

Spool File For Oracle Students Trained By Mr. Balram

```
SQL> CREATE INDEX EmpEmpnoIDX
      2  ON Emp(Empno);
ON Emp(Empno)
      *
```

```
ERROR at line 2:
ORA-01408: such column list already indexed
```

```
SQL> SELECT Empno, Ename, Deptno, Sal
      2  FROM Emp;
```

EMPNO	ENAME	DEPTNO	SAL
7839	KING	10	5000
7698	BLAKE	30	2850
7782	CLARK	10	2450
7566	JONES	20	2975
7654	MARTIN	30	1250
7499	ALLEN	30	1600
7844	TURNER	30	1500
7900	JAMES	30	950
7521	WARD	30	1250
7902	FORD	20	3000
7369	SMITH	20	800
7788	SCOTT	20	3000
7876	ADAMS	20	1100
7934	MILLER	10	1300

14 rows selected.

```
SQL> SELECT Empno, Ename, Deptno, Sal
      2  FROM Emp
      3  WHERE Empno = 7839;
```

EMPNO	ENAME	DEPTNO	SAL
7839	KING	10	5000

```
SQL> SET AUTOTRACE ON EXPLAIN
```

```
SQL> SELECT Empno, Ename, Deptno, Sal
      2  FROM Emp;
```

EMPNO	ENAME	DEPTNO	SAL
7839	KING	10	5000
7698	BLAKE	30	2850
7782	CLARK	10	2450
7566	JONES	20	2975
7654	MARTIN	30	1250
7499	ALLEN	30	1600
7844	TURNER	30	1500
7900	JAMES	30	950
7521	WARD	30	1250

Spool File For Oracle Students Trained By Mr. Balram

7902	FORD	20	3000
7369	SMITH	20	800
7788	SCOTT	20	3000
7876	ADAMS	20	1100
7934	MILLER	10	1300

14 rows selected.

Execution Plan

Plan hash value: 3956160932

Id	Operation	Name	Rows	Bytes	Cost (%CPU)	Time
0	SELECT STATEMENT		14	238	3 (0)	00:00:01
1	TABLE ACCESS FULL	EMP	14	238	3 (0)	00:00:01

```
SQL> SELECT Empno, Ename, Deptno, Sal
2 FROM Emp
3 WHERE Empno = 7839;
```

EMPNO	ENAME	DEPTNO	SAL
7839	KING	10	5000

Execution Plan

Plan hash value: 2949544139

Id	Operation	Name	Rows	Bytes	Cost
(%CPU)	Time				
0	SELECT STATEMENT		1	17	1
(0)	00:00:01				
1	TABLE ACCESS BY INDEX ROWID	EMP	1	17	1
(0)	00:00:01				
* 2	INDEX UNIQUE SCAN	PK_EMP	1		0
(0)	00:00:01				

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Predicate Information (identified by operation id):

2 - access("EMPNO"=7839)

SQL> ED

Wrote file afiedt.buf

```
1  SELECT Ename, Deptno, Sal
2  FROM Emp
3* WHERE Empno = 7839
SQL> /
```

ENAME	DEPTNO	SAL
KING	10	5000

Execution Plan

Plan hash value: 2949544139

Id	Operation	Name	Rows	Bytes	Cost
(%CPU)	Time				
0	SELECT STATEMENT		1	17	1
(0)	00:00:01				
1	TABLE ACCESS BY INDEX ROWID	EMP	1	17	1
(0)	00:00:01				
* 2	INDEX UNIQUE SCAN	PK_EMP	1		0
(0)	00:00:01				

Predicate Information (identified by operation id):

2 - access("EMPNO"=7839)

SQL> ED

Wrote file afiedt.buf

```
1  SELECT Ename, Deptno, Sal
2  FROM Emp
3* WHERE Ename = 'KING'
SQL> /
```

ENAME	DEPTNO	SAL
-------	--------	-----

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KING 10 5000

Execution Plan

Plan hash value: 3956160932

Id	Operation	Name	Rows	Bytes	Cost (%CPU)	Time
0	SELECT STATEMENT		1	13	3 (0)	00:00:01
* 1	TABLE ACCESS FULL	EMP	1	13	3 (0)	00:00:01

Predicate Information (identified by operation id):

1 - filter("ENAME"='KING')

SQL> ED

Wrote file afiedt.buf

```
1  SELECT Ename, Deptno, Sal
2  FROM Emp
3* WHERE Empno > 7839
SQL> /
```

ENAME	DEPTNO	SAL
TURNER	30	1500
ADAMS	20	1100
JAMES	30	950
FORD	20	3000
MILLER	10	1300

Execution Plan

Plan hash value: 169057108

Id	Operation	Name	Rows	Bytes	Cost	(%CPU)	Time
----	-----------	------	------	-------	------	--------	------

