DJILLALI LIABES UNIVERSITY OF SIDI BEL ABBES
FACULTY OF EXACT SCIENCES
DEPARTMENT OF COMPUTER SCIENCES

Module : Bases de données Avancés II
1ST YEAR OF MASTER'S DEGEREE IN
NETWORKS,INFORMATION SYSTEMS & SECURITY(RSSI)
2021/2022

Bases de données Avancés II
TP-01

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TP-01

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Contents

Chapter 1

Solutions of Fiche TP-01

Notes regarding this solution :
This solution and the executions of the code in it was done in the following machine :

- *Machine*: Lenovo Ideapad S210
- *CPU*: Intel Celeron 1037U 1800 MHz
- *RAM*: 8GB DDR3l
- *OS* : Linux Mint 20.2 Cinnamon Kernel v.5.4.0-88
- *IDE* : SQL PLUS
- *Oracle version*: Express Edition 11g R2

1.1 Partie 1

Soit le schéma de la base de données relationnelle suivant :

Employe (numEmploye, nom, prenom, age, adresse)
Sport (numSport, nomSport, numLocal, salle)
Inscription (numSport, numEmploye, date, nbreHeures)
Local-de-Sport (numLocal, nomLocal)

Inscription modélise l'inscription d'un employé identifiée par num Employe à un sport identifié par numSport. Un sport est géré dans un Local-Sport identifié par numLocal.

1.1.1 Exprimez, lorsque cela est possible, les requêtes suivantes en algèbre relationnelle, en calcul relationnel de tuples et en SQL.)

```
CREATE TABLE Employe(
        numEmploye int not null PRIMARY KEY,
        nom char(30), prenom char(30),
        age int, adresse varchar(100));


CREATE TABLE Locale_de_Sport(
        numLocal int not null PRIMARY KEY,
        nomLocal varchar(200));


CREATE TABLE Sport(
        numSport int not null PRIMARY KEY,
        nomSport char(30),
        numLocal int,
        salle varchar(100),
        FOREIGN KEY(numLocal) REFERENCES Locale_de_Sport(numLocal));


CREATE TABLE Inscription (
        numSport int,
        numEmploye int,
        Inscription_date date,
        nbreHeures int,
        FOREIGN KEY(numSport) REFERENCES Sport(numSport),
        FOREIGN KEY(numEmploye) REFERENCES Employe(numEmploye));
```

We then Inserted to the tables random data.

```
INSERT INTO Employe VALUES(1,'Hadjazi','Hisham',20,'SBA');
INSERT INTO Employe VALUES(2,'Obaba','Maroko',20,'Tindouf');
INSERT INTO Employe VALUES(3,'Sahraoui','Amine',31,'SBA');
INSERT INTO Employe VALUES(4,'Merioua','Adel',31,'Oran');
```

```
INSERT INTO Employe VALUES(5,'Rais','Akram',35,'Biskra');
INSERT INTO Employe VALUES(6,'Chanbi','Maroua',25,'Oran');
INSERT INTO Employe VALUES(7,'Azzi','Sara',20,'Saida');
INSERT INTO Employe VALUES(8,'Mlata','Moncif',50,'Mascara');


INSERT INTO Locale_de_Sport VALUES(1, 'MiraSport');
INSERT INTO Locale_de_Sport VALUES(2, 'Victoire');
INSERT INTO Locale_de_Sport VALUES(3, 'SBAGYM');


INSERT INTO Sport VALUES(1, 'Swim', 1, 'bobasalle');
INSERT INTO Sport VALUES(2, 'Football', 1, 'Field');
INSERT INTO Sport VALUES(3, 'Running', 1, 'no1');
INSERT INTO Sport VALUES(4, 'Swim', 3, 'Ki30');
INSERT INTO Sport VALUES(5, 'Football', 2, 'SYM30');
INSERT INTO Sport VALUES(6, 'VollyBall', 2, '1');
INSERT INTO Sport VALUES(7, 'Soccer', 1, '1');
INSERT INTO Sport VALUES(8, 'Tennis', 3, '2');
INSERT INTO Sport VALUES(9, 'Rugby', 2, '2');


INSERT INTO Inscription VALUES(1, 1, '13-SEP-07', 20);
INSERT INTO Inscription VALUES(1, 2, '13-SEP-10', 50);
INSERT INTO Inscription VALUES(2, 6, '20-DEC-21', 10);
INSERT INTO Inscription VALUES(2, 7, '10-DEC-19', 14);
INSERT INTO Inscription VALUES(3, 8, '15-DEC-20', 18);
INSERT INTO Inscription VALUES(3, 9, '15-JAN-21', 18);
INSERT INTO Inscription VALUES(5, 1, '15-JAN-21', 18);
INSERT INTO Inscription VALUES(5, 9, '15-JAN-21', 18);
INSERT INTO Inscription VALUES(4, 9, '15-JAN-21', 06);
INSERT INTO Inscription VALUES(4, 5, '15-JAN-21', 05);
INSERT INTO Inscription VALUES(4, 3, '15-JAN-21', 14);
INSERT INTO Inscription VALUES(1, 3, '15-JAN-21', 14);
INSERT INTO Inscription VALUES(1, 4, '15-JAN-21', 14);
INSERT INTO Inscription VALUES(1, 5, '15-JAN-21', 14);
INSERT INTO Inscription VALUES(1, 6, '15-JAN-21', 14);
INSERT INTO Inscription VALUES(1, 7, '15-JAN-21', 14);
INSERT INTO Inscription VALUES(1, 8, '15-JAN-21', 14);
```

