```
SQL> set feedback on
SQL>
SQL> /*====================================
SQL>       Name - Hay Munn Hnin Wai
SQL>       Student ID - 6573277
SQL>       Tutorial - T02
SQL>       Assignment 1 - Task(2B)
SQL> ====================================*/
SQL>
SQL> -- (2b-i) explain plan before the creation of the Index
SQL> explain plan for
  2  SELECT distinct o_total, o_orderDate
  3  FROM ORDERS
  4  ORDER BY O_ORDERDATE;
SELECT distinct o_total, o_orderDate
                 *
ERROR at line 2:
ORA-00904: "O_TOTAL": invalid identifier


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

PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
Plan hash value: 2932526239

-------------------------------------------------------------------------------
| Id  | Operation             | Name      | Rows  | Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------------
|   0 | SELECT STATEMENT      |           |  3023 | 15115 |  1326   (4)| 00:00:01 |
|*  1 |  FILTER               |           |       |       |            |          |
|   2 |   HASH GROUP BY       |           |  3023 | 15115 |  1326   (4)| 00:00:01 |
|   3 |    INDEX FAST FULL SCAN| A1Q2B4IDX |  1800K|  8789K|  1281   (1)| 00:00:01 |

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


PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
Predicate Information (identified by operation id):
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   1 - filter(COUNT(*)>2)

15 rows selected.

SQL>
SQL> --(2b-ii) explain plan before the creation of the Index
SQL> explain plan for
  2  SELECT *
```

```
  3  FROM PART
  4  WHERE P_BRAND = 'GOLDEN BOLTS'
  5  AND P_SIZE = 25;

Explained.

SQL>
SQL> -- Displan Plan (2b-ii)
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):
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PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------

   1 - filter("P_SIZE"=25 AND "P_BRAND"='GOLDEN BOLTS')

13 rows selected.

SQL>
SQL> --(2b-iii) explain plan before the creation of the Index
SQL> explain plan for
  2  SELECT C_CUSTKEY,C_NAME,C_ADDRESS
  3  FROM CUSTOMER;

Explained.

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

PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
Plan hash value: 2844954298

-------------------------------------------------------------------------
| Id  | Operation         | Name     | Rows  | Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------
|   0 | SELECT STATEMENT  |          | 45000 |  2241K|   282   (0)| 00:00:01 |
|   1 |  TABLE ACCESS FULL| CUSTOMER | 45000 |  2241K|   282   (0)| 00:00:01 |
```

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8 rows selected.

SQL>
SQL>
SQL> --(2b-iv) explain plan before the creation of the Index
SQL> explain plan for
  2  SELECT L_PARTKEY,count(*)
  3  FROM LINEITEM
  4  GROUP BY L_PARTKEY
  5  HAVING COUNT(L_TAX) >2;

Explained.

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

PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
Plan hash value: 2487493660

-------------------------------------------------------------------------------
| Id  | Operation          | Name     | Rows  | Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------------
|   0 | SELECT STATEMENT   |          |  3023 | 15115 |  8821   (1)| 00:00:01 |
|*  1 |  FILTER            |          |       |       |            |          |
|   2 |   HASH GROUP BY    |          |  3023 | 15115 |  8821   (1)| 00:00:01 |
|   3 |    TABLE ACCESS FULL| LINEITEM |  1800K|  8789K|  8775   (1)| 00:00:01 |

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


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

   1 - filter(COUNT(*)>2)

15 rows selected.

SQL>
SQL> --(2b-v) explain plan before the creation of the Index
SQL> explain plan for
  2  SELECT *
  3  FROM LINEITEM
  4  WHERE L_QUANTITY = 100
  5  OR L_SHIPMODE = 'FAST';
```

```
Explained.

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

PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
Plan hash value: 98068815

-------------------------------------------------------------------------------
| Id  | Operation         | Name     | Rows  | Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------------
|   0 | SELECT STATEMENT  |          |   257K|    30M|  8802   (1)| 00:00:01 |
|*  1 |  TABLE ACCESS FULL| LINEITEM |   257K|    30M|  8802   (1)| 00:00:01 |

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

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

   1 - filter("L_SHIPMODE"='FAST' OR "L_QUANTITY"=100)

13 rows selected.

SQL>
SQL> /*============================================================
SQL> -- Create the Index-1
SQL> ============================================================*/
SQL> create index A1Q2b1Idx on ORDERS(o_totalprice, o_orderDate);

Index created.

SQL>
SQL> -- (2b-i)explain plan after the creation of the Index for Q.2b-i
SQL> explain plan for
  2  SELECT distinct o_totalprice, o_orderDate
  3  FROM ORDERS
  4  ORDER BY O_ORDERDATE;

Explained.

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

PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
Plan hash value: 2215324369
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-------------------------------------------------------------------------------------------
| Id  | Operation            | Name      | Rows  | Bytes |TempSpc| Cost (%CPU)| Time     |
-------------------------------------------------------------------------------------------
|   0 | SELECT STATEMENT     |           |   449K|  6152K|       | 4874   (1)| 00:00:01 |
|   1 |  SORT UNIQUE         |           |   449K|  6152K|    10M|  2651   (1)| 00:00:01 |
|   2 |   INDEX FAST FULL SCAN| A1Q2B1IDX |   450K|  6152K|       |   428   (1)| 00:00:01 |

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

9 rows selected.

