

```
SQL>
SQL> exec dbms_random.seed(0)
```

PL/SQL procedure successfully completed.

```
SQL>
SQL> create table t1
 2 as
 3 select
 4     rownum as id
 5     , trunc(dbms_random.value(1, 1000000000000)) as fk
 6     , case when rownum <= 900000 then 1 else ceil(rownum / 10) end as attr1
 7     , case when rownum <= 900000 then 1 else ceil(rownum / 10) end as attr2
 8     , rpad('x', 100) as filler
 9 from
10     dual
11 connect by
12     level <= 1000000
13 ;
```

Table created.

```
SQL>
SQL> exec dbms_stats.gather_table_stats(null, 't1', method_opt => 'for all columns size 1 for columns size 254 attr1, attr2')
```

PL/SQL procedure successfully completed.

```
SQL>
SQL> create table t2
 2 as
 3 select
 4     fk as id
 5     , ceil(rownum / 10) as attr1
 6     , ceil(rownum / 10) as attr2
 7     , rpad('x', 100) as filler
 8 from
 9     t1
10 order by
11     id
12 ;
```

Table created.

```
SQL>
SQL> exec dbms_stats.gather_table_stats(null, 't2', method_opt => 'for all columns size 1')
```

PL/SQL procedure successfully completed.

```
SQL> exec dbms_stats.gather_table_stats(null, 't2', method_opt => 'for all columns size 1')
```

PL/SQL procedure successfully completed.

```
SQL>
```

```
SQL> create unique index t2_idx on t2 (id);
```

Index created.

```
SQL>
```

```
SQL> set echo on timing on time on
```

```
20:56:36 SQL>
```

```
20:56:36 SQL> select
```

```
20:56:36 2      *
20:56:36 3      from
20:56:36 4      (
20:56:36 5          select
20:56:36 6              attr1
20:56:36 7              , attr2
20:56:36 8              , count(*) as cnt
20:56:36 9          from
20:56:36 10             t1
20:56:36 11          group by
20:56:36 12              attr1
20:56:36 13              , attr2
20:56:36 14          order by
20:56:36 15              cnt desc
20:56:36 16              , attr1
20:56:36 17              , attr2
20:56:36 18          )
20:56:36 19 where
20:56:36 20     rownum <= 10
20:56:36 21 ;
```

ATTR1	ATTR2	CNT
1	1	900000
90001	90001	10
90002	90002	10
90003	90003	10
90004	90004	10
90005	90005	10
90006	90006	10
90007	90007	10
90008	90008	10
90009	90009	10

10 rows selected.

20:56:37 SQL> alter session set statistics\_level = all;

Session altered.

Elapsed: 00:00:00.00

```
20:56:37 SQL>
20:56:37 SQL> select
20:56:37 2      count(t2.attr2)
20:56:37 3      from
20:56:37 4          t1
20:56:37 5          , t2
20:56:37 6      where
20:56:37 7      /*-----*/
20:56:37 8          t1.attr1 = 1
20:56:37 9      and   t1.attr2 = 1
20:56:37 10     /*-----*/
20:56:37 11     and   t1.fk = t2.id
20:56:37 12     ;
```

COUNT(T2.ATTR2)

900000

Elapsed: 00:00:02.37

```
20:56:39 SQL>
20:56:39 SQL> @xplan_extended_display_cursor
20:56:39 SQL> set echo off verify off termout off
SQL_ID 8fdsxrqz30abs, child number 0
```

```
select      count(t2.attr2) from      t1      , t2 where
/*-----*/          t1.attr1 = 1 and      t1.attr2 = 1
/*-----*/ and      t1.fk = t2.id
```

Plan hash value: 906334482

Id	Pid	Ord	Operation	Name	Starts	E-Rows	A-Rows	A-Time	Buffers	Reads	OMem	1Mem	Used-Mem	A-Time Self	Bufs Self	Reads S
0		5	SELECT STATEMENT		1		1	00:00:02.37	34820	34812				00:00:00.00	0	
1	0	4	SORT AGGREGATE		1	1	1	00:00:02.37	34820	34812				00:00:00.04	0	
* 2	1	3	HASH JOIN		1	812K	900K	00:00:02.32	34820	34812	29M	6963K	44M (0)	00:00:00.85	0	
* 3	2	1	TABLE ACCESS FULL	T1	1	812K	900K	00:00:00.89	17576	17572				00:00:00.89	17576	175
* 4	2	2	TABLE ACCESS FULL	T2	1	1000K	1000K	00:00:00.58	17244	17240				00:00:00.58	17244	172

