02. SELECT

목차

1. SQL 명령어 분류 와 SELECT

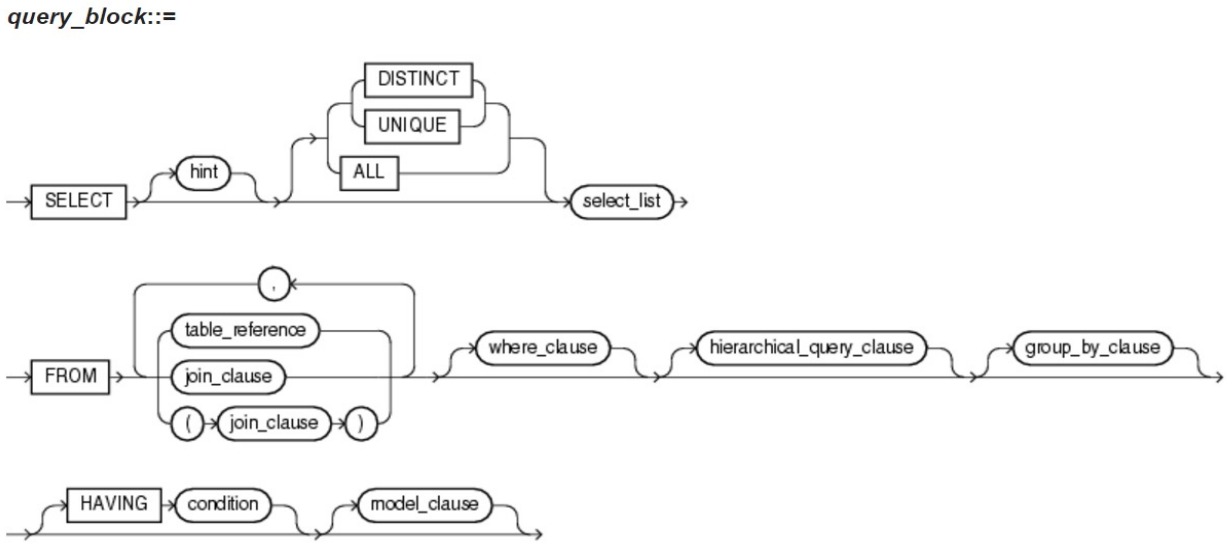
분 류	종 류
QUERY	SELECT(데이터 조회)
DML(Data Manipulation Language)	INSERT(데이터 입력), UPDATE(데이터 수정), DELETE(데이터 삭제)
TCL(Transaction Control Language)	COMMIT(트랜잭션 저장),ROLLBACK(트랜잭션 취소), SAVEPOINT(트랜잭션 임시 저장점)
DDL(Data Definition Language)	CREATE(데이터베이스 Object 생성), ALTER(데이터타베이스 Object 변경), DROP(데이터타베이스 Object 삭제)
DCL(Data Control Language)	GRANT(권한 부여),REVOKE(권한 취소)

Google →

oracle select syntax 12c

→ SELECT(클릭)

→ SYNTAX(클릭)



Description of the illustration query_block.gif

2. SELECT LIST

▣ SELECT LIST

의미: SELECT 와 FROM사이를 SELECT LIST
역할: 원하는 COLUMN(즉 속성)만 조회(Projection)

① SELECT * FROM EMP;
② SELECT EMPNO,ENAME,JOB,MGR,HIREDATE,SAL,COMM,DEPTNO FROM EMP;
③ SELECT EMPNO, ENAME, JOB, SAL FROM EMP;
④ SELECT SAL, JOB, EMPNO, ENAME FROM EMP; → 순서 변경가능
⑤ SELECT EMPNO, EMPNO, EMPNO, ENAME, JOB, SAL FROM EMP;
⑥ SELECT EMPNO, SAL, 8, 'ORACLE' FROM EMP;

* 컬럼의 조회순서를 임의로 변경이 가능
* 하나의 컬럼을 여러 번 조회 가능
* 8: 숫자 데이터, 'ORACLE' :문자 데이터
  존재하지 않는 컬럼을 만들어서 조회 가능

	EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
1	7369	SMITH	CLERK	7902	80/12/17	800	(null)	20
2	7499	ALLEN	SALESMAN	7698	81/02/20	1600	300	30
3	7521	WARD	SALESMAN	7698	81/02/22	1250	500	30
4	7566	JONES	MANAGER	7839	81/04/02	2975	(null)	20
5	7654	MARTIN	SALESMAN	7698	81/09/28	1250	1400	30
6	7698	BLAKE	MANAGER	7839	81/05/01	2850	(null)	30
7	7782	CLARK	MANAGER	7839	81/06/09	2450	(null)	10
8	7788	SCOTT	ANALYST	7566	87/04/19	3000	(null)	20
9	7839	KING	PRESIDENT	(null)	81/11/17	5000	(null)	10
10	7844	TURNER	SALESMAN	7698	81/09/08	1500	0	30
11	7876	ADAMS	CLERK	7788	87/05/23	1100	(null)	20
12	7900	JAMES	CLERK	7698	81/12/03	950	(null)	30
13	7902	FORD	ANALYST	7566	81/12/03	3000	(null)	20
14	7934	MILLER	CLERK	7782	82/01/23	1300	(null)	10

2. SELECT LIST

▣ 산술 연산자

* SQL 문장안에서 사칙연산(*, /, +, -)의 의미는?
* CLIENT/SERVER적 관점에서는?
* NUMBER 와 DATE 자료형에 적용한다.
* 연산자 우선순위 : 수학과 동일하다 ???