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```

| 0 | SELECT STATEMENT | | 2 | 34 | 2
(0) | 00:00:01 |
| 1 | TABLE ACCESS BY INDEX ROWID | EMP | 2 | 34 | 2
(0) | 00:00:01 |
|* 2 | INDEX RANGE SCAN | PK_EMP | 2 | | 1
(0) | 00:00:01 |

```

Predicate Information (identified by operation id):

2 - access("EMPNO">7839)

SQL> ED

Wrote file afiedt.buf

```

1 SELECT Ename, Deptno, Sal
2 FROM Emp
3* WHERE Empno < 7839
SQL> /

```

ENAME	DEPTNO	SAL
SMITH	20	800
ALLEN	30	1600
WARD	30	1250
JONES	20	2975
MARTIN	30	1250
BLAKE	30	2850
CLARK	10	2450
SCOTT	20	3000

8 rows selected.

Execution Plan

Plan hash value: 169057108

Id	Operation	Name	Rows	Bytes	Cost
(%CPU)	Time				
0	SELECT STATEMENT		12	204	2
(0)	00:00:01				
1	TABLE ACCESS BY INDEX ROWID	EMP	12	204	2
(0)	00:00:01				
* 2	INDEX RANGE SCAN	PK_EMP	12		1
(0)	00:00:01				

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Predicate Information (identified by operation id):

2 - access ("EMPNO"<7839)

SQL> SET AUTOTRACE OFF EXPLAIN

SQL> CL SCR

SQL> SELECT Empno, Ename, Deptno, Sal

2 FROM Emp

3 WHERE Ename = 'JONES';

EMPNO	ENAME	DEPTNO	SAL
7566	JONES	20	2975

SQL> CREATE INDEX EmpEnameIDX

2 ON Emp(Ename);

Index created.

SQL> SELECT Empno, Ename, Deptno, Sal

2 FROM Emp

3 WHERE Ename = 'JONES';

EMPNO	ENAME	DEPTNO	SAL
7566	JONES	20	2975

SQL> SET AUTOTRACE ON EXPLAIN

SQL> SELECT Empno, Ename, Deptno, Sal

2 FROM Emp

3 WHERE Empno = 7566;

EMPNO	ENAME	DEPTNO	SAL
7566	JONES	20	2975

Execution Plan

Plan hash value: 2949544139

Id	Operation	Name	Rows	Bytes	Cost
----	-----------	------	------	-------	------

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```
| 0 | SELECT STATEMENT | | 1 | 17 | 1
(0)| 00:00:01 |
| 1 | TABLE ACCESS BY INDEX ROWID| EMP | 1 | 17 | 1
(0)| 00:00:01 |
|* 2 | INDEX UNIQUE SCAN | PK_EMP | 1 | | 0
(0)| 00:00:01 |
```

Predicate Information (identified by operation id):

2 - access("EMPNO"=7566)

```
SQL> SELECT Empno, Ename, Deptno, Sal
2 FROM Emp
3 WHERE Ename = 'JONES';
```

EMPNO	ENAME	DEPTNO	SAL
7566	JONES	20	2975

Execution Plan

Plan hash value: 777873844

```
| Id | Operation | Name | Rows | Bytes | Cost
(%CPU)| Time |
-----|-----|-----|-----|-----|-----
| 0 | SELECT STATEMENT | | 1 | 17 | 2
(0)| 00:00:01 |
| 1 | TABLE ACCESS BY INDEX ROWID| EMP | 1 | 17 | 2
(0)| 00:00:01 |
|* 2 | INDEX RANGE SCAN | EMPENAMEIDX | 1 | | 1
(0)| 00:00:01 |
```

Predicate Information (identified by operation id):

2 - access("ENAME"='JONES')

```
SQL> SET AUTOTRACE OFF EXPLAIN
SQL> SELECT ROWNUM, EMPNO, ENAME, DEPTNO, SAL
2 FROM Emp;
```

ROWNUM	EMPNO	ENAME	DEPTNO	SAL
--------	-------	-------	--------	-----

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1	7839	KING	10	5000
2	7698	BLAKE	30	2850
3	7782	CLARK	10	2450
4	7566	JONES	20	2975
5	7654	MARTIN	30	1250
6	7499	ALLEN	30	1600
7	7844	TURNER	30	1500
8	7900	JAMES	30	950
9	7521	WARD	30	1250
10	7902	FORD	20	3000
11	7369	SMITH	20	800
12	7788	SCOTT	20	3000
13	7876	ADAMS	20	1100
14	7934	MILLER	10	1300

14 rows selected.

```
SQL> SELECT ROWID, EMPNO, ENAME, DEPTNO, SAL
       2 FROM Emp;
```