Predicate Information (identified by operation id):

2 - access("T1"."FK"="T2"."ID")

```

Elapsed: 00:00:00.13
20:56:39 SQL>
20:56:39 SQL> select
20:56:39 2      count(t2.attr2)
20:56:39 3      from
20:56:39 4          t1
20:56:39 5      , t2
20:56:39 6      where
20:56:39 7      /*-----*/
20:56:39 8          t1.attr1 = 90001
20:56:39 9      and   t1.attr2 = 90001
20:56:39 10     /*-----*/
20:56:39 11     and   t1.fk = t2.id
20:56:39 12 ;
    
```

```

COUNT(T2.ATTR2)
-----
10
    
```

```

Elapsed: 00:00:01.24
20:56:41 SQL>
20:56:41 SQL> @xplan_extended_display_cursor
20:56:41 SQL> set echo off verify off termout off
SQL_ID 1zhdphxm9dwk3, child number 0
    
```

```

select      count(t2.attr2) from      t1      , t2 where
/*-----*/          t1.attr1 = 90001 and      t1.attr2 =
90001 /*-----*/ and      t1.fk = t2.id
    
```

Plan hash value: 2900488714

Id	Pid	Ord	Operation	Name	Starts	E-Rows	A-Rows	A-Time	Buffers	Reads	A-Time Self	Bufs Self	Reads Self	A-Ti S-Grp
0		7	SELECT STATEMENT		1		1	00:00:01.23	17608	17594	00:00:00.00	0	0	
1	0	6	SORT AGGREGATE		1	1	1	00:00:01.23	17608	17594	00:00:00.00	0	0	
2	1	5	NESTED LOOPS		1		10	00:00:01.23	17608	17594	00:00:00.00	0	0	
3	2	3	NESTED LOOPS		1	1	10	00:00:01.21	17598	17586	00:00:00.00	0	0	
* 4	3	1	TABLE ACCESS FULL	T1	1	1	10	00:00:01.11	17576	17572	00:00:01.11	17576	17572	@@@@@@@@
* 5	3	2	INDEX UNIQUE SCAN	T2_IDX	10	1	10	00:00:00.10	22	14	00:00:00.10	22	14	@
6	2	4	TABLE ACCESS BY INDEX ROWID	T2	10	1	10	00:00:00.02	10	8	00:00:00.02	10	8	

Predicate Information (identified by operation id):

- 4 - filter(("T1"."ATTR1"=90001 AND "T1"."ATTR2"=90001))
- 5 - access(("T1"."FK"="T2"."ID"))

```
20:56:41 SQL> explain plan for
20:56:41 2 select
20:56:41 3 count(*)
20:56:41 4 from
20:56:41 5 t1
20:56:41 6 where
20:56:41 7 attr1 = 1
20:56:41 8 and attr2 = 1;
```

Explained.

Elapsed: 00:00:00.00

```
20:56:41 SQL>
20:56:41 SQL> select * from table(dbms_xplan.display(format => 'BASIC PREDICATE ROWS'));
```

PLAN\_TABLE\_OUTPUT

Plan hash value: 3724264953

Id	Operation	Name	Rows
0	SELECT STATEMENT		1
1	SORT AGGREGATE		1
* 2	TABLE ACCESS FULL	T1	812K

Predicate Information (identified by operation id):

2 - filter("ATTR1"=1 AND "ATTR2"=1)

14 rows selected.

Elapsed: 00:00:00.01

```
20:56:41 SQL>
20:56:41 SQL> explain plan for
20:56:41 2 select
20:56:41 3 count(*)
20:56:41 4 from
20:56:41 5 t1
20:56:41 6 where
20:56:41 7 trunc(attr1) = 1
20:56:41 8 and trunc(attr2) = 1;
```

Explained.

Elapsed: 00:00:00.00

```
20:56:41 SQL>
```

0	SELECT STATEMENT		1
1	SORT AGGREGATE		1
* 2	TABLE ACCESS FULL	T1	812K

Predicate Information (identified by operation id):

2 - filter("ATTR1"=1 AND "ATTR2"=1)

14 rows selected.

Elapsed: 00:00:00.01

```
20:56:41 SQL>
20:56:41 SQL> explain plan for
20:56:41 2 select
20:56:41 3 count(*)
20:56:41 4 from
20:56:41 5 t1
20:56:41 6 where
20:56:41 7 trunc(attr1) = 1
20:56:41 8 and trunc(attr2) = 1;
```

Explained.