① ( ) ② NOT ③ 비교연산자 , SQL연산자 ④ AND ⑤ OR ⑥ 산술연산자(?) * ,/ , + , -

① SELECT ENAME,SAL,SAL*12,COMM,COMM+300 FROM EMP;

② SELECT SAL, SAL+300*12,(SAL+300)*12 FROM EMP;

▣ **Alias 종류: Table Alias, Column Alias**

Table Alias용도: 일반적으로는 SELF JOIN 시에 사용

ex) 사용방법: SELECT E.EMPNO,E.ENAME FROM EMP E;

Column Alias 용도: Column Heading(컬럼 레이블 변경?)을 의미있는 다른 이름으로 재정의

① COLUMN의 의미 명료성 ②DB 프로그램 개발시 Code의 명료성(계산식에서 유용)

③ SELECT ENAME,SAL+200 bonus,SAL*12 as annual_SAL, COMM, COMM+300 "Special Bonus" FROM EMP;

④ SELECT ENAME, COMM+300 AS "Special Bonus" FROM EMP;

⑤ SELECT ENAME, COMM+300 보너스 FROM EMP;

2. SELECT LIST

▣ (문자열) 합성 연산자

① SELECT ENAME||JOB FROM EMP;

② SELECT DNAME||' 부서는 '||LOC||' 지역에 위치합니다.' as LOC FROM DEPT;

③ SELECT ENAME,SAL,SAL*100, SAL||'00',to_char(SAL)||'00' FROM EMP;

▣ DUAL

정의: Dummy Table
sys user 소유, 1개의 row, 1개의 column을 가진 작고 가벼운 테이블,
용도:실제 테이블로부터 데이터를 가져오는 것이 아닌 function, calculation을 수행하기 위해서 사용

④ Desc dual // desc dual , DESC DUAL
SELECT * FROM dual;

⑤ SELECT sysdate FROM dual;

⑥ SELECT 143475*127363, to_char(143475*127363,'999,999,999,999') FROM dual;

3. WHERE

WHERE

의미:조건절

역할:원하는 ROW(레코드)만 조회(Selection)

① SELECT * FROM EMP WHERE DEPTNO = 10;
② SELECT EMPNO,ENAME,JOB,SAL FROM EMP WHERE SAL > 2000;
③ SELECT SALGRADE,SAL,EMPNO,ENAME FROM EMP WHERE DEPTNO = 10 AND SAL > 2000;
SELECT DEPTNO,SAL,EMPNO,ENAME FROM EMP WHERE DEPTNO = 10 AND SAL > 2000;
SELECT DEPTNO,SAL,EMPNO,ENAME FROM EMP WHERE DEPTNO = 10 OR SAL > 2000;
④ SELECT DEPTNO,ENAME,JOB FROM EMP WHERE JOB = 'manager';
⑤ SELECT DEPTNO,ENAME,JOB FROM EMP WHERE 1=1;
⑥ SELECT DEPTNO,ENAME,JOB FROM EMP WHERE 1=2;

	EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
1	7369	SMITH	CLERK	7902	80/12/17	800	(null)	20
2	7499	ALLEN	SALESMAN	7698	81/02/20	1600	300	30
3	7521	WARD	SALESMAN	7698	81/02/22	1250	500	30
4	7566	JONES	MANAGER	7839	81/04/02	2975	(null)	20
5	7654	MARTIN	SALESMAN	7698	81/09/28	1250	1400	30
6	7698	BLAKE	MANAGER	7839	81/05/01	2850	(null)	30
7	7782	CLARK	MANAGER	7839	81/06/09	2450	(null)	10
8	7788	SCOTT	ANALYST	7566	87/04/19	3000	(null)	20
9	7839	KING	PRESIDENT	(null)	81/11/17	5000	(null)	10
10	7844	TURNER	SALESMAN	7698	81/09/08	1500	0	30
11	7876	ADAMS	CLERK	7788	87/05/23	1100	(null)	20
12	7900	JAMES	CLERK	7698	81/12/03	950	(null)	30
13	7902	FORD	ANALYST	7566	81/12/03	3000	(null)	20
14	7934	MILLER	CLERK	7782	82/01/23	1300	(null)	10

4. ORDER BY

[역할] 정렬(SORTING)
[기준] 정렬시 값 비교기준

숫자	~ 작은수/큰수	EX) 123 < 456
문자	~ 알파벳 순서(ASCII)	EX) 'SCOTT' < 'T'
날짜	~ 숫자와 동일	EX) '2003/11/16' > '19990916'
NULL	~ 가장 큰 값으로 간주	