SQL>
SQL> /*=========================================================
SQL> -- Create the Index-2
SQL> ==========================================================*/
SQL> create index A1Q2b2Idx on PART(P_BRAND,P_SIZE);

Index created.

SQL>
SQL> --(2b-ii) explain plan after the creation of the Index
SQL> explain plan for
  2  SELECT *
  3  FROM PART
  4  WHERE P_BRAND = 'GOLDEN BOLTS'
  5  AND P_SIZE = 25;

Explained.

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

PLAN_TABLE_OUTPUT
-------------------------------------------------------------------------------------------------------------------------------
Plan hash value: 2863840681

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

|*  2 |   INDEX RANGE SCAN            | A1Q2B2IDX |     1 |       |     1   (0)| 00:00:01 |
-----------------------------------------------------------------------------------------

Predicate Information (identified by operation id):

PLAN_TABLE_OUTPUT
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```
   2 - access("P_BRAND"='GOLDEN BOLTS' AND "P_SIZE"=25)

14 rows selected.

SQL>
SQL> /*=========================================================
SQL> -- Create the Index-3
SQL> ==========================================================*/
SQL> create index A1Q2b3Idx on CUSTOMER(c_CUSTKEY,C_NAME , C_ADDRESS);

Index created.

SQL>
SQL>
SQL> --(2b-iii) explain plan after the creation of the Index
SQL> explain plan for
  2  SELECT C_CUSTKEY,C_NAME,C_ADDRESS
  3  FROM CUSTOMER;

Explained.

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

PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
Plan hash value: 1838490812

-------------------------------------------------------------------------------
| Id  | Operation             | Name      | Rows  | Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------------
|   0 | SELECT STATEMENT      |           | 45000 |  2241K|   105   (0)| 00:00:01 |
|   1 |  INDEX FAST FULL SCAN| A1Q2B3IDX | 45000 |  2241K|   105   (0)| 00:00:01 |

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

8 rows selected.

SQL>
SQL>
SQL> /*=========================================================
SQL> -- Create the Index-4
SQL> ==========================================================*/
SQL> create index A1Q2b4Idx on LINEITEM(L_partkey,L_TAX);

Index created.

SQL>
SQL> --(2b-iv) explain plan after the creation of the Index
SQL> explain plan for
```

```
  2  SELECT L_PARTKEY,count(*)
  3  FROM LINEITEM
  4  GROUP BY L_PARTKEY
  5  HAVING COUNT(L_TAX) >2;

Explained.

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

PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
Plan hash value: 2932526239

-------------------------------------------------------------------------------
| Id  | Operation             | Name      | Rows  | Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------------
|   0 | SELECT STATEMENT      |           |  3023 | 15115 |  1326   (4)| 00:00:01 |
|*  1 |  FILTER               |           |       |       |            |          |
|   2 |   HASH GROUP BY       |           |  3023 | 15115 |  1326   (4)| 00:00:01 |
|   3 |    INDEX FAST FULL SCAN| A1Q2B4IDX |  1800K|  8789K|  1281   (1)| 00:00:01 |

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


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

   1 - filter(COUNT(*)>2)

15 rows selected.

SQL>
SQL> /*============================================================
SQL> -- Create the Index-5
SQL> ============================================================*/
SQL> create index A1Q2b5Idx on LINEITEM (L_QUANTITY,L_SHIPMODE);

Index created.

SQL>
SQL> --(2b-v) explain plan after the creation of the Index
SQL> explain plan for
  2  SELECT *
  3  FROM LINEITEM
  4  WHERE L_QUANTITY = 100
  5  OR L_SHIPMODE = 'FAST';

Explained.
```

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

PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------------------------------------
Plan hash value: 98068815

-------------------------------------------------------------------------------
| Id  | Operation         | Name     | Rows  | Bytes | Cost (%CPU)| Time     |
-------------------------------------------------------------------------------
|   0 | SELECT STATEMENT  |          |   257K|    30M|  8802   (1)| 00:00:01 |
|*  1 |  TABLE ACCESS FULL| LINEITEM |   257K|    30M|  8802   (1)| 00:00:01 |

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

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

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

   1 - filter("L_SHIPMODE"='FAST' OR "L_QUANTITY"=100)

13 rows selected.

SQL>
SQL>
SQL> --Drop the Index
SQL> drop index A1Q2b1Idx;

Index dropped.

SQL> drop index A1Q2b2Idx;

Index dropped.

SQL> drop index A1Q2b3Idx;

Index dropped.

SQL> drop index A1Q2b4Idx;

Index dropped.

SQL> drop index A1Q2b5Idx;

Index dropped.

SQL> ---
SQL>
```

SQL> set echo off

/* From the Above 5 Queries, there is One Query from 3b(v) that cannot be speed up query processing. */