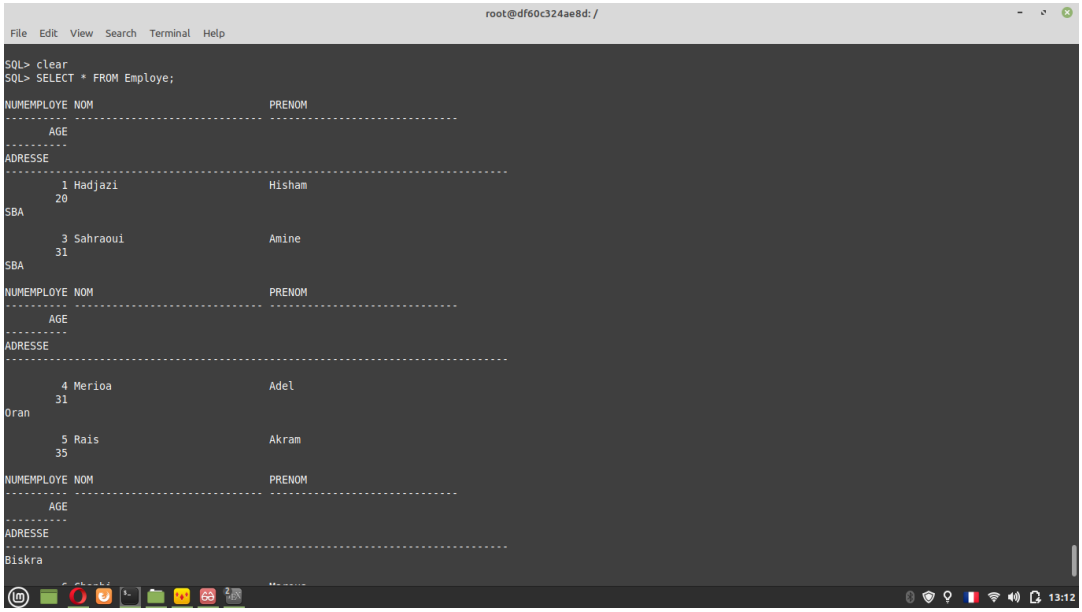

FIGURE 1.1: Employe Table

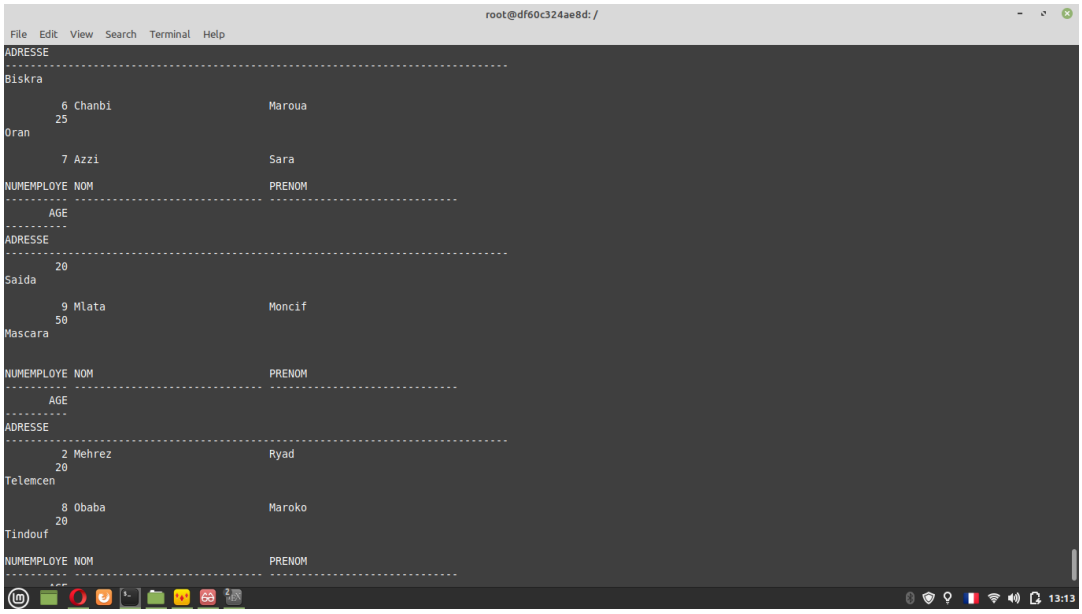

FIGURE 1.2: Employe Table

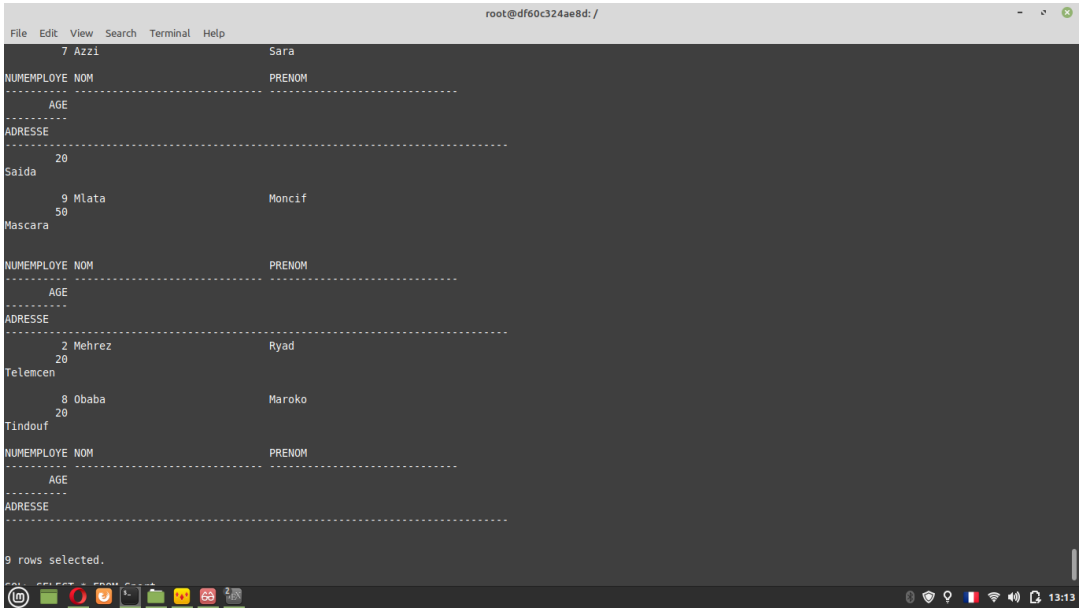

FIGURE 1.3: Employe Table

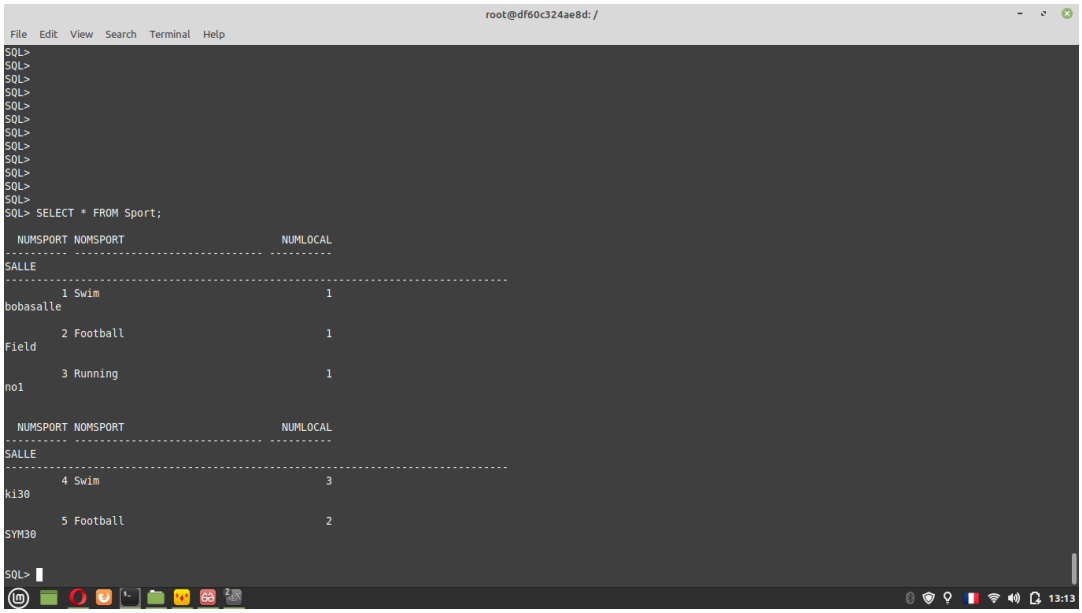

FIGURE 1.4: Sport Table