[방향] ASC ~ 오름차순(ASCENDING ORDER) , DEFAULT
DESC ~ 내림차순(DESCENDING ORDER)

```
SELECT DEPTNO,ENAME,SAL,HIREDATE FROM EMP ORDER BY ENAME;
SELECT DEPTNO,ENAME,SAL,HIREDATE FROM EMP ORDER BY SAL;
SELECT DEPTNO,ENAME,SAL,HIREDATE FROM EMP ORDER BY SAL ASC;
SELECT DEPTNO,ENAME,SAL,HIREDATE FROM EMP ORDER BY SAL DESC;
SELECT DEPTNO,JOB,ENAME FROM EMP ORDER BY DEPTNO;
SELECT DEPTNO,JOB,ENAME FROM EMP ORDER BY DEPTNO,JOB;
SELECT DEPTNO,JOB,ENAME FROM EMP ORDER BY DEPTNO,JOB desc;
```

	EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
1	7369	SMITH	CLERK	7902	80/12/17	800	(null)	20
2	7499	ALLEN	SALESMAN	7698	81/02/20	1600	300	30
3	7521	WARD	SALESMAN	7698	81/02/22	1250	500	30
4	7566	JONES	MANAGER	7839	81/04/02	2975	(null)	20
5	7654	MARTIN	SALESMAN	7698	81/09/28	1250	1400	30
6	7698	BLAKE	MANAGER	7839	81/05/01	2850	(null)	30
7	7782	CLARK	MANAGER	7839	81/06/09	2450	(null)	10
8	7788	SCOTT	ANALYST	7566	87/04/19	3000	(null)	20
9	7839	KING	PRESIDENT	(null)	81/11/17	5000	(null)	10
10	7844	TURNER	SALESMAN	7698	81/09/08	1500	0	30
11	7876	ADAMS	CLERK	7788	87/05/23	1100	(null)	20
12	7900	JAMES	CLERK	7698	81/12/03	950	(null)	30
13	7902	FORD	ANALYST	7566	81/12/03	3000	(null)	20
14	7934	MILLER	CLERK	7782	82/01/23	1300	(null)	10

5. DISTINCT , FUNCTION

DISTINCT [역할] : 중복된 데이터를 필터링하여 조회(SELECT)

① SELECT JOB FROM EMP;
② SELECT DISTINCT JOB FROM EMP;
③ SELECT DISTINCT DEPTNO, JOB FROM EMP;
④ SELECT DISTINCT DEPTNO, JOB FROM EMP ORDER BY DEPTNO;

	DEPTNO	JOB
1	20	CLERK
2	30	SALESMAN
3	20	MANAGER
4	30	CLERK
5	10	PRESIDENT
6	30	MANAGER
7	10	CLERK
8	10	MANAGER
9	20	ANALYST

FUNCTION [역할] : 입력값(Input Data)을 기반으로 특정 연산을 수행하여
결과값(Output Data) 값을 리턴(Return)하는 단위 기능 모듈(Module)

SELECT ENAME,LENGTH(ENAME),UPPER(ENAME),LOWER(ENAME) FROM EMP;
⑤ SELECT COUNT(*),COUNT(SAL),SUM(SAL),AVG(SAL),MIN(SAL),MAX(SAL) FROM EMP;

<table>
<tr><td rowspan="6">ORACLE 제공 함수</td><td rowspan="5">단일행 함수</td><td>문자 함수</td></tr>
<tr><td>숫자 함수</td></tr>
<tr><td>날짜 함수</td></tr>
<tr><td>형변환 함수</td></tr>
<tr><td>기타 함수</td></tr>
<tr><td colspan="2">그룹행 함수</td></tr>
<tr><td>사용자 정의 함수</td><td colspan="2">PL/SQL로 사용자가 작성</td></tr>
</table>

6. GROUP BY , HAVING

GROUP BY [역할] : 기준 컬럼으로 데이터를 그룹핑

① SELECT DEPTNO,COUNT(*) FROM SCOTT.EMP GROUP BY DEPTNO;
SELECT DEPTNO,AVG(SAL) ,SUM(SAL) FROM EMP GROUP BY DEPTNO;
SELECT DEPTNO,AVG(SAL) ,SUM(SAL) FROM EMP
GROUP BY DEPTNO
ORDER BY DEPTNO;

	DEPTNO	AVG(SAL)	SUM(SAL)
1	30	1566.6666...	9400
2	20	2175	10875
3	10	2916.6666...	8750

② SELECT DEPTNO,ROUND(AVG(SAL),1) ,SUM(SAL) FROM EMP
GROUP BY DEPTNO
ORDER BY DEPTNO;

③ [과제] 부서별 최대 ,최소 급여를 조회 하십시요

HAVING [역할] : GROUP BY 결과 데이터에 대한 조건절

⑤ SELECT DEPTNO,ROUND(AVG(SAL),1) ,SUM(SAL) FROM EMP
GROUP BY DEPTNO
HAVING SUM(SAL) >= 9000
ORDER BY DEPTNO DESC;

