t.order_date <=
'2018-09-09' γ o.provider_id [ρo(orders) ▷◁ ρt(π o.provider_id, o.book_id,
o.quantity, o.order_date, ps.provider_price, ρsumAll(o.quantity * ps.provider_price)
(σ ps.provider_id=o.provider_id [ρo(orders), ρps(provider_stock)])

(19)

π p.salesman_id, p.purchase_date, ρtotal(Gsum(t.sumAll)) (σ p.purchase_date >= '2018-1-10' ∧
p.purchase_date <= '2018-09-09' γ p.salesman_id [ρp(purchase) ▷◁
ρt(π pd.quantity, pd.book, pd.purchase_id, ρsumAll(pd.quantity * b.price), b.price
(σ [illegible] ρb(book) ▷◁ b.book_id=pd.book_id [ρpd(purchase_details)]))

π pd.book_id, pd.quantity, sumQuan Gsum(pd.quantity) [σ γ pd.book_id, T sumQuan(LIMIT 5)
[illegible]
(ρpd(purchase_details))]

Group by γ
Order by T
Sum Gsum