ROWID	EMPNO	ENAME	DEPTNO	SAL
AAASQGAAEAAAACUAAA	7839	KING	10	5000
AAASQGAAEAAAACUAAB	7698	BLAKE	30	2850
AAASQGAAEAAAACUAAC	7782	CLARK	10	2450
AAASQGAAEAAAACUAAD	7566	JONES	20	2975
AAASQGAAEAAAACUAAE	7654	MARTIN	30	1250
AAASQGAAEAAAACUAAF	7499	ALLEN	30	1600
AAASQGAAEAAAACUAAG	7844	TURNER	30	1500
AAASQGAAEAAAACUAAH	7900	JAMES	30	950
AAASQGAAEAAAACUAAI	7521	WARD	30	1250
AAASQGAAEAAAACUAAJ	7902	FORD	20	3000
AAASQGAAEAAAACUAAK	7369	SMITH	20	800
AAASQGAAEAAAACUAAL	7788	SCOTT	20	3000
AAASQGAAEAAAACUAAM	7876	ADAMS	20	1100
AAASQGAAEAAAACUAAN	7934	MILLER	10	1300

14 rows selected.

```
SQL> SELECT EMPNO, ENAME, DEPTNO, SAL
       2 FROM Emp WHERE Ename > 'JONES';
```

EMPNO	ENAME	DEPTNO	SAL
7839	KING	10	5000
7654	MARTIN	30	1250
7934	MILLER	10	1300
7788	SCOTT	20	3000
7369	SMITH	20	800
7844	TURNER	30	1500
7521	WARD	30	1250

7 rows selected.

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```
SQL> SET AUTOTRACE ON EXPLAIN
SQL> R
  1 SELECT EMPNO, ENAME, DEPTNO, SAL
  2* FROM Emp WHERE Ename > 'JONES'
```

EMPNO	ENAME	DEPTNO	SAL
7839	KING	10	5000
7654	MARTIN	30	1250
7934	MILLER	10	1300
7788	SCOTT	20	3000
7369	SMITH	20	800
7844	TURNER	30	1500
7521	WARD	30	1250

7 rows selected.

Execution Plan

Plan hash value: 777873844

Id	Operation	Name	Rows	Bytes	Cost
(%CPU)	Time				
0	SELECT STATEMENT		8	136	2
(0)	00:00:01				
1	TABLE ACCESS BY INDEX ROWID	EMP	8	136	2
(0)	00:00:01				
* 2	INDEX RANGE SCAN	EMPENAMEIDX	8		1
(0)	00:00:01				

Predicate Information (identified by operation id):

2 - access("ENAME">'JONES')

```
SQL> ED
Wrote file afiedt.buf
```

```
  1 SELECT EMPNO, ENAME, DEPTNO, SAL
  2* FROM Emp WHERE Ename < 'JONES'
SQL>
SQL> /
```

EMPNO	ENAME	DEPTNO	SAL
-------	-------	--------	-----

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7876	ADAMS	20	1100
7499	ALLEN	30	1600
7698	BLAKE	30	2850
7782	CLARK	10	2450
7902	FORD	20	3000
7900	JAMES	30	950

6 rows selected.

Execution Plan

Plan hash value: 777873844

Id	Operation	Name	Rows	Bytes	Cost
(%CPU)	Time				
0	SELECT STATEMENT		6	102	2
(0)	00:00:01				
1	TABLE ACCESS BY INDEX ROWID	EMP	6	102	2
(0)	00:00:01				
* 2	INDEX RANGE SCAN	EMPENAMEIDX	6		1
(0)	00:00:01				

Predicate Information (identified by operation id):

2 - access("ENAME"<'JONES')

SQL> -- Composite Indexes --

SQL> CREATE INDEX EmpEmpnoEnameIDX
2 ON Emp(Empno, Ename);

Index created.

SQL> SELECT Empno, Ename, Deptno, Sal
2 FROM Emp
3 WHERE Empno = 7566;

EMPNO	ENAME	DEPTNO	SAL
7566	JONES	20	2975

Execution Plan

Plan hash value: 2949544139

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```
-----  
-----  
| Id | Operation | Name | Rows | Bytes | Cost  
(%CPU) | Time |  
-----
```

```
-----  
| 0 | SELECT STATEMENT | | 1 | 17 | 1  
(0) | 00:00:01 |  
| 1 | TABLE ACCESS BY INDEX ROWID | EMP | 1 | 17 | 1  
(0) | 00:00:01 |  
|* 2 | INDEX UNIQUE SCAN | PK_EMP | 1 | | 0  
(0) | 00:00:01 |  
-----
```