	DEPTNO	AVG(SAL)	SUM(SAL)
1	30	1566.6666...	9400
2	20	2175	10875
3	10	2916.6666...	8750

7. NULL

[정의] 값이 정의되지 않은, 존재하지 않는(unassigned) → 데이터가 없는(unavailable, unknown,inapplicable)
not the same as zero or a blank space

[주의]

① 연산불가 ② 비교불가 ③ 적용불가

[함수] ① Single Row함수 ② Group Row 함수 ③ Null 무시함수

	EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
1	7369	SMITH	CLERK	7902	80/12/17	800	(null)	20
2	7499	ALLEN	SALESMAN	7698	81/02/20	1600	300	30
3	7521	WARD	SALESMAN	7698	81/02/22	1250	500	30
4	7566	JONES	MANAGER	7839	81/04/02	2975	(null)	20
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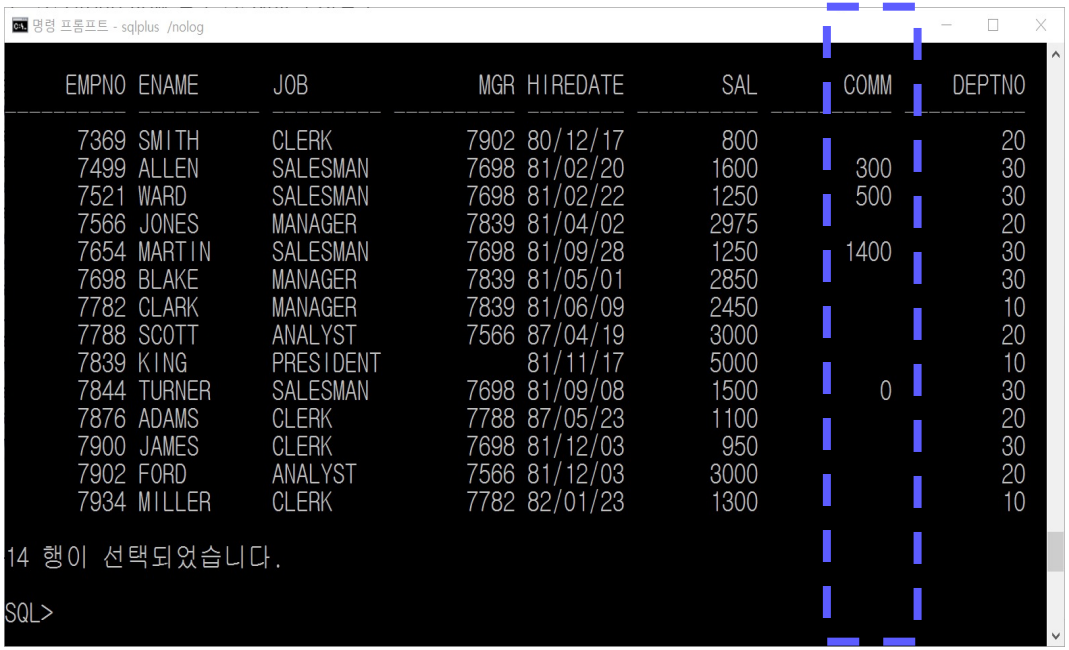
8	7788	SCOTT	ANALYST	7566	87/04/19	3000	(null)	20
9	7839	KING	PRESIDENT	(null)	81/11/17	5000	(null)	10
10	7844	TURNER	SALESMAN	7698	81/09/08	1500	0	30
11	7876	ADAMS	CLERK	7788	87/05/23	1100	(null)	20
12	7900	JAMES	CLERK	7698	81/12/03	950	(null)	30
13	7902	FORD	ANALYST	7566	81/12/03	3000	(null)	20
14	7934	MILLER	CLERK	7782	82/01/23	1300	(null)	10



7. NULL

① **연산불가(NULL 값 연산)**

```
SELECT 300+400, 300+NULL, 300/NULL FROM dual;          // NULL 연산 결과는?
SELECT ENAME,SAL,COMM,COMM + SAL*0.3 as bonus FROM EMP;  // 실수하기 쉬운...해결책은....?
```

② **비교불가(NULL 값 비교)**

```
SELECT ENAME,SAL,COMM FROM EMP WHERE SAL  > 1000;   // null이 없는 column과 비교
SELECT ENAME,SAL,COMM FROM EMP WHERE COMM > -1;     // null이 있는 column과 비교
SELECT ENAME,SAL,COMM FROM EMP WHERE COMM = null;

SELECT ENAME,SAL,COMM FROM EMP WHERE COMM is null;
SELECT ENAME,SAL,COMM FROM EMP WHERE COMM is not null;
```

③ **적용불가(NULL값 함수에 적용)**

```
SELECT ENAME,length(ENAME),COMM,length(COMM) FROM EMP;.
```

