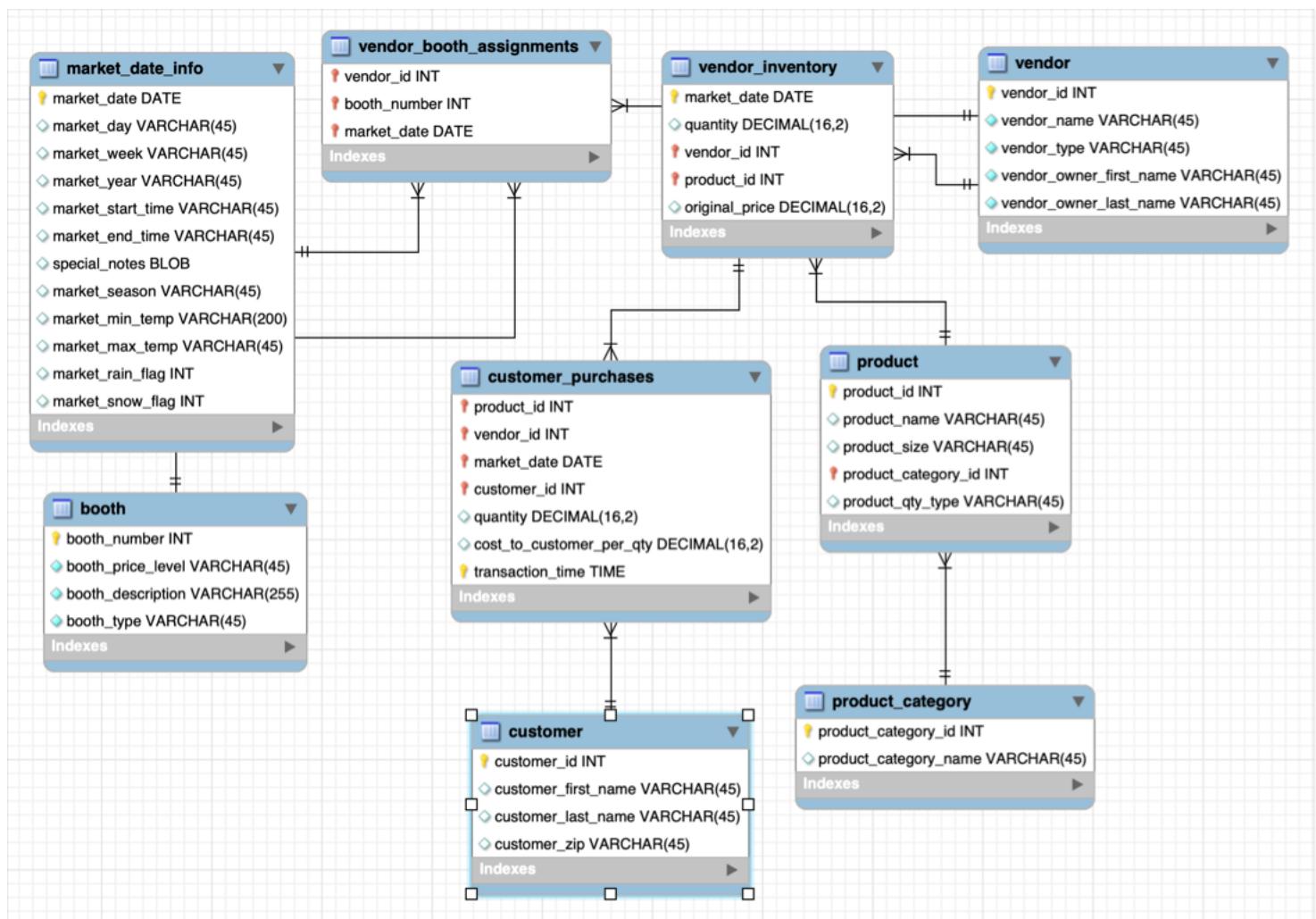


# Agenda :

- a. Having Clause
- b. Need for Window Function
- c. Window Function types
  - a. Analytical Category : Rownumber,rank,dense rank, NTILE, LAG,LEAD, Nth Value, First Value,Last Value
  - b. Aggregation Category : Sum,Avg,count,min,max