Predicate Information (identified by operation id):

```
-----  
2 - access("EMPNO"=7566)
```

```
SQL> ED  
Wrote file afiedt.buf
```

```
1 SELECT Empno, Ename, Deptno, Sal  
2 FROM Emp  
3* WHERE Ename = 'JONES'  
SQL> /
```

```
-----  
EMPNO ENAME DEPTNO SAL  
-----  
7566 JONES 20 2975  
-----
```

Execution Plan

Plan hash value: 777873844

```
-----  
-----  
| Id | Operation | Name | Rows | Bytes | Cost  
(%CPU) | Time |  
-----  
-----  
| 0 | SELECT STATEMENT | | 1 | 17 | 2  
(0) | 00:00:01 |  
| 1 | TABLE ACCESS BY INDEX ROWID | EMP | 1 | 17 | 2  
(0) | 00:00:01 |  
|* 2 | INDEX RANGE SCAN | EMPENAMEIDX | 1 | | 1  
(0) | 00:00:01 |  
-----
```

Predicate Information (identified by operation id):

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```
-----  
2 - access ("ENAME"='JONES')
```

```
SQL> CREATE INDEX EmpEnameEmpnoIDX  
2 ON Emp (Ename, Empno);
```

Index created.

```
SQL> SELECT Empno, Ename, Deptno, Sal  
2 FROM Emp  
3 WHERE Empno = 7566;
```

EMPNO	ENAME	DEPTNO	SAL
7566	JONES	20	2975

Execution Plan

Plan hash value: 2949544139

```
-----  
| Id | Operation | Name | Rows | Bytes | Cost  
(%CPU) | Time |  
-----  
| 0 | SELECT STATEMENT | | 1 | 17 | 1  
(0) | 00:00:01 |  
| 1 | TABLE ACCESS BY INDEX ROWID | EMP | 1 | 17 | 1  
(0) | 00:00:01 |  
|* 2 | INDEX UNIQUE SCAN | PK_EMP | 1 | | 0  
(0) | 00:00:01 |  
-----
```

Predicate Information (identified by operation id):

```
-----  
2 - access ("EMPNO"=7566)
```

```
SQL> SELECT Empno, Ename, Deptno, Sal  
2 FROM Emp  
3 WHERE Ename = 'JONES';
```

EMPNO	ENAME	DEPTNO	SAL
7566	JONES	20	2975

Execution Plan

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Plan hash value: 2787433117

Id	Operation	Name	Rows	Bytes
0	SELECT STATEMENT		1	17
(0)	00:00:01			
1	TABLE ACCESS BY INDEX ROWID	EMP	1	17
(0)	00:00:01			
* 2	INDEX RANGE SCAN	EMPENAMEEMPNOIDX	1	
(0)	00:00:01			

Predicate Information (identified by operation id):

2 - access("ENAME"='JONES')

SQL> DROP INDEX EmpEnameIDX;

Index dropped.

SQL> DROP INDEX EmpEmpnoEnameIDX;

Index dropped.

SQL> DROP INDEX EmpEnameEmpnoIDX;

Index dropped.

SQL> CL SCR

SQL> -- UNIQUE Indexes Implementations --

SQL> CREATE UNIQUE INDEX EmpEnameUNQIDX
2 ON Emp(Ename);

Index created.

SQL> INSERT INTO Emp(Empno, Ename, Deptno, Sal)
2 VALUES(7935, 'SMITH', 30, 2000);

INSERT INTO Emp(Empno, Ename, Deptno, Sal)

*

ERROR at line 1:

ORA-00001: unique constraint (SCOTT.EMPENAMEUNQIDX) violated

SQL> INSERT INTO EMP(Empno, Ename, Deptno, Sal)
2 VALUES(7936, 'RAJU', 30, 2000);

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1 row created.

Execution Plan

```
-----
| Id  | Operation                      | Name | Rows  | Bytes | Cost (%CPU)|
Time  |
-----
| 0   | INSERT STATEMENT                |      | 1     | 38    | 1 (0)      |
00:00:01 |
| 1   | LOAD TABLE CONVENTIONAL        | EMP  |       |       |            |
|
```

SQL> ROLLBACK;

Rollback complete.

SQL> DROP INDEX EMPENAMEUNQIDX;

Index dropped.

```
SQL> CREATE UNIQUE INDEX EmpDeptnoUNQIDX
2 ON EMP(DEPTNO);
ON EMP(DEPTNO)
*
```

ERROR at line 2:

ORA-01452: cannot CREATE UNIQUE INDEX; duplicate keys found

SQL> -- BITMAP Indexes --

```
SQL> CREATE BITMAP INDEX EmpDeptnoBMIDX
2 ON EMP(DEPTNO);
```

Index created.