④ **NULL 제어 함수**

```
SELECT  nvl(COMM,-1), decode(COMM,null,-999,COMM)  FROM EMP
```

[과제] 커미션(COMM)을 받는 사원수, 커미션 평균을 조회 하십시요

8. DECODE, CASE

① SELECT DEPTNO,ENAME,SAL,
DECODE(DEPTNO,10,0.1,20,0.2,30,0.3,0.5) * SAL AS BONUS
FROM EMP ORDER BY DEPTNO;

② SELECT DEPTNO,ENAME,SAL,
DECODE(GREATEST(SAL,5000),SAL,'HIGH',
DECODE(GREATEST(SAL,2500),SAL,'MID','LOW'))
FROM EMP
ORDER BY DEPTNO; -- SAL 대신 COMM으로 대체해서 실습해볼것

③ SELECT DEPTNO,ENAME,SAL,
CASE WHEN SAL >= 5000 THEN 'HIGH'
WHEN SAL >= 2500 THEN 'MID'
WHEN SAL < 2500 THEN 'LOW'
ELSE
'UNKNOWN'
END
FROM EMP
ORDER BY DEPTNO;

④ **NULL 제어 함수**
SELECT nvl(COMM,-1), decode(COMM,null,-999,COMM) FROM EMP

8. DECODE, CASE

➔ 노가다 SQL Coding

```
if($con_faxno == "c" && $con_telno == "p")  {
   $loofInsertSql = "insert into $addr_u (ADDRESS_SEQ,USERID,NAME,EMAIL,".
                    " P_HTELNO,P_TELNO,C_TELNO,P_FAXNO,C_FAXNO,CON_TELNO, CON_FAXNO)".
                    " value (ADDRESS_SEQ.NEXTVAL,'$addid','$name','$email',".
                    " $htelno,$telno,$faxno)";    }
   if($con_faxno == "p" && $con_telno == "c")  {
   $loofInsertSql = "insert into $addr_u (ADDRESS_SEQ,USERID,NAME,EMAIL,".
                    " P_HTELNO,P_FAXNO,C_TELNO,CON_TELNO, CON_FAXNO)".
                    " value (ADDRESS_SEQ.NEXTVAL,'$addid','$name','$email',".
                    " $htelno,$telno,$faxno)";  }
  if($con_faxno == "c" && $con_telno == "c")  {
   $loofInsertSql = "insert into $addr_u (ADDRESS_SEQ,USERID,NAME,EMAIL,".
                    " P_HTELNO,C_TELNO,C_FAXNO,CON_TELNO, CON_FAXNO)".
                    " value (ADDRESS_SEQ.NEXTVAL,'$addid','$name','$email',".
                    " $htelno,$telno,$faxno)";  }
  if($con_faxno == "p" && $con_telno == "p")  {
   $loofInsertSql = "insert into $addr_u (ADDRESS_SEQ,USERID,NAME,EMAIL,".
                    " P_HTELNO,P_TELNO,P_FAXNO,CON_TELNO, CON_FAXNO)".
                    " value (ADDRESS_SEQ.NEXTVAL,'$addid','$name','$email',".
                    " $htelno,$telno,$faxno,'$','$con_faxno')";  }
  echo $loofInsertSql;
  $db->execute($loofInsertSql);
 }
```

➔ **Decode를 사용한 SQL coding**

```
$loofInsertSql = "insert into $addr_u (ADDRESS_SEQ,USERID,NAME,EMAIL,".
                 " P_HTELNO,P_TELNO,C_TELNO,P_FAXNO,C_FAXNO,CON_TELNO, CON_FAXNO)".
                 " values (ADDRESS_SEQ.NEXTVAL,'$addid','$name','$email',".
                 " '$htelno',decode('$con_telno','p',decode('$telno','N',null,'$telno'),null),".
                 " decode('$con_telno','c',decode('$telno','N',null,'$telno'),null),".
                 " decode('$con_faxno','p',decode('$telno','N',null,'$faxno'),null),".
                 "
decode('$con_faxno','c',decode('$telno','N',null,'$faxno'),null),'$con_telno','$con_faxno')";
```

9. ROWNUM

▣ ROWNUM

① SELECT ROWNUM,ENAME,DEPTNO,SAL FROM EMP;

② SELECT ROWNUM,ENAME,DEPTNO,SAL FROM EMP ORDER BY DEPTNO,SAL;

③ SELECT ROWNUM,ENAME,DEPTNO,SAL FROM EMP WHERE DEPTNO IN (10,20) ORDER BY DEPTNO,SAL;
** 실행순서 ROWNUM or ORDER BY?

