

Exam 1 18/19

1

(a) & A:

$\sigma_{\text{price} \geq 100} (\text{Orders}) \bowtie \sigma_{\text{Orders.aid} = A.\text{aid} \wedge \text{city} = 'koper'} (\text{Agent})$

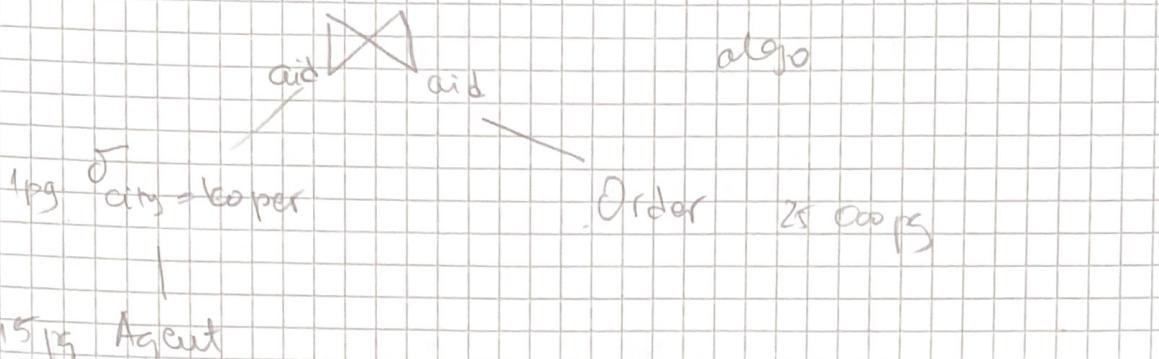
PC:

$\{ \langle O, P, A, C, Q, PR, D \rangle \mid \langle O, P, A, C, Q, PR, D \rangle \in \text{Orders} \wedge$
 $(PR \geq 1000 \wedge \exists \langle A1, AN, C1 \rangle \in \text{Agent} \mid$
 $C1 = 'koper' \wedge \exists \langle O1, P1, A1, C1, Q1, PR1, D1 \rangle \in \text{Orders}$
 $(A1 = A \wedge AN = A)) \}$
 $\{ \langle O, P, A, C, Q, PR, D \rangle \mid \langle O, P, A, C, Q, PR, D \rangle \in \text{Orders} \wedge$
 $(PR \geq 1000 \wedge \exists \langle A1, AN, C1 \rangle \in \text{Agent} \mid$
 $C1 = 'koper' \wedge A1 = A \}$

(b) SELECT ct.city FROM Customer ct, Order or
WHERE ct.cid = or.cid
GROUP BY ct.city
HAVING SUM(or.price) >= 100 000

2

"aid, aware, price" on-the-fly



scan Agent : 15 pg

$$\frac{1 \times 1200}{500} \approx 24 \text{ record}$$

$\Rightarrow [1 \text{ pg.}]$

To write 1 pg

join block - nested :

$$\Rightarrow MTH = 25\ 000 + 1 = 25\ 001 \text{ pg}$$

$$\Rightarrow [25\ 017 \text{ pg}]$$

join sort-merge join : 1

$$2 \times 25\ 000 \times \left(1 + \log_{9855} \frac{25\ 000}{10\ 000} \right) +$$

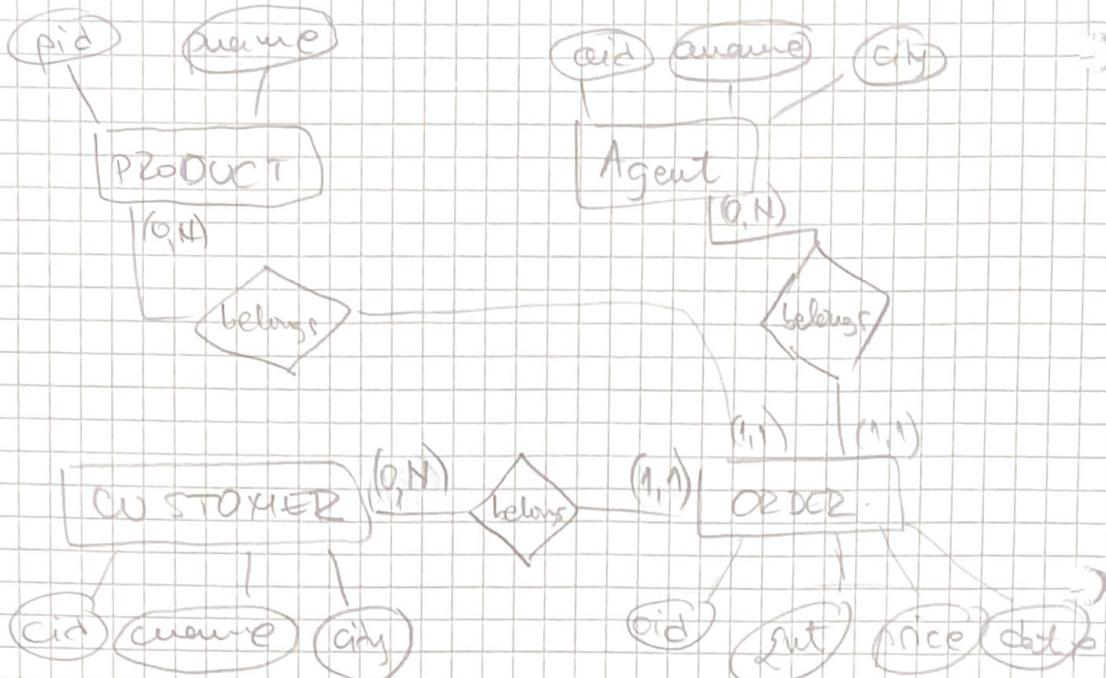
$$2 \times 1 \times (1) + 25\ 000 + 1 = 125\ 003$$

$\Rightarrow [125\ 019 \text{ pg}]$

ASSUMPTION

- uniform distribution of city in Agent
- same values in Cust city and Pg City
- batch size 10 000

3



```
CREATE TABLE Product (
    pid INT,
    name CHAR(20),
    PRIMARY KEY (pid)
);
```

```
CREATE TABLE Order (
    oid INTEGER,
    out INTEGER,
    price DOUBLE,
    date TIMESTAMP,
    aid INTEGER NOT NULL,
    cid INTEGER NOT NULL,
    pid INTEGER NOT NULL,
    PRIMARY KEY (oid),
    FOREIGN KEY (aid) REFERENCES Agent,
```

ON DELETE CASCADE ON UPDATE CASCADE

⋮

(h)

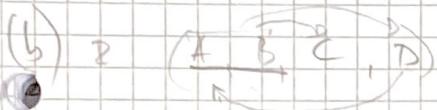
$$F = \{ AB \rightarrow C, AB \rightarrow D, D \rightarrow A \}$$

(a) A2 : $\{ AB \rightarrow C \} \models AB \rightarrow AC$

A2 : $\{ D \rightarrow A \} \models DB \rightarrow AB$

A3 : $\{ AB \rightarrow AC, DB \rightarrow AB \} \models BD \rightarrow AC$

(b)



candidate A, B

in 3NF normal form

(c) if lossless join and dep preserving only important, then no, 3NF guarantees this
Otherwise, if no redundancy important, then yes (BCNF)