```
SQL> SELECT ROWID, Empno, Ename, Deptno
2 FROM Emp;
```

ROWID	EMPNO	ENAME	DEPTNO
AAASQGAAEAAAACUAAA	7839	KING	10
AAASQGAAEAAAACUAAB	7698	BLAKE	30
AAASQGAAEAAAACUAAC	7782	CLARK	10
AAASQGAAEAAAACUAAD	7566	JONES	20
AAASQGAAEAAAACUAAE	7654	MARTIN	30
AAASQGAAEAAAACUAAF	7499	ALLEN	30
AAASQGAAEAAAACUAAG	7844	TURNER	30

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```
AAASQGAAEAAAACUAAH      7900 JAMES      30
AAASQGAAEAAAACUAAI      7521 WARD      30
AAASQGAAEAAAACUAAJ      7902 FORD      20
AAASQGAAEAAAACUAAK      7369 SMITH     20
AAASQGAAEAAAACUAAAL     7788 SCOTT     20
AAASQGAAEAAAACUAAAM     7876 ADAMS     20
AAASQGAAEAAAACUAAAN     7934 MILLER    10
```

14 rows selected.

Execution Plan

Plan hash value: 3956160932

Id	Operation	Name	Rows	Bytes	Cost (%CPU)	Time
0	SELECT STATEMENT		14	350	3 (0)	00:00:01
1	TABLE ACCESS FULL	EMP	14	350	3 (0)	00:00:01

```
SQL> SELECT
  2  ENAME,
  3  SAL,
  4  COMM,
  5  SAL,
  6  SAL+NVL(COMM,0) TOTSAL
  7  FROM EMP
  8  WHERE SAL+NVL(COMM,0) > 2500;
```

ENAME	SAL	COMM	SAL	TOTSAL
KING	5000		5000	5000
BLAKE	2850		2850	2850
JONES	2975		2975	2975
MARTIN	1250	1400	1250	2650
FORD	3000		3000	3000
SCOTT	3000		3000	3000

6 rows selected.

```
SQL> CREATE INDEX EmpTotSalIDX
  2  ON EMP(SAL+NVL(COMM,0));
```

Index created.

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```
SQL> SET AUTOTRACE ON EXPLAIN
SQL> SELECT
  2  ENAME,
  3  SAL,
  4  COMM,
  5  SAL,
  6  SAL+NVL(COMM,0) TOTSAL
  7  FROM EMP
  8  WHERE SAL+NVL(COMM,0) > 2500;
```

ENAME	SAL	COMM	SAL	TOTSAL
MARTIN	1250	1400	1250	2650
BLAKE	2850		2850	2850
JONES	2975		2975	2975
FORD	3000		3000	3000
SCOTT	3000		3000	3000
KING	5000		5000	5000

6 rows selected.

Execution Plan

Plan hash value: 673040625

Id	Operation	Name	Rows	Bytes	Cost
(%CPU)					
Time					
0	SELECT STATEMENT		1	25	
2 (0)					
00:00:01					
1	TABLE ACCESS BY INDEX ROWID	EMP	1	25	
2 (0)					
00:00:01					
* 2	INDEX RANGE SCAN	EMPTOTSALIDX	1		
1 (0)					
00:00:01					

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Predicate Information (identified by operation id):

2 - access("SAL"+NVL("COMM",0)>2500)

```
SQL> SET AUTOTRACE OFF EXPLAIN
SQL> SELECT ENAME, DEPTNO, JOB, SAL
       2 FROM EMP
       3 WHERE ENAME='smith';
```

no rows selected

```
SQL> SELECT ENAME, DEPTNO, JOB, SAL
       2 FROM EMP
       3 WHERE LOWER(ENAME)='smith';
```

ENAME	DEPTNO	JOB	SAL
SMITH	20	CLERK	800

```
SQL> CREATE INDEX EMPLNAMEIDX
       2 ON EMP (LOWER(ENAME));
```

Index created.

```
SQL> SET AUTOTRACE ON EXPLAIN
SQL> SELECT ENAME, DEPTNO, JOB, SAL
       2 FROM EMP
       3 WHERE LOWER(ENAME)='smith';
```

ENAME	DEPTNO	JOB	SAL
SMITH	20	CLERK	800

Execution Plan

Plan hash value: 801765044

Id	Operation	Name	Rows	Bytes	Cost
(%CPU)					
Time					

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```
| 0 | SELECT STATEMENT | | 1 | 28 |
2 (0)
| 00:00:01 |

| 1 | TABLE ACCESS BY INDEX ROWID| EMP | 1 | 28 |
2 (0)
| 00:00:01 |

|* 2 | INDEX RANGE SCAN | EMPLOYEEIDX | 1 |
1 (0)
| 00:00:01 |
```

Predicate Information (identified by operation id):

2 - access(LOWER("ENAME")='smith')

```
SQL> SELECT Empno, Ename, Job, Deptno, Sal
2 FROM Emp;
```