④ SELECT ENAME,DEPTNO,SAL FROM EMP WHERE ROWNUM = 1;
⑤ SELECT ENAME,DEPTNO,SAL FROM EMP WHERE ROWNUM = 5;
⑥ SELECT ENAME,DEPTNO,SAL FROM EMP WHERE ROWNUM > 5;

⑦ SELECT ENAME,DEPTNO,SAL FROM EMP WHERE ROWNUM <= 5;
⑧ SELECT ENAME,DEPTNO,SAL FROM EMP WHERE ROWNUM < 5;

과제

- SubQuery를 공부한후 최상위 급여자 5명을 조회하는 SQL문을 작성하시요

10. 논리연산자 AND OR NOT

① SELECT ENAME,JOB,SAL,DEPTNO FROM EMP WHERE DEPTNO = 10 AND SAL > 2000;
② SELECT ENAME,JOB,SAL,DEPTNO FROM EMP WHERE DEPTNO = 10 OR SAL > 2000;
③ SELECT ENAME,JOB,SAL,DEPTNO FROM EMP WHERE SAL > 2000 OR SAL > 2000;
④ SELECT ENAME,JOB,SAL,DEPTNO FROM EMP
WHERE DEPTNO = 10 AND SAL > 2000 OR JOB = 'CLERK';
⑤ SELECT ENAME,JOB,SAL,DEPTNO FROM EMP
WHERE (DEPTNO = 10 AND SAL > 2000) OR JOB = 'CLERK';
⑥ SELECT ENAME,JOB,SAL,DEPTNO FROM EMP
WHERE DEPTNO = 10 AND (SAL > 2000 OR JOB = 'CLERK');

⑦ SELECT EMPNO,ENAME, JOB,SAL,DEPTNO FROM EMP WHERE DEPTNO = 10 AND SAL > 2000;
⑧ SELECT ENAME,JOB,SAL FROM EMP WHERE SAL > 2000;
⑨ SELECT ENAME,JOB,SAL FROM EMP WHERE JOB != 'CLERK';
⑩ SELECT ENAME,JOB,SAL FROM EMP WHERE JOB NOT IN('CLERK','MANAGER');

⑪ SELECT ENAME,JOB,SAL FROM EMP WHERE SAL > 2000 OR JOB = 'CLERK';
⑫ SELECT ENAME,JOB,SAL FROM EMP WHERE SAL > 2000 AND JOB = 'CLERK';
⑬ SELECT ENAME,JOB,SAL FROM EMP WHERE SAL > 2000 OR SAL > 2000;

⑭ SELECT ENAME,JOB,SAL FROM EMP WHERE SAL > 2000 or JOB = 'CLERK' and DEPTNO >= 20; -- 우선순위?
⑮ SELECT ENAME,JOB,SAL FROM EMP WHERE SAL > 2000 or (JOB = 'CLERK' and DEPTNO >= 20);
SELECT ENAME,JOB,SAL FROM EMP WHERE (SAL > 2000 or JOB = 'CLERK') and DEPTNO >= 20;

11. SQL 연산자

▣ BETWEEN

① SELECT EMPNO,ENAME,SAL FROM EMP WHERE SAL between 1000 and 2000; -- 숫자,범위
② SELECT EMPNO,ENAME,SAL FROM EMP WHERE SAL >= 1000 and SAL <= 2000; -- 차이점?
③ SELECT EMPNO,ENAME,HIREDATE,SAL FROM EMP WHERE SAL between 2000 and 1000; -- 이유는?

④ SELECT EMPNO,ENAME,HIREDATE,SAL FROM EMP WHERE ENAME between 'C' and 'K'; -- 문자
⑤ SELECT EMPNO,HIREDATE,SAL FROM EMP WHERE HIREDATE between '81/02/20' and '82/12/09'; -- 날짜

⑥ SELECT ENAME,HIREDATE FROM EMP
WHERE HIREDATE between to_date('81/02/20','yy/mm/dd') and to_date('82/12/09','yy/mm/dd');

▣ IN

⑦ SELECT EMPNO,ENAME,JOB FROM EMP WHERE EMPNO in (7369,7521,7654); -- 숫자
⑧ SELECT EMPNO,ENAME,JOB FROM EMP WHERE EMPNO = 7369 or EMPNO = 7521 or EMPNO=7654;

⑨ SELECT EMPNO,ENAME,JOB FROM EMP WHERE JOB in ('clerk','manager'); -- 문자
⑩ SELECT EMPNO,ENAME,HIREDATE FROM EMP WHERE HIREDATE in ('81/05/01','81/02/20') -- 날짜
⑪ SELECT EMPNO,ENAME,JOB,DEPTNO FROM EMP
WHERE (JOB,DEPTNO) in (('MANAGER',20),('CLERK',20));

11. SQL 연산자

▣ LIKE

정의: 문자 패턴 매칭 연산자, 정확한 값을 몰라도 찾을수 있는 EX) 김서방 찾기 !!