FIGURE 1.5: Local-de-Sport Table

FIGURE 1.6: Local-de-Sport Table

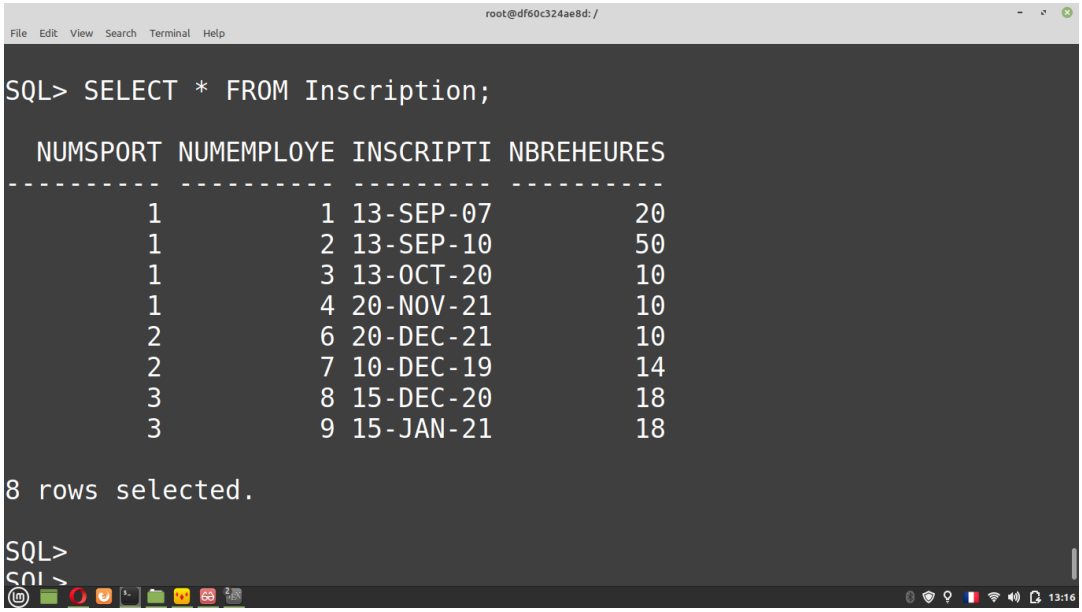

FIGURE 1.7: Local-de-Sport Table

1. Donnez les numéros, noms et prénoms des employés inscrits dans les sports gérés par le local de nom «Victoire».

```
SELECT e.numEmploye, e.nom, e.prenom
        FROM Employe e
        INNER JOIN Inscription i
                ON e.numEmploye = i.numEmploye
        INNER JOIN Sport s
                ON i.numSport = s.numSport
        INNER JOIN Locale_de_Sport l
                ON s.numLocal = l.numLocal
        WHERE l.nomLocal = 'Victoire';
```