Group By

Emp

Dept

Dept<sup>+2</sup>

Dept wise  
Salary

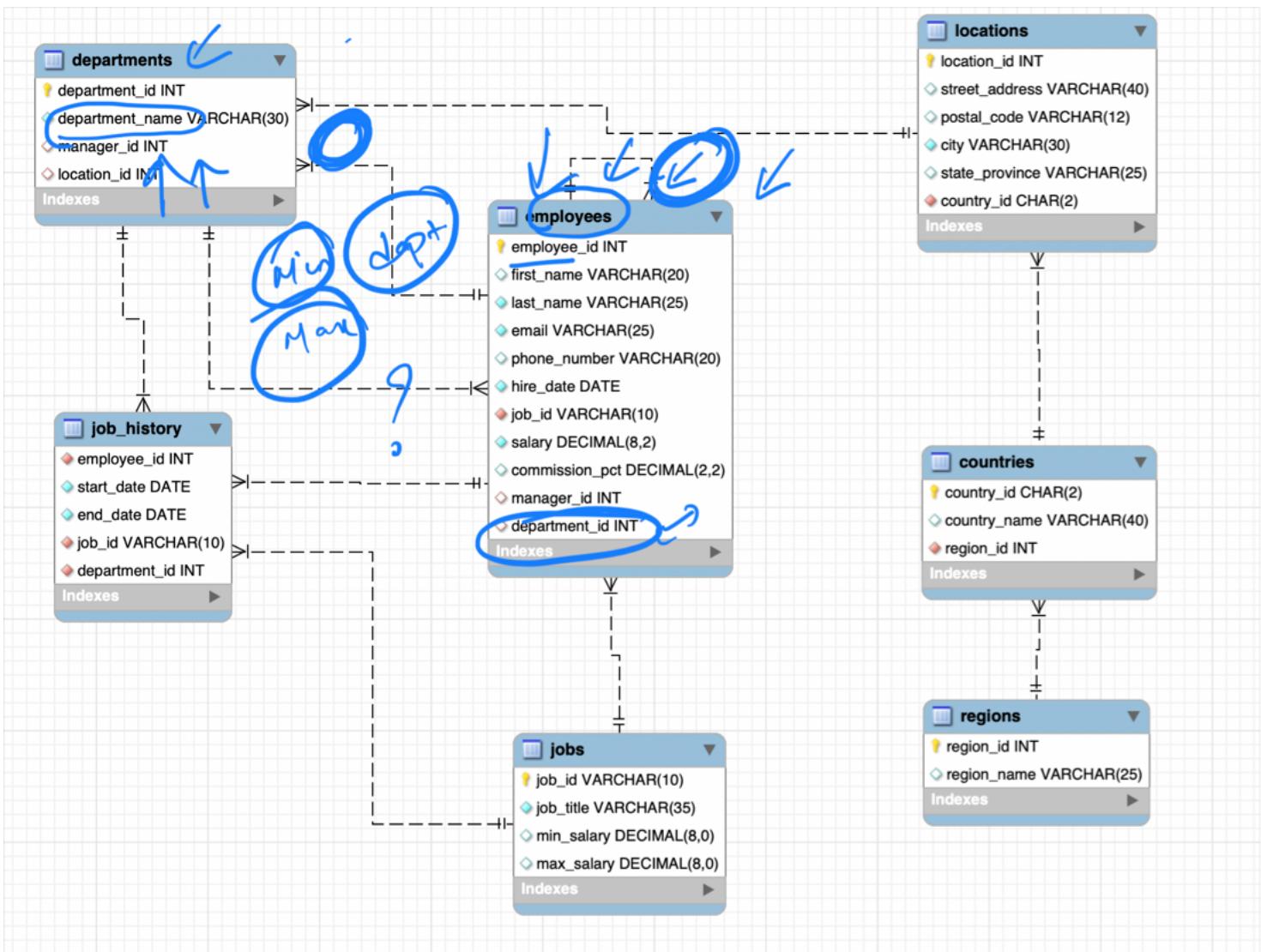
Dept Name	10	20	30	40	50

Dept	10	20	30	40	50
1	700	HR	10		
2	1000	AD	20		
3	800	HR	10		
4	2500	AD	20		
5	3000	AD	20		