Elapsed: 00:00:00.00

```
20:56:41 SQL>
20:56:41 SQL> select * from table(dbms_xplan.display(format => 'BASIC PREDICATE ROWS'));
```

PLAN\_TABLE\_OUTPUT

Plan hash value: 3724264953

Id	Operation	Name	Rows
0	SELECT STATEMENT		1
1	SORT AGGREGATE		1
* 2	TABLE ACCESS FULL	T1	100

Predicate Information (identified by operation id):

2 - filter(TRUNC("ATTR1")=1 AND TRUNC("ATTR2")=1)

14 rows selected.

Elapsed: 00:00:00.01

```
20:56:41 SQL>
20:56:41 SQL> select
20:56:41 2      *
20:56:41 3  from
20:56:41 4      (
20:56:41 5      select
20:56:41 6          trunc(attr1)
20:56:41 7          , trunc(attr2)
20:56:41 8          , count(*) as cnt
20:56:41 9      from
20:56:41 10         t1
20:56:41 11      group by
20:56:41 12          trunc(attr1)
20:56:41 13          , trunc(attr2)
20:56:41 14      order by
20:56:41 15          cnt desc
20:56:41 16          , trunc(attr1)
20:56:41 17          , trunc(attr2)
20:56:41 18      )
20:56:41 19  where
20:56:41 20      rownum <= 10
20:56:41 21 ;
```

TRUNC(ATTR1)	TRUNC(ATTR2)	CNT
1	1	900000
90001	90001	10
90002	90002	10
90003	90003	10
90004	90004	10
90005	90005	10
90006	90006	10
90007	90007	10
90008	90008	10
90009	90009	10

10 rows selected.

Elapsed: 00:00:01.12

```
20:56:42 SQL>
20:56:42 SQL> select
20:56:42 2      count(t2.attr2)
20:56:42 3  from
20:56:42 4      t1
20:56:42 5      , t2
20:56:42 6  where
20:56:42 7  /*-----*/
```

```

20:56:42 SQL>
20:56:42 SQL> select
20:56:42 2      count(t2.attr2)
20:56:42 3      from
20:56:42 4          t1
20:56:42 5          , t2
20:56:42 6      where
20:56:42 7      /*-----*/
20:56:42 8          trunc(t1.attr1) = 1
20:56:42 9      and
20:56:42 10         trunc(t1.attr2) = 1
20:56:42 11         /*-----*/
20:56:42 12         and
20:56:42 13         t1.fk = t2.id
20:56:42 14         ;

```

ERROR at line 4:  
ORA-01013: user requested cancel of current operation

Elapsed: 00:10:17.05

```

21:06:59 SQL>
21:06:59 SQL> @xplan_extended_display_cursor "" "" "ALLSTATS LAST +COST"
21:06:59 SQL> set echo off verify off termout off
SQL_ID 353msax56jvvp, child number 0

```

```

select      count(t2.attr2) from      t1      , t2 where
/*-----*/      trunc(t1.attr1) = 1 and
trunc(t1.attr2) = 1 /*-----*/ and      t1.fk = t2.id

```

Plan hash value: 2900488714

Id	Pid	Ord	Operation	Name	Starts	E-Rows	Cost (%CPU)	A-Rows	A-Time	Buffers	Reads	A-Time Self	Bufs Self	Reads Sel
0		7	SELECT STATEMENT		1		4999 (100)	0	00:00:00.01	0	0	00:00:00.00	0	0
1	0	6	SORT AGGREGATE		1	1		0	00:00:00.01	0	0	00:00:00.00	0	0
2	1	5	NESTED LOOPS		1			117K	00:10:16.98	353K	91821	00:00:00.15	0	0
3	2	3	NESTED LOOPS		1	100	4999 (1)	117K	00:00:28.84	236K	6659	00:00:00.16	0	0
* 4	3	1	TABLE ACCESS FULL	T1	1	100	4799 (1)	117K	00:00:00.43	2057	2175	00:00:00.43	2057	2175
* 5	3	2	INDEX UNIQUE SCAN	T2_IDX	117K	1	1 (0)	117K	00:00:28.26	234K	4484	00:00:28.26	235K	4484
6	2	4	TABLE ACCESS BY INDEX ROWID	T2	117K	1	2 (0)	117K	00:09:47.98	117K	85162	00:09:47.98	117K	85162

Predicate Information (identified by operation id):

- 4 - filter((TRUNC("T1"."ATTR1")=1 AND TRUNC("T1"."ATTR2")=1))
- 5 - access("T1"."FK"="T2"."ID")