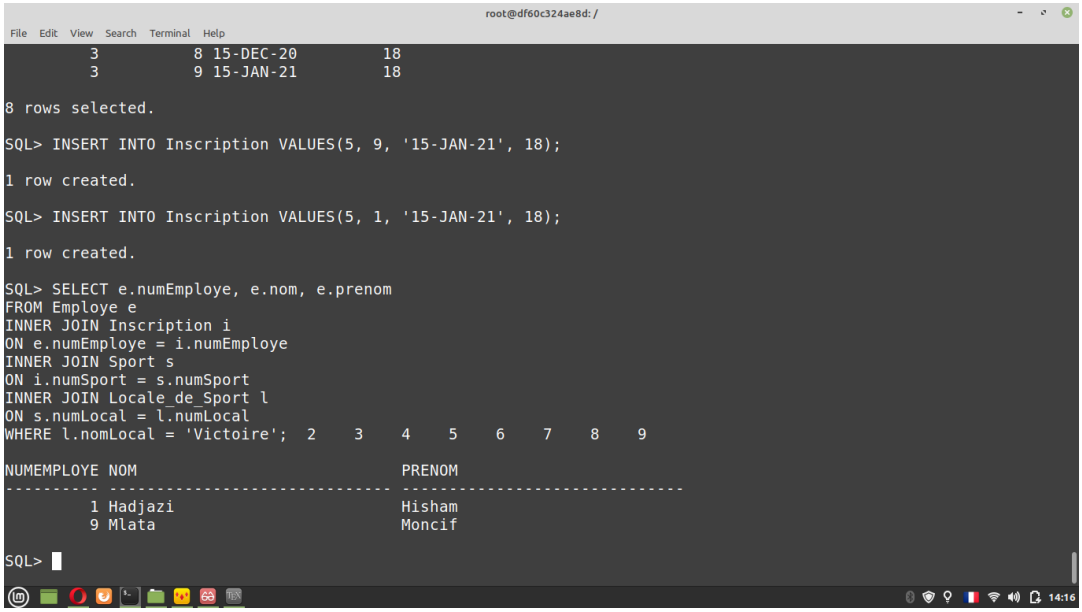

FIGURE 1.8: Query 1

2. Donnez les numéros des employés qui ne sont inscrits à aucun sport du Local n° 1.

```
SELECT DISTINCT e.numEmploye
        FROM Employe e
INNER JOIN Inscription i
        ON e.numEmploye = i.numEmploye
INNER JOIN Sport s
        ON i.numSport = s.numSport
INNER JOIN Locale_de_Sport l
        ON s.numLocal = l.numLocal
WHERE l.numLocal <> 1
        ORDER BY e.numEmploye;
```

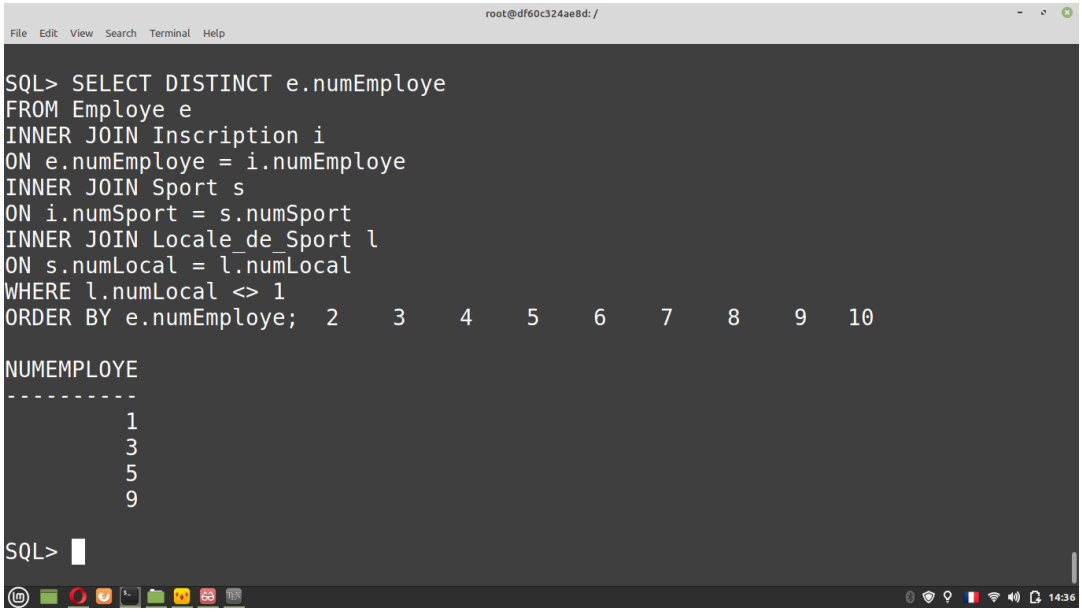

FIGURE 1.9: Query 2

3. Numéros des sports assurés dans les salles 1 ou 2.

```
SELECT numSport FROM Sport WHERE Salle = '1' OR Salle = '2';
```