HR	= 1500
AD	= 8500

Select Sum(Salary) from  
employee ; X

Min      Max  
↑            ↑



empid	ename	sal	deptid	deptl	deptnm
1	A	100	10	10	HR
2	B	200 ← 20		20	AD
3	C	300	10	10	HR
4	D	200 ← 20		20	AD
5	E	300	10	10	HR

JLR

deptl man mn

10	100	20
20	100	200

↑ — — — — Tabu 2

Table I

Select <sup>Take 2</sup> dept\_id, min(sal), max(sal)

Select Dept\_id, min(Sal), max(Sal)

dept name

*Tanacetum* - -

by de

Group by

Unit 1

Wit Ma

Dept    Min    Max

①	<del>10</del>	100	30
---	---------------	-----	----

A horizontal number line starting at 0 and ending at 100. Major tick marks are labeled at 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100. There are 10 major segments between 0 and 100. Minor grid lines are present every 1 unit, creating 99 intermediate tick marks.

20 100 20

2 | 20 | 100 |

— 100 —

100

## Select

300

vid

one (act)

$\Rightarrow \text{QIM}(q+\gamma)$

1 From v1  
 where date > '2019-04-03' AND ('2019-05-16')  
 2 Group by Vendor-id;  
 Sum(qty) >= 100

v1,2 Inventory

a1	1	100
a2	2	200
a3	3	250
a4	4	50
a5	5	40

having

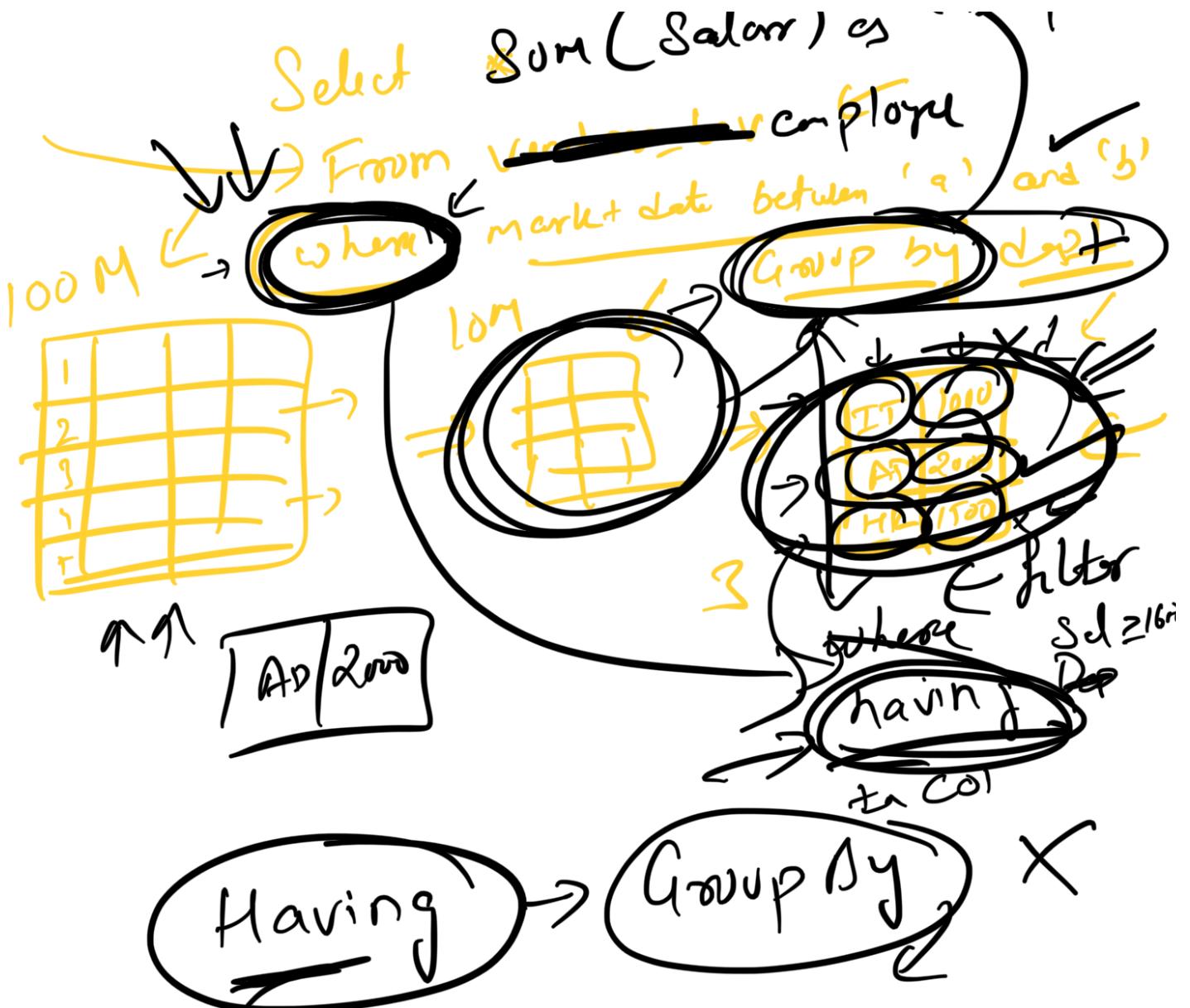
>= 100

1	32
2	45

1	A	10	-	-	-
2	B	20	-	-	-
1	A	15	-	-	-
2	B	25	-	-	-
1	A	7	-	-	-
2	B	8	-	-	-

Having

where ↪  
temp'



Select a

from employee

where

X having

Salary > 100;

Agg

abc 100 Rows

1 Ja	1 ↗ 2 ↘ App	1 ↗ 3 ↘ Comp
1 Ja	1 ↗ 3 ↘ Comp	

1 ↗ 4

SELECT  
FROM abc  
where Sel > 1000  
group

U1	IT	2	2	AD	2
	IT	2	3	GR	
Q29	2	1	7		3
	2	2	6	12	-

↓

1			
2			
3			

having

↓

Q1	3.9
Q2	9.5

~~Count(\*) > 3~~

## window function

- ①  $\text{Sum}(\text{Salary}) \rightarrow$  1 Row
- ②  $\text{Sum}(\text{Salary}) \rightarrow$  10 rows  
group by deptid

Qn. Can you show me salary compared with department wise salary?

