

```

CREATE TABLE ARTICOLO
  (A_IDArt NUMBER(5,0),
  A_Titolo VARCHAR2(200 BYTE),
  A_Rivista VARCHAR2(200 BYTE),
  A_Vol NUMBER(5,0),
  A_Num NUMBER(5,0),
  A_Pagg VARCHAR2(20 BYTE),
  PRIMARY KEY (A_IDArt)
);

CREATE TABLE RICERCATORE
  (R_IDRic NUMBER(5,0),
  R_Nome VARCHAR2(30 BYTE),
  R_Cognome VARCHAR2(30 BYTE),
  R_Email VARCHAR2(30 BYTE),
  R_Afferenza VARCHAR2(300 BYTE),
  PRIMARY KEY (R_IDRic)
);

CREATE TABLE AUTORE
  (AU_IDArt NUMBER(5,0),
  AU_IDRic NUMBER(5,0),
  PRIMARY KEY (AU_IDArt,AU_IDRic),
  FOREIGN KEY (AU_IDArt) REFERENCES ARTICOLO (A_IDArt),
  FOREIGN KEY (AU_IDRic) REFERENCES RICERCATORE (R_IDRic)
);

CREATE TABLE CITA
  (C_IDArt NUMBER(5,0),
  C_Pos NUMBER(5,0),
  C_ArticoloCitato NUMBER(5,0),
  PRIMARY KEY (C_IDArt,C_Pos),
  FOREIGN KEY (C_IDArt) REFERENCES ARTICOLO (A_IDArt),
  FOREIGN KEY (C_ArticoloCitato) REFERENCES ARTICOLO (A_IDArt)
);

create or replace Function Hindex(vRic number) return int IS

CURSOR cArticoli IS
select count(*) as numCit from Cita C, Articolo A, Autore Au
where A_IdArt=C_Articolocitato and A_IdArt=Au_IdArt and Au_IdRic=vRic
group by A_idArt
order by 1 desc;

vIndex int;
vCit int;

Begin
  vIndex:=0;
  OPEN cArticoli();
  LOOP
    FETCH cArticoli into vCit;
    EXIT WHEN cArticoli%NOTFOUND;
    if vCit>vIndex then
      vIndex:=vIndex+1;
    else
      EXIT;
    end if;
  END LOOP;
  DBMS_OUTPUT.PUT_LINE('HIndex : ' || vIndex );
  return vIndex;
end;

```

```

select P_BRAND, count(*)
from TPCD.PART,TPCD.ORDERS, TPCD.LINEITEM
where P_PARTKEY=L_PARTKEY and L_ORDERKEY=O_ORDERKEY and
O_ORDERPRIORITY='5-LOW'
group by P_BRAND;

```

| OPERATION | OBJECT_NAME | CARDINALITY |
|-------------------------------|--------------|-------------|
| SELECT STATEMENT | | 25 |
| SORT (GROUP BY) | | 25 |
| NESTED LOOPS | | 1200243 |
| NESTED LOOPS | | 1200243 |
| TABLE ACCESS (FULL) | ORDERS | 300000 |
| Filter Predicates | | |
| O_ORDERPRIORITY='5-LOW' | | |
| TABLE ACCESS (BY INDEX ROWID) | LINEITEM | 4 |
| INDEX (RANGE SCAN) | IX_ORDER_LI | 4 |
| Access Predicates | | |
| L_ORDERKEY=O_ORDER | | |
| TABLE ACCESS (BY INDEX ROWID) | PART | 1 |
| INDEX (UNIQUE SCAN) | SYS_C0036430 | 1 |
| Access Predicates | | |
| P_PARTKEY=L_PARTKEY | | |

$$NP_{PART} = \lceil 200.000 \times 131 / (4096 \times 0,69) \rceil = 9.271$$

$$NPL_{LINEITEM} = \lceil 6.001.215 \times 113 / (4096 \times 0,69) \rceil = 239.944$$

$$NP_{ORDERS} = \lceil 1.500.000 \times 106 / (4096 \times 0,69) \rceil = 56.259$$

$$Sel(O_ORDERPRIORITY='5-LOW') = 1/5$$

$$NL_{L_ORDERKEY} = \lceil (6.001.215 \times 4 + 1.500.000 \times 4) / (4096 \times 0,69) \rceil = 10.617$$

$$\text{Costo di accesso con indice ordered a LINEITEM} = 2 + \lceil 1/1.500.000 * 10.617 \rceil + \lceil 1/1.500.000 * 239.944 \rceil = 4$$

$$\text{Costo jon L-O} = 56.259 + 1.500.000 \times 1/5 \times 4 = \mathbf{1.256.259}$$

$$NT_{LI-O} = \lceil 6.001.215 \times 1/5 \rceil = 1.200.243$$

$$NPL_{LI-O} = \lceil 1.200.243 \times (113+106) / (4096 \times 0,69) \rceil = 93.005$$

$$NLP_{PARTKEY} = \lceil (200.000 \times 4 + 200.000 \times 4) / (4096 \times 0,69) \rceil = 567$$

$$\text{Costo di accesso con indice ordered a PART} = 1 + \lceil 1/200.000 * 567 \rceil + \lceil 1/200.000 * 9.271 \rceil = 3$$

$$\text{Costo jon [L-O]-P} = 93.005 + 1.200.243 \times 3 = \mathbf{3.693.734}$$

$$NT_{LI-O-P} = 1.200.243$$

$$NPL_{LI-O-P} = \lceil 1.200.243 \times (131+113+106) / (4096 \times 0,69) \rceil = 148.638$$

$$\text{Costo del group by} = 2 \times 148.638 \times (\lceil \log_{100} 148.638 \rceil + 1) = \mathbf{1.189.104}$$

$$\mathbf{\text{Costo Totale} = 1.256.259 + 3.693.734 + 1.189.104 = 6.139.097}$$