EMPNO	ENAME	JOB	DEPTNO	SAL
7839	KING	PRESIDENT	10	5000
7698	BLAKE	MANAGER	30	2850
7782	CLARK	MANAGER	10	2450
7566	JONES	MANAGER	20	2975
7654	MARTIN	SALESMAN	30	1250
7499	ALLEN	SALESMAN	30	1600
7844	TURNER	SALESMAN	30	1500
7900	JAMES	CLERK	30	950
7521	WARD	SALESMAN	30	1250
7902	FORD	ANALYST	20	3000
7369	SMITH	CLERK	20	800

EMPNO	ENAME	JOB	DEPTNO	SAL
7788	SCOTT	ANALYST	20	3000
7876	ADAMS	CLERK	20	1100
7934	MILLER	CLERK	10	1300

14 rows selected.

Execution Plan

Plan hash value: 3956160932

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```
-----  
-  
| Id | Operation | Name | Rows | Bytes | Cost (%CPU) | Time  
|  
-----  
-  
| 0 | SELECT STATEMENT | | 14 | 350 | 3 (0) | 00:00:01  
|  
| 1 | TABLE ACCESS FULL | EMP | 14 | 350 | 3 (0) | 00:00:01  
|  
-----  
-
```

SQL> ED

Wrote file afiedt.buf

```
1 SELECT Empno, Ename, Job, Deptno, Sal, Sal * 12 AnnSal  
2* FROM Emp  
SQL> /
```

EMPNO	ENAME	JOB	DEPTNO	SAL	ANNSAL
7839	KING	PRESIDENT	10	5000	60000
7698	BLAKE	MANAGER	30	2850	34200
7782	CLARK	MANAGER	10	2450	29400
7566	JONES	MANAGER	20	2975	35700
7654	MARTIN	SALESMAN	30	1250	15000
7499	ALLEN	SALESMAN	30	1600	19200
7844	TURNER	SALESMAN	30	1500	18000
7900	JAMES	CLERK	30	950	11400
7521	WARD	SALESMAN	30	1250	15000
7902	FORD	ANALYST	20	3000	36000
7369	SMITH	CLERK	20	800	9600

EMPNO	ENAME	JOB	DEPTNO	SAL	ANNSAL
7788	SCOTT	ANALYST	20	3000	36000
7876	ADAMS	CLERK	20	1100	13200
7934	MILLER	CLERK	10	1300	15600

14 rows selected.

Execution Plan

Plan hash value: 3956160932

```
-----  
-  
| Id | Operation | Name | Rows | Bytes | Cost (%CPU) | Time  
|  
-----  
-
```

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```
-----
| 0 | SELECT STATEMENT | | 14 | 350 | 3 (0) | 00:00:01
|
| 1 | TABLE ACCESS FULL| EMP | 14 | 350 | 3 (0) | 00:00:01
|
-----
```

```
SQL> ED
Wrote file afiedt.buf
```

```
1 SELECT Empno, Ename, Job, Deptno, Sal, Sal * 12 AnnSal
2 FROM Emp
3* WHERE Sal * 12 > 25000
SQL> /
```

EMPNO	ENAME	JOB	DEPTNO	SAL	ANNSAL
7839	KING	PRESIDENT	10	5000	60000
7698	BLAKE	MANAGER	30	2850	34200
7782	CLARK	MANAGER	10	2450	29400
7566	JONES	MANAGER	20	2975	35700
7902	FORD	ANALYST	20	3000	36000
7788	SCOTT	ANALYST	20	3000	36000

6 rows selected.

Execution Plan

Plan hash value: 3956160932

```
-----
| Id | Operation | Name | Rows | Bytes | Cost (%CPU) | Time |
|-----|-----|-----|-----|-----|-----|-----|
| 0 | SELECT STATEMENT | | 1 | 25 | 3 (0) | 00:00:01 |
|* 1 | TABLE ACCESS FULL| EMP | 1 | 25 | 3 (0) | 00:00:01 |
|-----|-----|-----|-----|-----|-----|
```

Predicate Information (identified by operation id):

```
1 - filter("SAL"*12>25000)
```

```
SQL> CREATE INDEX EmpAnnSalIDX
2 ON Emp(Sal * 12);
```

Index created.