③

1	100	AD	600
2	200	AD	600
3	100	MR	500

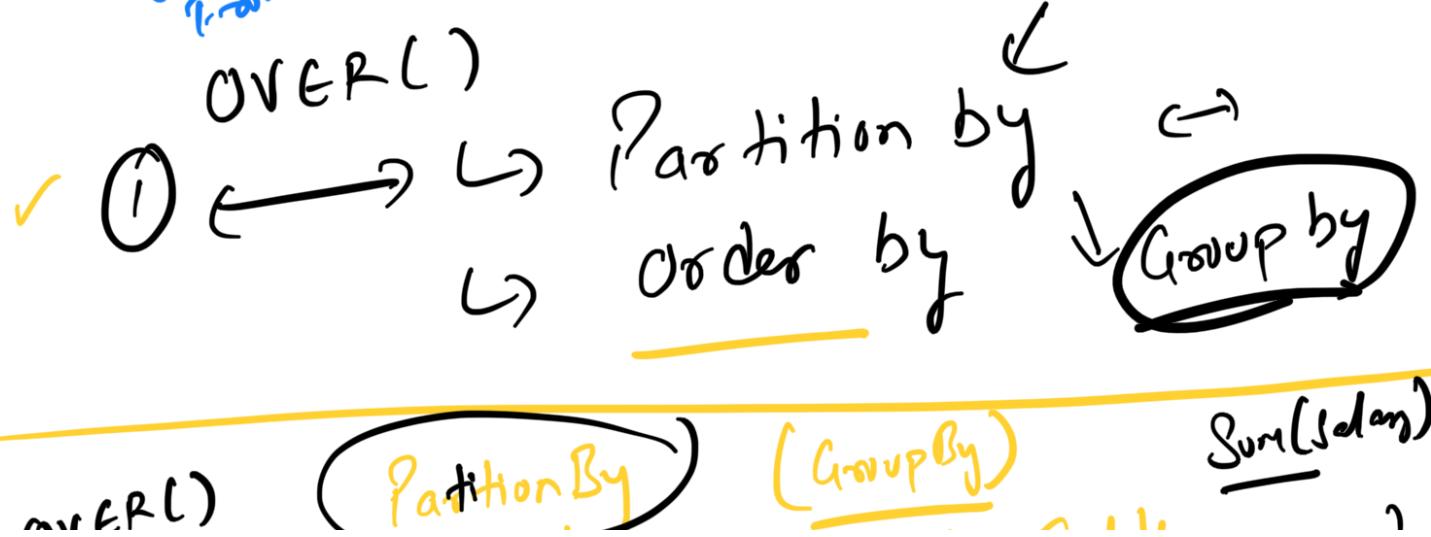
