이럴때는

SQL을 재작성해서 튜닝하세요. 두번째!

◨ 학습 내용

1. 악성 SQL을 분석하여 왜 튜닝이 필요한지 이해합니다.

2. 튜닝후 SQL이 왜 더 성능이 우수한지 학습합니다.

3. ChatGPT를 나에게 더 최적화 해서 SQL튜닝하는 tip을 배웁니다.

◨ 학습 목표

데이터 분석함수로 SQL을 재작성하여 튜닝할 수 있게 됩니다.

직업별 부서번호별 토탈월급과 부서번호별 관리자 번호별 토탈월급을 출력하시오

출력결과

emp 테이블

EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
7839	KING	PRESIDENT		1981-11-17	5000		10
7698	BLAKE	MANAGER	7839	1981-05-01	2850		30
7782	CLARK	MANAGER	7839	1981-05-09	2450		10
7566	JONES	MANAGER	7839	1981-04-01	2975		20
7654	MARTIN	SALESMAN	7698	1981-09-10	1250	1400	30
7499	ALLEN	SALESMAN	7698	1981-02-11	1600	300	30
7844	TURNER	SALESMAN	7698	1981-08-21	1500	0	30
7900	JAMES	CLERK	7698	1981-12-11	950		30
7521	WARD	SALESMAN	7698	1981-02-23	1250	500	30
7902	FORD	ANALYST	7566	1981-12-11	3000		20
7369	SMITH	CLERK	7902	1980-12-09	800		20
7788	SCOTT	ANALYST	7566	1982-12-22	3000		20
7876	ADAMS	CLERK	7788	1983-01-15	1100		20
7934	MILLER	CLERK	7782	1982-01-11	1300		10

JOB	DEPTNO	MGR	SUM(SAL)
ANALYST	20		6000
CLERK	10		1300
CLERK	20		1900
CLERK	30		950
MANAGER	10		2450
MANAGER	20		2975
MANAGER	30		2850
PRESIDENT	10		5000
SALESMAN	30		5600
	10	7782	1300
	10	7839	2450
	10		5000
	20	7566	6000
	20	7788	1100
	20	7839	2975
	20	7902	800
	30	7698	6550
	30	7839	2850

튜닝전 :

```
select job, deptno, null as mgr, sum(sal)
 from emp
 group by job, deptno
union all
select null as job, deptno, mgr, sum(sal)
 from emp
 group by deptno, mgr
 order by job, deptno, mgr;
```

출력결과

JOB	DEPTNO	MGR	SUM(SAL)
ANALYST	20		6000
CLERK	10		1300
CLERK	20		1900
CLERK	30		950
MANAGER	10		2450
MANAGER	20		2975
MANAGER	30		2850
PRESIDENT	10		5000
SALESMAN	30		5600
	10	7782	1300
	10	7839	2450
	10		5000
	20	7566	6000
	20	7788	1100
	20	7839	2975
	20	7902	800
	30	7698	6550
	30	7839	2850

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튜닝전 :

```sql
select job, deptno, null as mgr, sum(sal)
  from emp
  group by job, deptno

union all

select null as job, deptno, mgr, sum(sal)
  from emp
  group by deptno, mgr
  order by job, deptno, mgr;
```

출력결과

JOB	DEPTNO	MGR	SUM(SAL)
ANALYST	20		6000
CLERK	10		1300
CLERK	20		1900
CLERK	30		950
MANAGER	10		2450
MANAGER	20		2975
MANAGER	30		2850
PRESIDENT	10		5000
SALESMAN	30		5600
	10	7782	1300
	10	7839	2450
	10	7839	5000
	20	7566	6000
	20	7788	1100
	20	7839	2975
	20	7902	800
	30	7698	6550
	30	7839	2850

출력결과

```
select job, deptno, null as mgr, sum(sal)
 from emp
 group by job, deptno

union all

select null as job, deptno, mgr, sum(sal)
 from emp
 group by deptno, mgr
 order by job, deptno, mgr;
```

JOB	DEPTNO	MGR	SUM(SAL)
ANALYST	20		6000
CLERK	10		1300
CLERK	20		1900
CLERK	30		950
MANAGER	10		2450
MANAGER	20		2975
MANAGER	30		2850
PRESIDENT	10		5000
SALESMAN	30		5600
	10	7782	1300
	10	7839	2450
	10	7839	5000
	20	7566	6000
	20	7788	1100
	20	7839	2975
	20	7902	800
	30	7698	6550
	30	7839	2850

emp 테이블을 2번 select 했습니다 !