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```
SQL> SELECT Empno, Ename, Job, Deptno, Sal, Sal * 12 AnnSal
2   FROM Emp
3   WHERE Sal * 12 > 25000;
```

EMPNO	ENAME	JOB	DEPTNO	SAL	ANNSAL
7782	CLARK	MANAGER	10	2450	29400
7698	BLAKE	MANAGER	30	2850	34200
7566	JONES	MANAGER	20	2975	35700
7902	FORD	ANALYST	20	3000	36000
7788	SCOTT	ANALYST	20	3000	36000
7839	KING	PRESIDENT	10	5000	60000

6 rows selected.

Execution Plan

Plan hash value: 259973847

Id	Operation	Name	Rows	Bytes	Cost
(%CPU)					
Time					
0	SELECT STATEMENT		1	38	
2	(0)				
00:00:01					
1	TABLE ACCESS BY INDEX ROWID	EMP	1	38	
2	(0)				
00:00:01					
* 2	INDEX RANGE SCAN	EMPANNSALIDX	1		
1	(0)				
00:00:01					

Predicate Information (identified by operation id):

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```
2 - access ("SAL"*12>25000)
```

```
SQL> DESC USER_OBJECTS;
```

Name	Null?	Type
OBJECT_NAME		VARCHAR2 (128)
SUBOBJECT_NAME		VARCHAR2 (30)
OBJECT_ID		NUMBER
DATA_OBJECT_ID		NUMBER
OBJECT_TYPE		VARCHAR2 (19)
CREATED		DATE
LAST_DDL_TIME		DATE
TIMESTAMP		VARCHAR2 (19)
STATUS		VARCHAR2 (7)
TEMPORARY		VARCHAR2 (1)
GENERATED		VARCHAR2 (1)
SECONDARY		VARCHAR2 (1)
NAMESPACE		NUMBER
EDITION_NAME		VARCHAR2 (30)

```
SQL> COL ObjName FORMAT A20
```

```
SQL> COL ObjType FORMAT A15
```

```
SQL> SELECT OBJECT_NAME ObjName, OBJECT_TYPE ObjType
2 FROM USER_OBJECTS
3 WHERE OBJECT_TYPE = 'INDEX';
```

OBJNAME	OBJTYPE
---------	---------

SYS_C0011137	INDEX
SAMPLEUNQ04_SAMPLEID	INDEX
NAME_UNQ	

SAMPLEUNQ02_SAMPLEID	INDEX
_UNQ	

SAMPLEUNQ01_SAMPLEID	INDEX
_UNQ	

SAMPLEPK04_SAMPID_PK	INDEX
----------------------	-------

OBJNAME	OBJTYPE
---------	---------

SAMPLEPK04_SAMPIDUNQ	INDEX
_UNQ	

SAMPLEPK03_SAMPID_PK	INDEX
----------------------	-------

SAMPLEPK01_SAMPID_PK	INDEX
----------------------	-------

SAMPLEFK_03_SAMPID_P	INDEX
----------------------	-------

K

SAMPLEFK04_SAMPID_PK	INDEX
----------------------	-------

SAMPLEFK02_SAMPID_PK	INDEX
----------------------	-------

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SAMPLEFK01_SAMPID_PK INDEX

OBJNAME	OBJTYPE
---------	---------

SAMPLECKPK02_SAMPIDN INDEX
AME_CKPK

SAMPLECKFK02_SAMPID_ INDEX
PK

SAMPLE02_SAMPID_PK	INDEX
SAMPLE01_SAMPID_PK	INDEX
PK_EMP	INDEX
PK_DEPT	INDEX
MYDEPT_DNAME_UNQ	INDEX

OBJNAME	OBJTYPE
---------	---------

MYDEPT_DEPTNO_PK	INDEX
MASTIDPK	INDEX
MASTIDDFPK	INDEX
EMPTOTSALIDX	INDEX
EMPLNAMEIDX	INDEX
EMPANNSALIDX	INDEX

25 rows selected.

Execution Plan

ERROR:

ORA-01039: insufficient privileges on underlying objects of the view

SP2-0612: Error generating AUTOTRACE EXPLAIN report

SQL> SET AUTOTRACE OFF EXPLAIN

SQL> DESC USER_INDEXES;

Name	Null?	Type
INDEX_NAME	NOT NULL	VARCHAR2 (30)
INDEX_TYPE		VARCHAR2 (27)
TABLE_OWNER	NOT NULL	VARCHAR2 (30)
TABLE_NAME	NOT NULL	VARCHAR2 (30)
TABLE_TYPE		VARCHAR2 (11)
UNIQUENESS		VARCHAR2 (9)
COMPRESSION		VARCHAR2 (8)
PREFIX_LENGTH		NUMBER
TABLESPACE_NAME		VARCHAR2 (30)
INI_TRANS		NUMBER
MAX_TRANS		NUMBER
INITIAL_EXTENT		NUMBER
NEXT_EXTENT		NUMBER