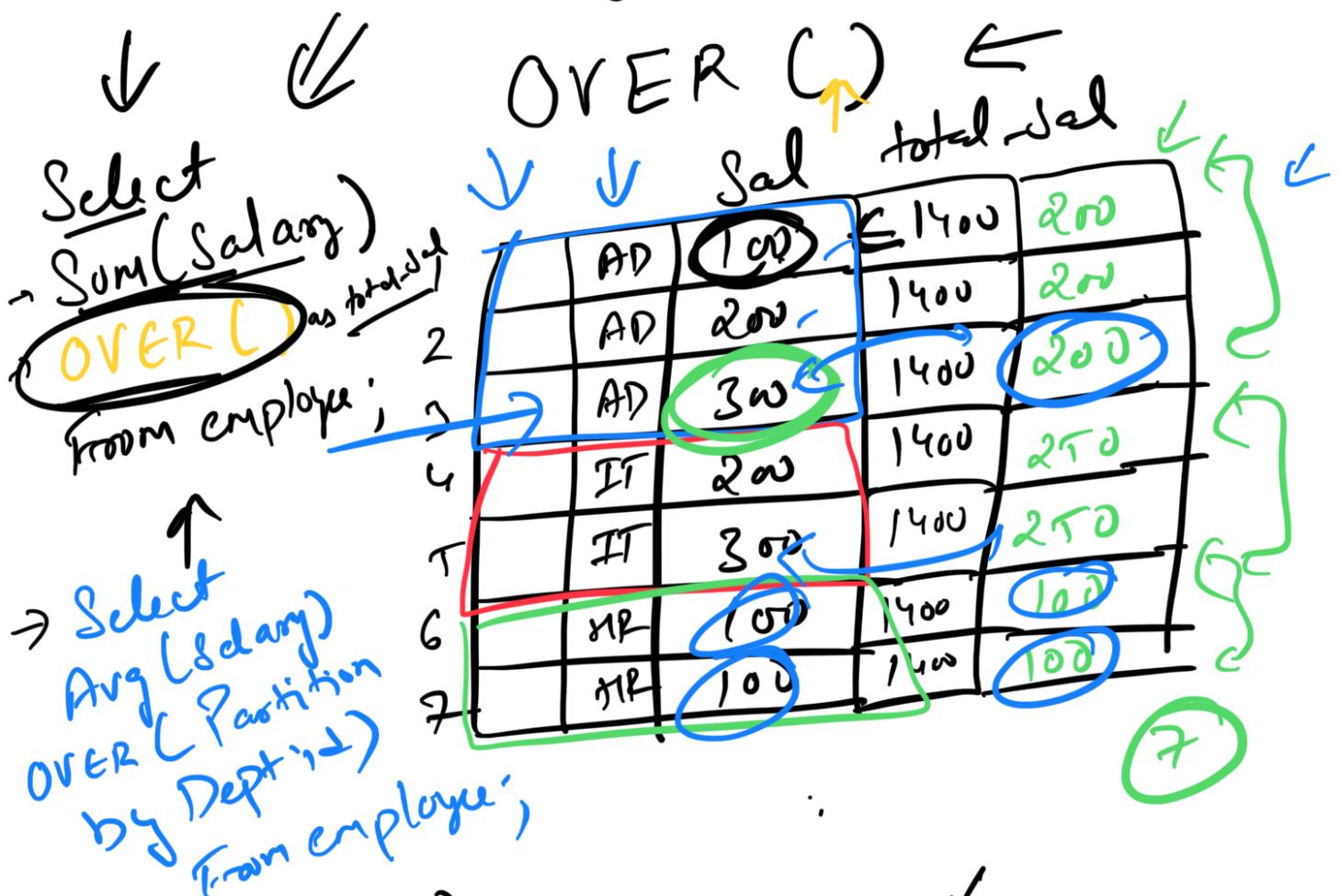
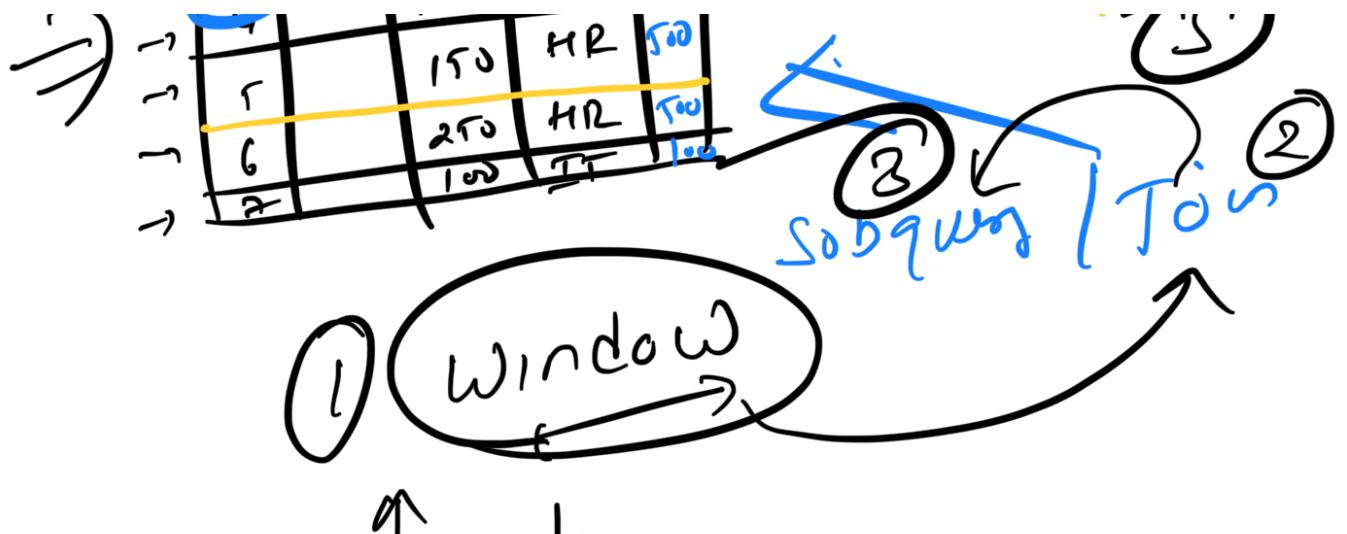
Salary

