EXAM 20121

(1)

(a) name = "The supplier"
date > 1.1.2020

RA:

$$\pi_{name}(Pid \bowtie \pi_{pid}(\sigma_{date>'1.1.2020'}(Ord \bowtie \pi_{sid}(\sigma_{name="The\ Supplier"}(S)))))$$

orders of "The S"

RC:

$$\{\langle N\rangle \mid \langle P,N,PR\rangle \in Prd \wedge \exists\langle O,PID,\_,S,Q,PC,D,C\rangle \in Ord($$
$$D>'1.1.2020' \wedge PID=P \wedge \exists\langle SID,NM,A,PH\rangle \in Suppliers($$
$$SID=S \wedge NM='The\ Supplier'))\}$$

(b)
```
SELECT sup.sid, sup.name, pr.tot FROM Suppliers sup
JOIN (SELECT sid, SUM(price) tot FROM Orders
      WHERE date>'1.1.2020'
      GROUP BY sid
      HAVING SUM(price) > 500 000) pr
ON supsid = pr.sid
```

(c)

(2)

algo

pid ⋈ pid

(tree index)
duh with on

σ
date = '1.1.2015'

Parts (ordered by pid)

|

Orders
(ordered by oid)

scan orders with B+ index on date:

[approx # pg on the way] + ([# of obj] * selectivity)

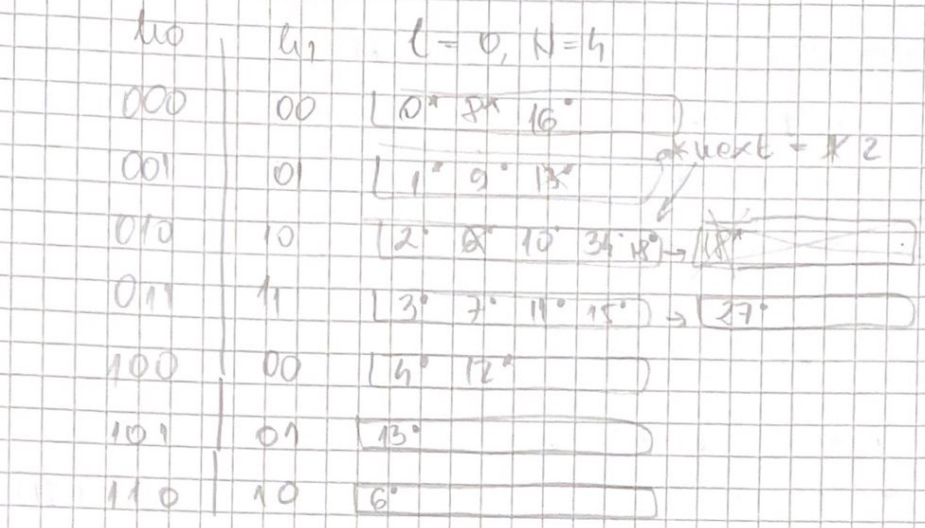
assuming unclustered:

3 + (1 000 000 * .5) pgs
# of rec

EXAM 1 20/21 22.1.22.

(3)

(a)



I(18): 18 mod 4 = 2 → split and not

1 mod 8 = 1

9 mod 8 = 1

13 mod 8 = 5

I(16): 16 mod 4 = 0

next → gotta check h1 as well

16 mod 8 = 0

I(27): 27 mod 4 = 3 → split

2 mod 8 = 2; 6 mod 8 = 6; 10 mod 8 = 2; 34 mod 8 = 2

18 mod 8 = 2

(b) directory pointing to buckets, local vs global depth

double dir when nec; no overflow

(4) $R(\underline{x}, \underline{y}, \underline{z}, w, \underline{Q})$

(a) $F_R = \{ x \to y,\ yz \to w \}$

A2: $\{x \to y\} \vdash xz \to yz$

A2: $\{yz \to w\} \vdash yz \to wyz$

A1: $wyz \subseteq wy \Rightarrow wyz \to wy$

A3: $\{xz \to yz,\ yz \to wyz\} \vdash xz \to wyz$

A3: $\{xz \to wyz,\ wyz \to wy\} \vdash xz \to wy$

- not in any NF, since no prim key

$R(\underline{x}, y, \underline{z}, w, \underline{Q}) \to$ 1NF

$F_R = \{ x \to y,\ yz \to w \}$
(partial, partial)

↓

2NF $R_1(\underline{x}, y)$ $F_{R_1} = \{x \to y\}$

$R_2(\underline{yz}, w)$ $F_{R_2} = \{yz \to w\}$

$R(\#x, \#z, Q)$ $F_R = \{\}$

} also in 3NF and BCNF

OR

$R(\underline{x\ y\ z\ Q}\ w)$ 1NF

$F_R = \{ x \to y,\ yz \to w \}$

2NF $R_1(\underline{x}, y)$ $x \to y$

$R_2(\underline{yz}, w)$ $yz \to w$

$R(\#x, \#y, \#z, Q)$ $\{\}$

} also 3NF and BCNF