```
SQL> set feedback on
SQL>
SQL> /*====================================
SQL>       Name - Hay Munn Hnin Wai
SQL>       Student ID - 6573277
SQL>       Tutorial - T02
SQL>       Assignment 1 - Task(2a)
SQL> ====================================*/
SQL>
SQL> -- (2a-i) explain plan before the creation of the Index that perform Vertal-Traversal and not access a relational
table.
SQL> explain plan for
  2  SELECT COUNT(*)
  3  FROM PART
  4  WHERE p_partkey = '##########' ;

Explained.

SQL>
SQL> -- Displan Plan (2a-i)
SQL> select * from table(dbms_xplan.display);

PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
Plan hash value: 2596278069

-----------------------------------------------------------------------------
| Id  | Operation          | Name       | Rows  | Bytes | Cost (%CPU)| Time     |
-----------------------------------------------------------------------------
|   0 | SELECT STATEMENT   |            |     1 |     5 |     1   (0)| 00:00:01 |
|   1 |  SORT AGGREGATE    |            |     1 |     5 |            |          |
|*  2 |   FILTER           |            |       |       |            |          |
|*  3 |    INDEX UNIQUE SCAN| PART_PEKEY |     1 |     5 |     1   (0)| 00:00:01 |
-----------------------------------------------------------------------------


PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
Predicate Information (identified by operation id):
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   2 - filter(TO_NUMBER('##########')>=0)
   3 - access("P_PARTKEY"=TO_NUMBER('##########'))

16 rows selected.

SQL> --------------------------------------------------------------------------------------------------------------------------------
SQL> -- (ii)explain plan before the creation of the Index that perform VERTICAL-Traversal and Horizontally With
ut access a relational table.
SQL> explain plan for
  2  SELECT COUNT(*)
  3  FROM PART
```

```
  4  WHERE p_partkey > '#########' ;

Explained.

SQL>
SQL> -- Displan Plan (2a-ii)
SQL> select * from table(dbms_xplan.display);

PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
Plan hash value: 4293627538

-------------------------------------------------------------------------------
| Id  | Operation         | Name       | Rows  | Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------------
|   0 | SELECT STATEMENT  |            |     1 |     5 |     3   (0)| 00:00:01 |
|   1 |  SORT AGGREGATE   |            |     1 |     5 |            |          |
|*  2 |   INDEX RANGE SCAN| PART_PEKEY |  3000 | 15000 |     3   (0)| 00:00:01 |

-------------------------------------------------------------------------------

Predicate Information (identified by operation id):

PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
--------------------------------------------------

   2 - access("P_PARTKEY">TO_NUMBER('#########'))

14 rows selected.

SQL>
SQL>
SQL> --------------------------------------------------------------------------------------------------------------------------------
SQL> -- (iii)explain plan before the creation of the Index that perform HORIZONTALLY Traversal Without access
 relational table.
SQL> explain plan for
  2  SELECT p_partkey
  3  FROM PART;

Explained.

SQL>
SQL> -- Displan Plan (2a-iii)
SQL> select * from table(dbms_xplan.display);

PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
Plan hash value: 2478391124

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

```
-------------------------------------------------------------------------------
|   0 | SELECT STATEMENT     |           | 60000 |   292K|    32   (0)| 00:00:01 |
|   1 |  INDEX FAST FULL SCAN| PART_PEKEY | 60000 |   292K|    32   (0)| 00:00:01 |

-------------------------------------------------------------------------------

8 rows selected.

SQL>
SQL>
SQL> ------------------------------------------------------------------------------------------------------------------------
SQL> -- (iv)explain plan before the creation of the Index that perform VERTICALLY and Access the relational tabl
.
SQL> explain plan for
  2  SELECT *
  3  FROM PART
  4  WHERE p_partkey = '#####'
  5  AND p_type = 'SMALL BRUSHED BRASS'
  6  AND p_retailprice = 1247.28;

Explained.