% : 0개 이상의 모든문자

_ : 1개의 모든문자, 위치가의미를 가짐.

```
① SELECT ENAME FROM EMP WHERE ENAME like 'A%';                    -- pattern matching
② SELECT ENAME FROM EMP WHERE ENAME like '_A%';
③ SELECT ENAME FROM EMP WHERE ENAME like '%L%E%';
④ SELECT ENAME FROM EMP WHERE ENAME like '%LE%';
⑤ SELECT ENAME FROM EMP WHERE ENAME like '%A%';
⑥ SELECT ENAME FROM EMP WHERE ENAME NOT like '%A%';

⑦ SELECT ENAME,HIREDATE FROM EMP WHERE HIREDATE like '81%';       --? 날짜
⑧ SELECT ENAME,SAL FROM EMP WHERE SAL like 2%;                    -- ? 숫자
⑨ SELECT ENAME,SAL FROM EMP WHERE SAL like '2%';                  -- ? 숫자 like 문자
```

12. 함수

▣ ORACLE DEFINED FUNCTION

① SINGLE ROW FUNCTION

문자함수
숫자함수
날짜함수
변환함수(DATA TYPE CONVERSION)
기타함수

② GROUP ROW FUNCTION

▣ USER DEFINED FUNCTION (by PL/SQL)

12. 함수

▣ SINGLE ROW FUNCTION

Single Row function 정의 : 1개의 row에 적용되고 1row당 1개의 결과를 return한다.

사용되는 위치 : select list , where, order by,group by

① SELECT ENAME,EMPNO,SAL,COMM FROM EMP; -- 14건

② SELECT ENAME,LOWER(ENAME),UPPER(LOWER(ENAME)),LENGTH(ENAME), -- 14건
ABS(SAL-EMPNO),COMM
FROM EMP;

③ SELECT ENAME,substr(ENAME,1,3) FROM EMP
WHERE HIREDATE between to_date('81/01/01','RR/MM/DD') and to_date('82/12/31','RR/MM/DD')
ORDER BY by length(ENAME);

▣ GROUP ROW FUNCTION

Group Row function 정의: N(여러개) 개의 row에 적용되고 그룹당 1개의 결과를 return한다.

④ SELECT AVG(SAL),SUM(SAL),SUM(COMM),COUNT(*) FROM EMP; -- 1건

⑤ SELECT DEPTNO,COUNT(*),SUM(SAL),AVG(SAL) FROM EMP -- GROUPING
GROUP BY DEPTNO;

⑥ SELECT DEPTNO,JOB,COUNT(*),SUM(SAL),AVG(SAL) FROM EMP
GROUP BY DEPTNO,JOB;

12. 함수 – 단일행 함수

▣ 문자 함수

① SELECT ENAME, lower(ENAME) ,upper(ENAME), initcap(ENAME) FROM EMP;

② SELECT ENAME, substr(ENAME,1,3), substr(ENAME,4), substr(ENAME,-3,2) FROM EMP;

③ SELECT ENAME, instr(ENAME,'A'), instr(ENAME,'A',2), instr(ENAME,'A',1,2) FROM EMP; --문자위치

④ SELECT ENAME, rpad(ENAME,10,'*'), lpad(ENAME,10,'+') FROM EMP;

⑤ SELECT ENAME,REPLACE(ENAME,'S','s') FROM EMP;

⑥ SELECT ENAME, concat(ENAME,JOB), ENAME||JOB FROM EMP;

⑦ SELECT ltrim(' 대한민국 '), rtrim(' 대한민국 '), trim(' 대한민국 ') FROM dual;

⑧ SELECT length('abcd'), substr('abcd',2,2), length('대한민국'), substr('대한민국',2,2) FROM dual;

⑨ SELECT lengthb('abcd'), substrb('abcd',2,2), lengthb('대한민국'), substrb('대한민국',2,2) FROM dual;

⑩ SELECT length('abcd'), vsize('abcd'), length('대한민국'), vsize('대한민국') FROM dual;

12. 함수 – 단일행 함수

▣ 숫자 함수

① SELECT round(45.923,2), round(45.923,1), round(45.923,0), round(45.923), round(45.923,-1) FROM dual;

② SELECT trunc(45.923,2), trunc(45.923,1), trunc(45.923,0), trunc(45.923), trunc(45.923,-1) FROM dual;

③ SELECT mod(100,3), mod(100,2) FROM dual; -- 나머지

④ SELECT ENAME,SAL,SAL*0.053 as tax,round(SAL*0.053,0) as r_tax FROM EMP; --급여의5.3%세금,원단위

⑤ SELECT CEIL(-45.594),CEIL(-45.294),CEIL(45.294),
ROUND(-45.594),ROUND(-45.294),ROUND(45.594) FROM DUAL; -- 절대값연산

⑥ SELECT FLOOR(45.245),FLOOR(-45.245),FLOOR(45.545),FLOOR(-45.545) FROM DUAL;

▣ DATE type

DATE DATA TYPE은 연산이 가능하다.

⑦ SELECT sysdate,sysdate + 7, sysdate –2, sysdate + 1/24 FROM dual; -- sysdate + 1/24 ?

⑧ SELECT deptno,ename, trunc(sysdate – hiredate) as work_day FROM emp ORDER BY deptno,work_day DESC;

DATE는 날짜와 시간 정보를 가지고 있다.

⑨ SELECT ename,sysdate,hiredate FROM emp; -- 왜 날짜만 보이고 시간은 보이지 않는가?