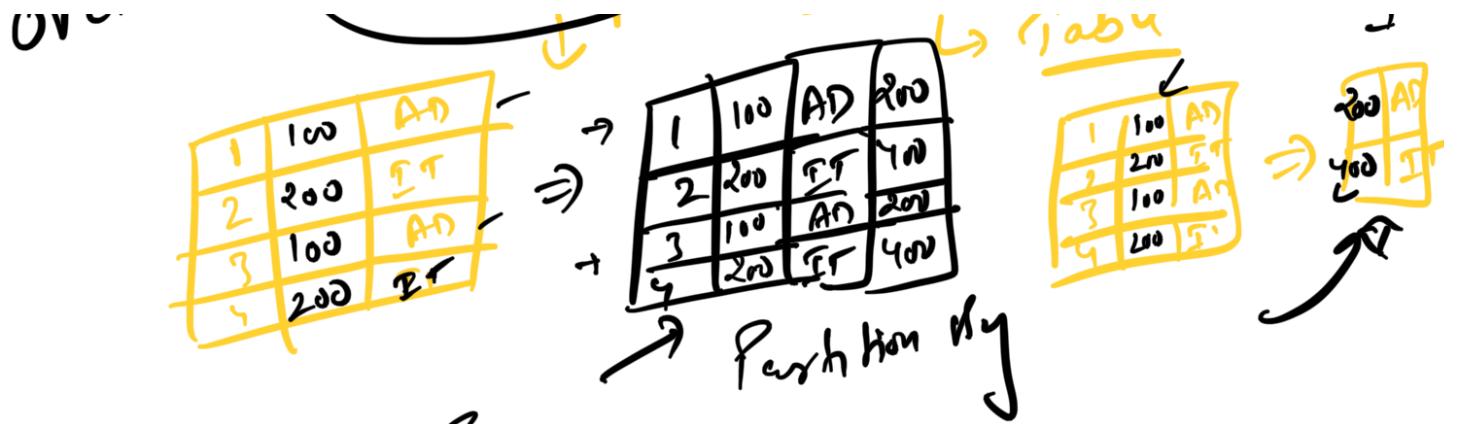
↓

$\text{Sum} = 1200$

$\text{group by} = \boxed{\begin{array}{l} AD \\ HR \\ IT \end{array}}$

AD	600
HR	500
IT	100





- ① Partition By →
- order by → asc, desc

↓

employee      Sale      total\_Sals

employee	Sale	total_Sals
Odin	I 200	900
	II 300	900
	III 900	900
Thor	I 400	1200
	II 300	1200
Thor	III 500	1200

Sum (Sales) OVER (Partition by employee) BY total\_Sals

→ Sum (Sales) OVER ()

↓

Sum (Sales)      over ( Partition By employee  
Order by date ) ← asc

↓      ↓      ↓

date      date      Sale

	Employee	Date	Amount
①	odin	1 Feb	200
	thor	1 Apr	300
②	odin	1 Jan	300
	thor	1 May	400
③	odin	1 June	200
	thor	1 Mar	300

Par

2	1	1	Odin	1 Feb	200	+	C1
2	1	2	Odin	1 Jan	300	+	
2	1	3	Odin	1 June	200	+	

total-Sales Com

↓

1	Odin	1 Jan	300	700	300
2	Odin	1 Feb	200	700	500
3	Odin	1 June	200	700	700

OVER Partition By Employee  
Sum(Sales) Order by date

BO MySQL

Default

BETWEEN UNBOUNDED Preceding  
And Current Row

Frame

1 Sales Partition

C1  
Odin

1	100	100	600
2	200	300	600
?	300	600	

P = 0  
F = 0  
CR = 100  
= 1500

$C_3 \cup (1 \text{ day before})$

$C_3 \cup (1 \text{ day after})$

4	→	400	1000	1100
5	→	500	1500	

$\text{Sum}(\text{Sales})$

over (Partition by employee  
order by date)

$C_P$

(Range  
Between  
1 Preceding  
and  
4 Following)

Between  
1 Preceding  
and  
4 Following

Unbounded Preceding

UP and CP

IP

IP and CP

Sale Result

employee	date	sale	Result
odin		100	0+100 +200+300 100
odin		200	200+100 300+100
odin		300	
odin		100	
Amit		200	
Amit		300	
Amit		400	

$\text{m Sum}(\text{Sales})$  over (P & employee  
min date)

Q2  
 Range between 1P and 3F)

Sum(Sales) OVER (Order by date) as cum-sals  
 $\hookrightarrow$  UP and CP

emp	Sale	date ↴	Cum-Sals
A	200	01 Jan	200
B	400	01 Jan	600
A	300	02 Feb	
B	300	02 Feb	
A	400	01 Mar	
B	500	01 Mar	

Order by date ↴  
 logical ↴  
 RANGE Between UP and CP  
 ROWS ↴

Agg

Physical

order By

Partition By

Analytical functions

① Row-number ↴

↓  
 ename sal Dept-ID

Sum  
Avg  
Min  
Max  
Count

OVER



$\downarrow \text{Row\_Number() OVER (PARTITION BY ...)}$