SQL>
SQL> -- Displan Plan (2a-iv)
SQL> select * from table(dbms_xplan.display);

PLAN_TABLE_OUTPUT
------------------------------------------------------------------------------------------------------------------------
Plan hash value: 937089370

-------------------------------------------------------------------------------
| Id  | Operation                    | Name       | Rows  | Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------------
|   0 | SELECT STATEMENT             |            |     1 |   121 |     2   (0)| 00:00:01 |
|*  1 |  FILTER                      |            |       |       |            |          |
|*  2 |   TABLE ACCESS BY INDEX ROWID| PART       |     1 |   121 |     2   (0)| 00:00:01 |

|*  3 |    INDEX UNIQUE SCAN         | PART_PEKEY |     1 |       |     1   (0)| 00:00:01 |
-------------------------------------------------------------------------------


PLAN_TABLE_OUTPUT
------------------------------------------------------------------------------------------------------------------------
Predicate Information (identified by operation id):
---------------------------------------------------

   1 - filter(TO_NUMBER('#####')>=0)
   2 - filter("P_RETAILPRICE"=1247.28 AND "P_TYPE"='SMALL BRUSHED BRASS')

   3 - access("P_PARTKEY"=TO_NUMBER('#####'))

17 rows selected.
```

```
SQL>
SQL> ------------------------------------------------------------------------------------------------------------------------
SQL> -- (v)explain plan before the creation of the Index that perform VERTICALLY & HORIZONTALLY and Ac
ess the relational table.
SQL> explain plan for
  2  SELECT *
  3  FROM PART
  4  WHERE p_retailprice > 5000;

Explained.

SQL>
SQL> -- Displan Plan (2a-v)
SQL> select * from table(dbms_xplan.display);

PLAN_TABLE_OUTPUT
------------------------------------------------------------------------------------------------------------------------
Plan hash value: 673417232

-------------------------------------------------------------------------
| Id  | Operation         | Name | Rows  | Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------
|   0 | SELECT STATEMENT  |      |     1 |   121 |   291   (1)| 00:00:01 |
|*  1 |  TABLE ACCESS FULL| PART |     1 |   121 |   291   (1)| 00:00:01 |
-------------------------------------------------------------------------

Predicate Information (identified by operation id):
---------------------------------------------------

PLAN_TABLE_OUTPUT
------------------------------------------------------------------------------------------------------------------------

   1 - filter("P_RETAILPRICE">5000)

13 rows selected.

SQL>
SQL> /*============================================================
SQL> -- Create the Index
SQL> ============================================================*/
SQL> create index A1Q2aIdx on PART(p_name,p_type,p_retailprice);

Index created.

SQL>
SQL> -- (2a-i) select statement that perform Vertal-Traversal and not access a relational table after create the Index
SQL> --explain plan
SQL> explain plan for
  2  SELECT COUNT(*)
  3  FROM PART
  4  WHERE p_partkey = '##########' ;
```

```
Explained.

SQL>
SQL> -- Displan Plan (2a-i)
SQL> select * from table(dbms_xplan.display);

PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
Plan hash value: 2596278069

-------------------------------------------------------------------------------
| Id  | Operation          | Name       | Rows  | Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------------
|   0 | SELECT STATEMENT    |            |     1 |     5 |     1   (0)| 00:00:01 |
|   1 |  SORT AGGREGATE     |            |     1 |     5 |            |          |
|*  2 |   FILTER            |            |       |       |            |          |
|*  3 |    INDEX UNIQUE SCAN| PART_PEKEY |     1 |     5 |     1   (0)| 00:00:01 |
-------------------------------------------------------------------------------


PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
Predicate Information (identified by operation id):
---------------------------------------------------

   2 - filter(TO_NUMBER('##########')>=0)
   3 - access("P_PARTKEY"=TO_NUMBER('##########'))

16 rows selected.

SQL>
SQL> -- (2a-ii) explain plan before the creation of the Index that perform Vertal-Traversal and Horizontally without
ccess a relational table.
SQL> explain plan for
  2  SELECT COUNT(*)
  3  FROM PART
  4  WHERE p_partkey > '#########' ;

Explained.