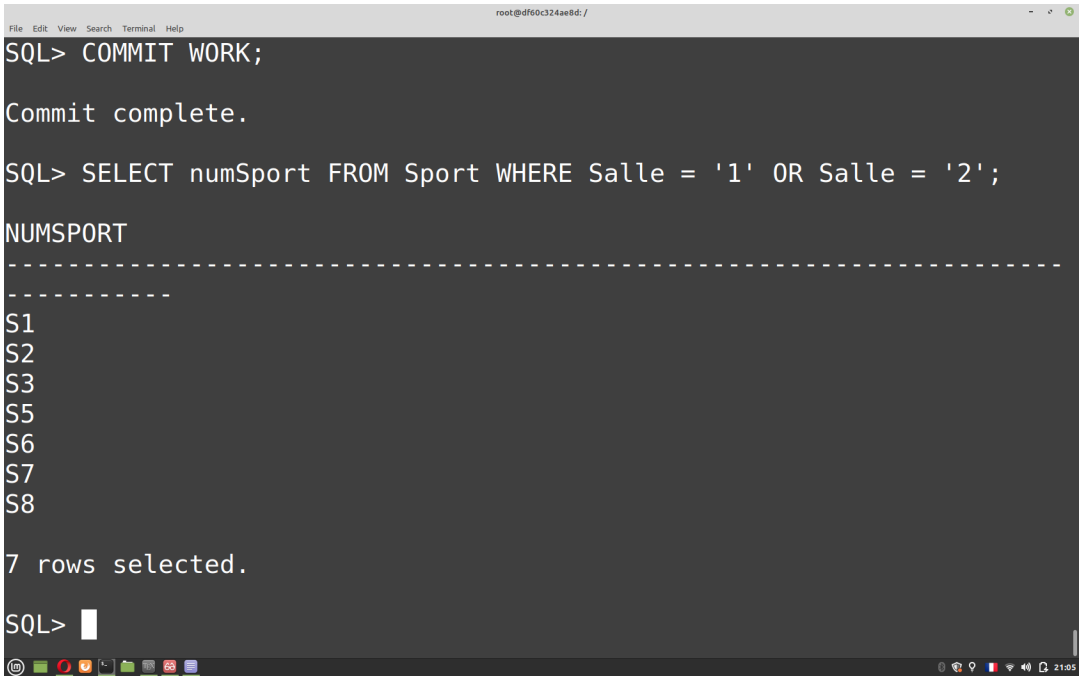

FIGURE 1.10: Query 3

4. Numéros des sports aux quels sont inscrits tous les employés.

```
select numSport from Sport s, Inscription i
where s.numSport = r.numSport
group by numSport
having count(*) = (select count(*) from Inscription)
```

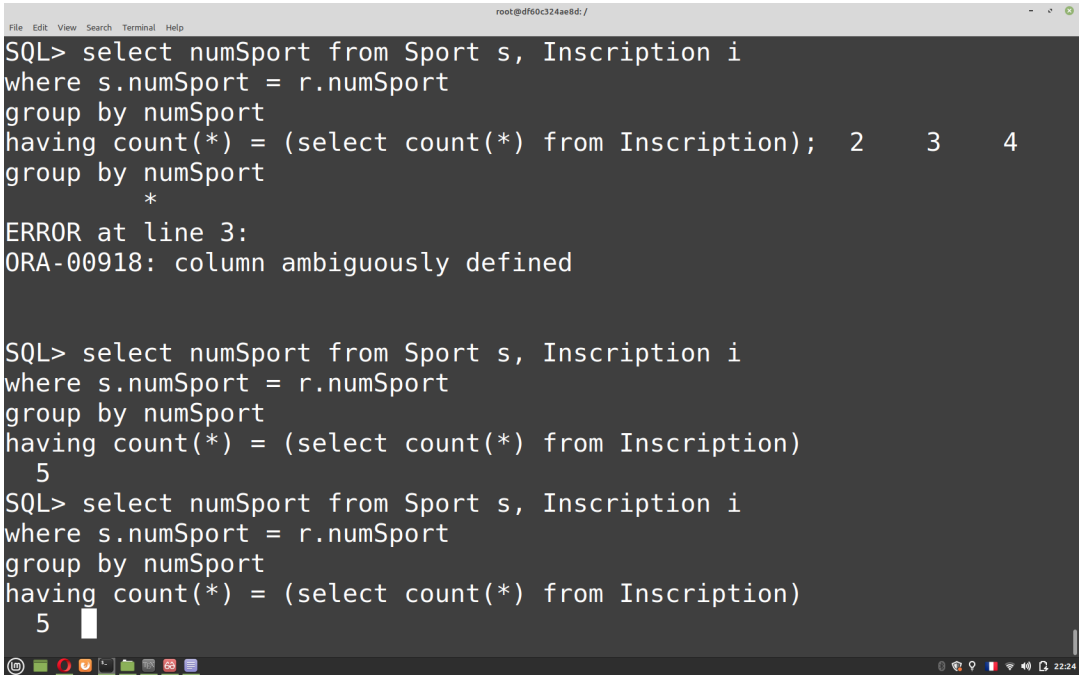

FIGURE 1.11: Query 3

5. Numéros des employés inscrits à tout sport du local n° 1.

```
select numEmploye, nbreHeures
from Inscription i , Sport s
where i.numSport = s.numSport
AND numLocal = '1'
group by numEmploye
having count(*) = (select count(*) from Inscription)
```