⑩ SELECT ename,to_char(sysdate,'YYYY-MM-DD:HH24:MI:SS'),to_char(hiredate,'YYYY-MM-DD:HH24:MI:SS')
FROM emp;

⑪ ALTER SESSION SET NLS_DATE_FORMAT = 'YYYY-MM-DD:HH24:MI:SS';
SELECT ename,sysdate,hiredate FROM emp;
SELECT SYSDATE FROM DUAL;

12. 함수 – 단일행 함수

▣ 날짜 함수

① SELECT HIREDATE,months_between(sysdate,HIREDATE),months_between(HIREDATE,sysdate) FROM EMP;
-- 찌꺼기 일자 처리: trunc(months_between(sysdate,HIREDATE))

② SELECT sysdate, add_months(sysdate,3), add_months(sysdate,-1) FROM dual;

③ SELECT sysdate, last_day(sysdate), next_day(sysdate,'일요일'), next_day(sysdate,2) FROM dual;

④ SELECT sysdate,round(sysdate,'YEAR'),round(sysdate,'MONTH'),round(sysdate,'DAY'),round(sysdate)
FROM dual;
-- 06월30일전/후 , 15일전/후 ,수요일 전/후 , 전은 = 의 의미를 포함하고 있다.
-- 11시59분 일때는 오늘 12:00은 내일...

⑤ SELECT sysdate,trunc(sysdate,'YEAR'),trunc(sysdate,'MONTH'),trunc(sysdate,'DAY'),trunc(sysdate)
FROM dual;

⑥ SELECT
to_char(sysdate,'MM"월"DD"일" ') as mmdd1,
to_char(sysdate,'MM')||'월'||to_char(sysdate,'DD')||'일' as mmdd2
FROM dual;

⑦ SELECT
EXTRACT(YEAR FROM SYSDATE), EXTRACT(MONTH FROM SYSDATE),EXTRACT(DAY FROM SYSDATE)
FROM DUAL;

12. 함수 – 단일행 함수

▣ 변환 함수

명시적,암시적(성능문제 & 오류 발생가능성)

FORMAT IS CASE SENSITIVE

```
① SELECT   SYSDATE,   TO_CHAR(SYSDATE,'YEAR'),TO_CHAR(SYSDATE,'Year'),
                      TO_CHAR(SYSDATE,'YYYY'),TO_CHAR(SYSDATE,'YY')    FROM DUAL;

② SELECT   TO_CHAR(SYSDATE,'MONTH'),TO_CHAR(SYSDATE,'MON'),                -- MONTH:9자, MON:3자
           TO_CHAR(SYSDATE,'Mon'),TO_CHAR(SYSDATE,'mon'),
           TO_CHAR(SYSDATE,'MM'),TO_CHAR(SYSDATE,'mm')   FROM DUAL;

③ SELECT SYSDATE,
           TO_CHAR(SYSDATE,'DAY'), TO_CHAR(SYSDATE,'Day'),TO_CHAR(SYSDATE,'DY'), TO_CHAR(SYSDATE,'dy'),
           TO_CHAR(SYSDATE,'DD'),TO_CHAR(SYSDATE,'dd')    FROM   DUAL;        -- ??

④ SELECT 123456, TO_CHAR(123456,'999999'), LENGTH(TO_CHAR(123456,'999999')),
           LENGTH(TO_CHAR(123456,'fm999999'))                    -- fm: remove padded blanks or
   FROM   DUAL;

⑤ SELECT TO_CHAR(12345*123.45,'999,999.99'),TO_CHAR(12345*123.45,'99,999,999.99') FROM DUAL; --??
⑥ SELECT  TO_CHAR(SAL,'$999,999'),          REPLACE(TO_CHAR(SAL,'$999,999'),' ','?'),
           TO_CHAR(SAL,'L999,999'),          TO_CHAR(SAL,'999,999L'),          TO_CHAR(SAL,'fm999,999L')
   FROM EMP;
```

12. 함수 – 그룹행 함수

① SELECT MIN(ENAME),MAX(ENAME),MIN(SAL),MAX(SAL),MIN(HIREDATE),MAX(HIREDATE) FROM EMP;
-- ENAME:문자, SAL:숫자,HIREDATE:날짜

② SELECT COUNT(*),COUNT(EMPNO),COUNT(MGR),COUNT(COMM) FROM EMP;

③ SELECT COUNT(JOB),COUNT(ALL JOB),COUNT(DISTINCT JOB),SUM(SAL),SUM(DISTINCT SAL)
FROM EMP;

④ SELECT COUNT(*), SUM(COMM), SUM(COMM)/COUNT(*),AVG(COMM),SUM(COMM)/COUNT(COMM)
FROM EMP;

⑤ 그룹행함수 와 NULL 그리고 NVL , 효율적인 계산방안은 ?

```
SELECT  SAL,COMM  FROM EMP;
SELECT  SUM(NVL(COMM,0)) AS SUM_COMM1,
        SUM(COMM)        AS SUM_COMM2,
        NVL(SUM(COMM),0) AS SUM_COMM3
FROM EMP
```