SQL>
SQL> -- Displan Plan (2a-ii)
SQL> select * from table(dbms_xplan.display);

PLAN_TABLE_OUTPUT
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Plan hash value: 4293627538

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

```
|   0 | SELECT STATEMENT  |           |     1 |     5 |     3   (0)| 00:00:01 |
|   1 |  SORT AGGREGATE   |           |     1 |     5 |            |          |
|*  2 |   INDEX RANGE SCAN| PART_PEKEY |  3000 | 15000 |     3   (0)| 00:00:01 |

---------------------------------------------------------------------------

Predicate Information (identified by operation id):

PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
-------------------------------------------------

   2 - access("P_PARTKEY">TO_NUMBER('#########'))

14 rows selected.

SQL>
SQL> -- (iii)explain plan before the creation of the Index that perform Horzontal Traversal without access a relation
l table.
SQL> explain plan for
  2  SELECT p_partkey
  3  FROM PART;

Explained.

SQL>
SQL> -- Displan Plan (2a-iii)
SQL> select * from table(dbms_xplan.display);

PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
Plan hash value: 2478391124

-----------------------------------------------------------------------------
| Id  | Operation            | Name       | Rows  | Bytes | Cost (%CPU)| Time     |
-----------------------------------------------------------------------------
|   0 | SELECT STATEMENT     |            | 60000 |   292K|    32   (0)| 00:00:01 |
|   1 |  INDEX FAST FULL SCAN| PART_PEKEY | 60000 |   292K|    32   (0)| 00:00:01 |

-----------------------------------------------------------------------------

8 rows selected.

SQL>
SQL> -- (iv)explain plan before the creation of the Index that perform VERTICALLY and Access the relational tabl
.
SQL> explain plan for
  2  SELECT *
  3  FROM PART
  4  WHERE p_partkey = '#####'
  5  AND p_type = 'SMALL BRUSHED BRASS'
  6  AND p_retailprice = 1247.28;
```

```
Explained.

SQL>
SQL> -- Displan Plan (2a-iv)
SQL> select * from table(dbms_xplan.display);

PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
Plan hash value: 937089370

-------------------------------------------------------------------------------------------
| Id  | Operation                    | Name       | Rows  | Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------------------------
|   0 | SELECT STATEMENT             |            |     1 |   121 |     2   (0)| 00:00:01 |
|*  1 |  FILTER                      |            |       |       |            |          |
|*  2 |   TABLE ACCESS BY INDEX ROWID| PART       |     1 |   121 |     2   (0)| 00:00:01 |

|*  3 |    INDEX UNIQUE SCAN         | PART_PEKEY |     1 |       |     1   (0)| 00:00:01 |
-------------------------------------------------------------------------------------------


PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
Predicate Information (identified by operation id):
---------------------------------------------------

   1 - filter(TO_NUMBER('#####')>=0)
   2 - filter("P_RETAILPRICE"=1247.28 AND "P_TYPE"='SMALL BRUSHED BRASS')

   3 - access("P_PARTKEY"=TO_NUMBER('#####'))

17 rows selected.

SQL>
SQL> -- (v)explain plan before the creation of the Index that perform VERTICALLY & HORIZONTALLY and Ac
ess the relational table.
SQL> explain plan for
  2  SELECT *
  3  FROM PART
  4  WHERE p_retailprice > 5000;

Explained.

SQL>
SQL> -- Displan Plan (2a-v)
SQL> select * from table(dbms_xplan.display);

PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
Plan hash value: 673417232
```

```
-------------------------------------------------------------------------
| Id  | Operation         | Name | Rows  | Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------
|   0 | SELECT STATEMENT  |      |     1 |   121 |   291   (1)| 00:00:01 |
|*  1 |  TABLE ACCESS FULL| PART |     1 |   121 |   291   (1)| 00:00:01 |
-------------------------------------------------------------------------

Predicate Information (identified by operation id):
---------------------------------------------------

PLAN_TABLE_OUTPUT
-----------------------------------------------------------------------------------------------------------------------------------

   1 - filter("P_RETAILPRICE">5000)

13 rows selected.

SQL>
SQL>
SQL> --Drop the Index
SQL> drop index A1Q2aIdx;

Index dropped.

SQL> ---
SQL>
SQL> set echo off
```