

Soluzione

```
CREATE TABLE PROGETTO
(P_NumProg NUMBER(5,0),
P_Specifiche VARCHAR2 (500),
P_Deadline DATE,
PRIMARY KEY (P_NumProg)
);
```

```
CREATE TABLE CONSEGNA
(C_NumProgetto NUMBER(5,0),
C_Gruppo NUMBER(1,0),
C_Voto NUMBER(5,0),
C_Data DATE,
PRIMARY KEY (C_NumProgetto,C_Gruppo,C_Data),
FOREIGN KEY (C_NumProgetto) REFERENCES PROGETTO (P_NumProg)
);
```

```
create or replace procedure stampaGruppi as
cursor curAmm is
select C_Gruppo, sum(C_Voto*10/P_PunteggioMax) as punti from PROGETTO p,
CONSEGNA c
where P_numProg=C_numProgetto and C_data=
(select max(c1.C_data) from consegna c1 where c1.C_gruppo=c.C_gruppo and
c1.C_numProgetto=c.C_numProgetto)
group by C_gruppo
order by C_gruppo;

begin
for vAmm in curAmm loop
dbms_output.put_line('Gruppo '||vAmm.C_gruppo||' punti =' || vAmm.punti);
end loop;

end;
```

```

select R_NAME, count(*)
from TPCD.REGION, TPCD.NATION, TPCD.SUPPLIER
where R_REGIONKEY=N_REGIONKEY and N_NATIONKEY=S_NATIONKEY
group by R_NAME;

```

OPERATION	OBJECT_NAME	CARDINALITY
SELECT STATEMENT		5
SORT (GROUP BY)		5
HASH JOIN		10000
Access Predicates		
N_NATIONKEY=S_NATIONKEY		
HASH JOIN		25
Access Predicates		
R_REGIONKEY=N_REGIONKEY		
TABLE ACCESS (FULL)	REGION	5
TABLE ACCESS (FULL)	NATION	25
TABLE ACCESS (FULL)	SUPPLIER	10000

$$NP_{REGION} = \lceil 5 \times 114 / (4096 \times 0,69) \rceil = 1$$

$$NP_{NATION} = \lceil 25 \times 106 / (4096 \times 0,69) \rceil = 1$$

$$NP_{SUPPLIER} = \lceil 10.000 \times 144 / (4096 \times 0,69) \rceil = 510$$

Costo Hash Join R-N = 1+1=2

$$N_{TR-N} = 25$$

$$NP_{R-N} = \lceil 25 \times (114+106) / (4096 \times 0,69) \rceil = 2$$

Costo Hybrid Hash Join R-N = 3 × (2 + 510) = 1.536

$$N_{TR-N-S} = 10.000$$

$$NP_{R-N-S} = \lceil 10.000 \times (144+114+106) / (4096 \times 0,69) \rceil = 1.288$$

Costo del group by $2 \times 1.288 \times (\lceil \log_{100} 1.288 \rceil + 1) = 7.728$

Costo Totale = 2 + 1.536 + 7.728 = 9.266