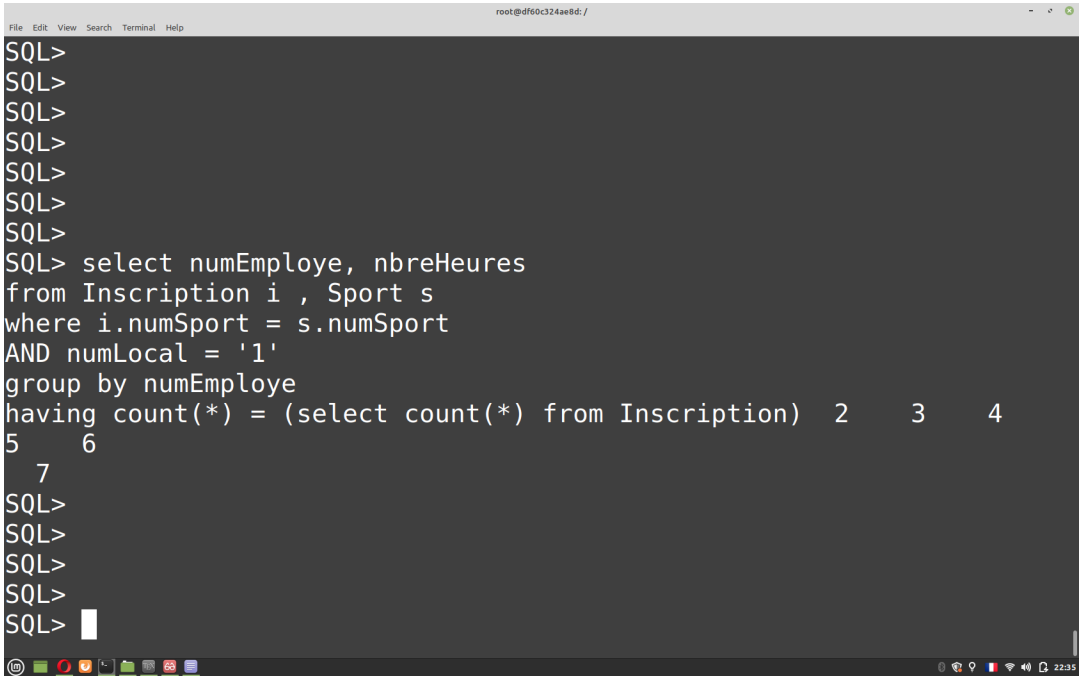

FIGURE 1.12: Query 3

1.2 Partie 2

1.2.1 1. A partir des énoncés ci-dessus, créez les tables base de données et procédez à leurs alimentations par les données suivantes :

Employe (numEmploye, nom, prenom, age, adresse)

(100, 'ABID', 'Mohamed', '35', 'SBA');
(101, 'BEY', 'Amina', '41', 'SBA');
(102, ' MIR', 'Ilyas', '29', 'Oran');
(103, 'DIAFI', 'Adel', '25', 'Oran');
(104, 'AMAR', 'Ali', '38', 'Oran');
(105, 'BENSAID', 'Salima', '39', 'Alger');
(106, 'NOUR', 'Khadija', '49', 'Alger');
(107, 'NACER', 'Fatima', '29', 'Oran');

```
INSERT INTO Employe VALUES(100, 'ABID', 'Mohamed', 35, 'SBA');
INSERT INTO Employe VALUES(101, 'BEY', 'Amina', 41, 'SBA');
INSERT INTO Employe VALUES(102, 'MIR', 'Ilyas', 29, 'Oran');
INSERT INTO Employe VALUES(103, 'DIAFI', 'Adel', 25, 'Oran');
INSERT INTO Employe VALUES(104, 'AMAR', 'Ali', 38, 'Oran');
INSERT INTO Employe VALUES(105, 'BENSAID', 'Salima', 39, 'Alger');
INSERT INTO Employe VALUES(106, 'NOUR', 'Khadija', 49, 'Alger');
INSERT INTO Employe VALUES(107, 'NACER', 'Fatima', 29, 'Oran');
```