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MIN_EXTENTS	NUMBER
MAX_EXTENTS	NUMBER
PCT_INCREASE	NUMBER
PCT_THRESHOLD	NUMBER
INCLUDE_COLUMN	NUMBER
FREELISTS	NUMBER
FREELIST_GROUPS	NUMBER
PCT_FREE	NUMBER
LOGGING	VARCHAR2 (3)
BLEVEL	NUMBER
LEAF_BLOCKS	NUMBER
DISTINCT_KEYS	NUMBER
AVG_LEAF_BLOCKS_PER_KEY	NUMBER
AVG_DATA_BLOCKS_PER_KEY	NUMBER
CLUSTERING_FACTOR	NUMBER
STATUS	VARCHAR2 (8)
NUM_ROWS	NUMBER
SAMPLE_SIZE	NUMBER
LAST_ANALYZED	DATE
DEGREE	VARCHAR2 (40)
INSTANCES	VARCHAR2 (40)
PARTITIONED	VARCHAR2 (3)
TEMPORARY	VARCHAR2 (1)
GENERATED	VARCHAR2 (1)
SECONDARY	VARCHAR2 (1)
BUFFER_POOL	VARCHAR2 (7)
FLASH_CACHE	VARCHAR2 (7)
CELL_FLASH_CACHE	VARCHAR2 (7)
USER_STATS	VARCHAR2 (3)
DURATION	VARCHAR2 (15)
PCT_DIRECT_ACCESS	NUMBER
ITYP_OWNER	VARCHAR2 (30)
ITYP_NAME	VARCHAR2 (30)
PARAMETERS	VARCHAR2 (1000)
GLOBAL_STATS	VARCHAR2 (3)
DOMIDX_STATUS	VARCHAR2 (12)
DOMIDX_OPSTATUS	VARCHAR2 (6)
FUNCIDX_STATUS	VARCHAR2 (8)
JOIN_INDEX	VARCHAR2 (3)
IOT_REDUNDANT_PKEY_ELIM	VARCHAR2 (3)
DROPPED	VARCHAR2 (3)
VISIBILITY	VARCHAR2 (9)
DOMIDX_MANAGEMENT	VARCHAR2 (14)
SEGMENT_CREATED	VARCHAR2 (3)

```
SQL> COL INDEX_NAME FOR A20
SQL> COL INDEX_TYPE FOR A25
SQL> COL TABLE_NAME FOR A10
SQL> SELECT TABLE_NAME, INDEX_NAME, INDEX_TYPE
       2 FROM USER_INDEXES
       3 WHERE TABLE_NAME = 'EMP';
```

TABLE_NAME	INDEX_NAME	INDEX_TYPE
------------	------------	------------

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```
-----
EMP          PK_EMP          NORMAL
EMP          EMPANNSALIDX    FUNCTION-BASED NORMAL
EMP          EMPLNAMEIDX     FUNCTION-BASED NORMAL
EMP          EMPTOTSALIDX    FUNCTION-BASED NORMAL
```

```
SQL> DESC USER_IND_COLUMNS'
SP2-0565: Illegal identifier.
SQL> DESC USER_IND_COLUMNS;
```

Name	Null?	Type
INDEX_NAME		VARCHAR2(30)
TABLE_NAME		VARCHAR2(30)
COLUMN_NAME		VARCHAR2(4000)
COLUMN_POSITION		NUMBER
COLUMN_LENGTH		NUMBER
CHAR_LENGTH		NUMBER
DESCEND		VARCHAR2(4)

```
SQL> COL COLUMN_NAME FOR A12
SQL> SELECT TABLE_NAME, COLUMN_NAME, INDEX_NAME
2   FROM USER_IND_COLUMNS
3   WHERE TABLE_NAME = 'EMP';
```

TABLE_NAME	COLUMN_NAME	INDEX_NAME
EMP	SYS_NC00009\$	EMPTOTSALIDX
EMP	SYS_NC00010\$	EMPLNAMEIDX
EMP	SYS_NC00011\$	EMPANNSALIDX
EMP	EMPNO	PK_EMP

```
SQL> COLUMN TABNAME FORMAT A15
SQL> COLUMN COLNAME FORMAT A15
SQL> COLUMN IDXNAME FORMAT A15
SQL> SELECT
2   UC.TABLE_NAME TABNAME,
3   UC.COLUMN_NAME COLNAME,
4   UI.INDEX_NAME IDXNAME
5   FROM USER_IND_COLUMNS UC, USER_INDEXES UI
6   WHERE UC.INDEX_NAME = UI.INDEX_NAME AND
7   UC.TABLE_NAME = 'EMP';
```

TABNAME	COLNAME	IDXNAME
EMP	SYS_NC00009\$	EMPTOTSALIDX
EMP	SYS_NC00010\$	EMPLNAMEIDX
EMP	SYS_NC00011\$	EMPANNSALIDX
EMP	EMPNO	PK_EMP

```
SQL> SPPOOL OFF
```