Exercice 10

Give the history of the maximum salary
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4 steps procedure

1. Find all temporal points of change
2. Build the intervals of constant value
3. Compute the aggregation on each interval
4. Coalesce the result
Give the history of the maximum salary

Example
Step 1: Find all temporal points of change

Instants(Instant) AS (  
    select distinct E.FromDate
    from EmployeeSalary E
    union
    select distinct E.ToDate
    from EmployeeSalary E ),
Step 2: Build the intervals of constant value

Intervals(FromDate,ToDate) AS ( 
    select distinct I1.Instant, I2.Instant 
    from Instants I1, 
        Instants I2 
    where I1.Instant < I2.Instant 
        and not exists ( select * 
            from Instants I3 
            where I1.Instant < I3.Instant 
                and I3.Instant < I2.Instant ) )
Step 3: Compute the aggregation on each interval

\[
\text{TempMax(SalaryMax, FromDate, ToDate) AS (}
\begin{align*}
\text{select} & \quad \text{max(E.Salary), I.FromDate, I.ToDate} \\
\text{from} & \quad \text{EmployeeSalary E, Intervals I} \\
\text{where} & \quad \text{E.FromDate} \leq \text{I.FromDate} \\
\text{and} & \quad \text{I.ToDate} \leq \text{E.ToDate} \\
\text{group by} & \quad \text{I.FromDate, I.ToDate})
\end{align*}
\]
Step 4: Coalesce the result

```sql
select distinct F.SalaryMax, F.FromDate, L.ToDate
from #TempMax F, #TempMax L
where F.FromDate < L.ToDate and F.SalaryMax = L.SalaryMax
    and not exists (select *
                        from #TempMax M
                        where M.SalaryMax = F.SalaryMax
                        and F.ToDate < M.FromDate and M.FromDate <= L.FromDate
                        and not exists (select *
                                        from #TempMax T1
                                        where T1.SalaryMax = F.SalaryMax
                                        and T1.FromDate < M.FromDate and M.FromDate <= T1.ToDate))
    and not exists (select *
                        from #TempMax T2
                        where T2.SalaryMax = F.SalaryMax
                        and (T2.FromDate < F.FromDate and F.FromDate <= T2.ToDate)
                           or (T2.FromDate <= L.ToDate and L.ToDate < T2.ToDate))
order by F.FromDate
```

WITH
-- First step: Construct intervals during which no salary change occurred
Instants(Instant) AS (  
    select distinct E.FromDate from EmployeeSalary E  
    union select distinct E.ToDate from EmployeeSalary E ),
Intervals(FromDate,ToDate) AS (  
    select distinct I1.Instant, I2.Instant  
    from Instants I1, Instants I2  
    where I1.Instant < I2.Instant  
    and not exists ( select *  
        from Instants I3  
        where I1.Instant < I3.Instant  
        and I3.Instant < I2.Instant ) ),
-- Second step: Compute the maximum salary for these intervals
TempMax(SalaryMax, FromDate, ToDate) AS (  
    select max(E.Salary), I.FromDate, I.ToDate  
    from EmployeeSalary E, Intervals I  
    where E.FromDate <= I.FromDate and I.ToDate <= E.ToDate  
    group by I.FromDate, I.ToDate )
-- Third step: Coalescing the above table
SELECT distinct F.SalaryMax, F.FromDate, L.ToDate  
from TempMax F, TempMax L  
where F.FromDate < L.ToDate and F.SalaryMax = L.SalaryMax  
and not exists ( select *  
    from TempMax M  
    where M.SalaryMax = F.SalaryMax  
    and F.ToDate < M.FromDate and M.FromDate <= L.FromDate  
    and not exists ( select *  
        from TempMax T1  
        where T1.SalaryMax = F.SalaryMax  
        and T1.FromDate < M FromDate  
        and M.FromDate <= T1.ToDate ) )  
    and not exists ( select *  
        from TempMax T2  
        where T2.SalaryMax = F.SalaryMax  
        and ( ( T2.FromDate < F.FromDate and F.FromDate <= T2.ToDate )  
            or ( T2.FromDate <= L.ToDate and L.ToDate < T2.ToDate ) ) )  
order by F.FromDate