튜닝전 :

```
select job, deptno, null as mgr, sum(sal)
 from emp
 group by job, deptno
union all
select null as job, deptno, mgr, sum(sal)
 from emp
 group by deptno, mgr
 order by job, deptno, mgr;
```

```
-------------------------------------------------------------------------------------
| Id  | Operation            | Name | Starts | E-Rows | A-Rows |   A-Time   | Buffers |
-------------------------------------------------------------------------------------
|   0 | SELECT STATEMENT     |      |      1 |        |     18 |00:00:00.01 |      12 |
|   1 |  UNION-ALL           |      |      1 |        |     18 |00:00:00.01 |      12 |
|   2 |   HASH GROUP BY      |      |      1 |     11 |      9 |00:00:00.01 |       6 |
|   3 |    TABLE ACCESS FULL | EMP  |      1 |     14 |     14 |00:00:00.01 |       6 |
|   4 |   HASH GROUP BY      |      |      1 |     13 |      9 |00:00:00.01 |       6 |
|   5 |    TABLE ACCESS FULL | EMP  |      1 |     14 |     14 |00:00:00.01 |       6 |
-------------------------------------------------------------------------------------
```

튜닝후 :

```
select job, deptno, mgr, sum(sal)
from emp
group by grouping sets( (job,deptno) , (deptno,mgr) )
order by job, deptno, mgr ;
```

출력결과

emp 테이블을 1번만 select 했습니다 !

JOB	DEPTNO	MGR	SUM(SAL)
ANALYST	20		6000
CLERK	10		1300
CLERK	20		1900
CLERK	30		950
MANAGER	10		2450
MANAGER	20		2975
MANAGER	30		2850
PRESIDENT	10		5000
SALESMAN	30		5600
	10	7782	1300
	10	7839	2450
	10		5000
	20	7566	6000
	20	7788	1100
	20	7839	2975
	20	7902	800
	30	7698	6550
	30	7839	2850

튜닝후 :

```sql
select job, deptno, mgr, sum(sal)
from emp
group by grouping sets( (job,deptno) , (deptno,mgr) )
order by job, deptno, mgr ;
```

Id	Operation	Name	Starts	E-Rows	A-Rows	A-Time	Buffers
0	SELECT STATEMENT		1		18	00:00:00.01	8
1	TEMP TABLE TRANSFORMATION		1		18	00:00:00.01	8
2	LOAD AS SELECT (CURSOR DURATION MEMORY)	SYS_TEMP_0FD9D6638_10E2D0A	1		0	00:00:00.01	7
3	TABLE ACCESS FULL	EMP	1	14	14	00:00:00.01	6
4	LOAD AS SELECT (CURSOR DURATION MEMORY)	SYS_TEMP_0FD9D6639_10E2D0A	1		0	00:00:00.01	0
5	HASH GROUP BY		1	13	9	00:00:00.01	0
6	TABLE ACCESS FULL	SYS_TEMP_0FD9D6638_10E2D0A	1	14	14	00:00:00.01	0
7	LOAD AS SELECT (CURSOR DURATION MEMORY)	SYS_TEMP_0FD9D6639_10E2D0A	1		0	00:00:00.01	0
8	HASH GROUP BY		1	11	9	00:00:00.01	0
9	TABLE ACCESS FULL	SYS_TEMP_0FD9D6638_10E2D0A	1	14	14	00:00:00.01	0
10	SORT ORDER BY		1	14	18	00:00:00.01	0
11	VIEW		1	13	18	00:00:00.01	0
12	TABLE ACCESS FULL	SYS_TEMP_0FD9D6639_10E2D0A	1	13	18	00:00:00.01	0

ChatGPT 를 통해서 쉽게 SQL 튜닝하기