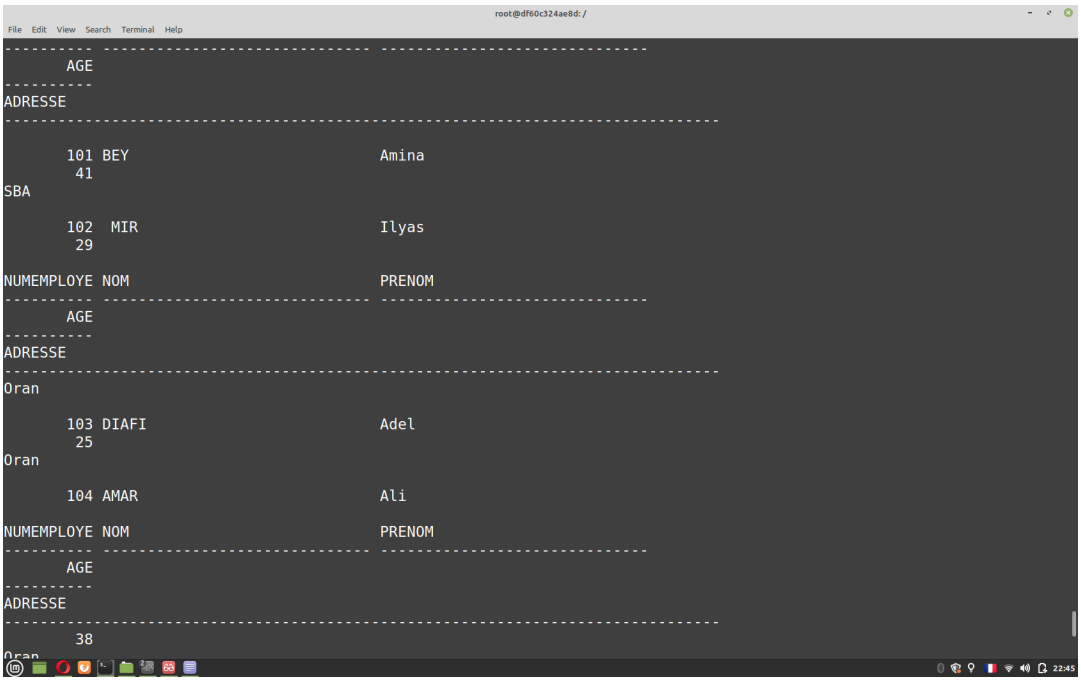

FIGURE 1.13: Query 1.1

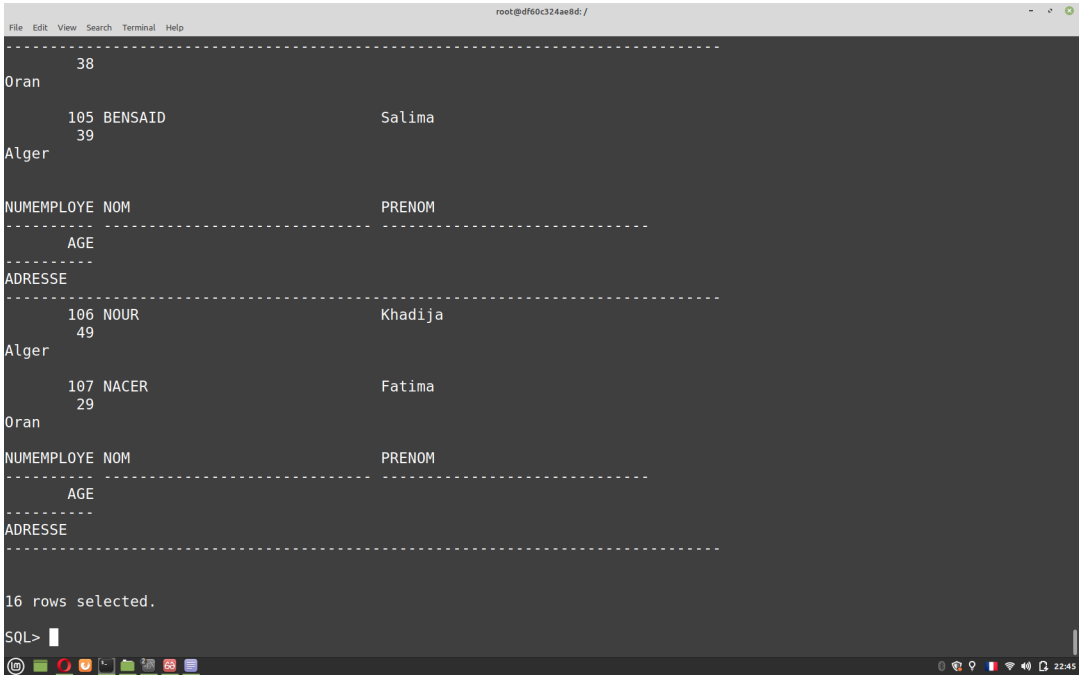

FIGURE 1.14: Query 1.2

Sport (numSport, nomSport, numLocal, salle)

('S1', ' Aérobic ', 'L1', '3');
('S2', ' Athlétisme ', 'L1', '1');
('S3', ' Basket-ball ', 'L2', '1');
('S4', ' Hand-ball ', 'L3', '2');

```
UPDATE Sport SET
    nomSport = 'Aerobic',
    numLocal = 'L1',
    salle = '3',

WHERE
     numSport = 'S1';

UPDATE Sport SET
    nomSport = 'Athletisme',
    numLocal = 'L1',
    salle = '1',

WHERE
     numSport = 'S2';

UPDATE Sport SET
    nomSport = 'Basket-ball',
    numLocal = 'L1',
    salle = '1',
```

```
WHERE
      numSport = 'S3';


UPDATE Sport SET
     nomSport = 'Hand-ball',
     numLocal = 'L3',
     salle = '2',

WHERE
      numSport = 'S4';
```

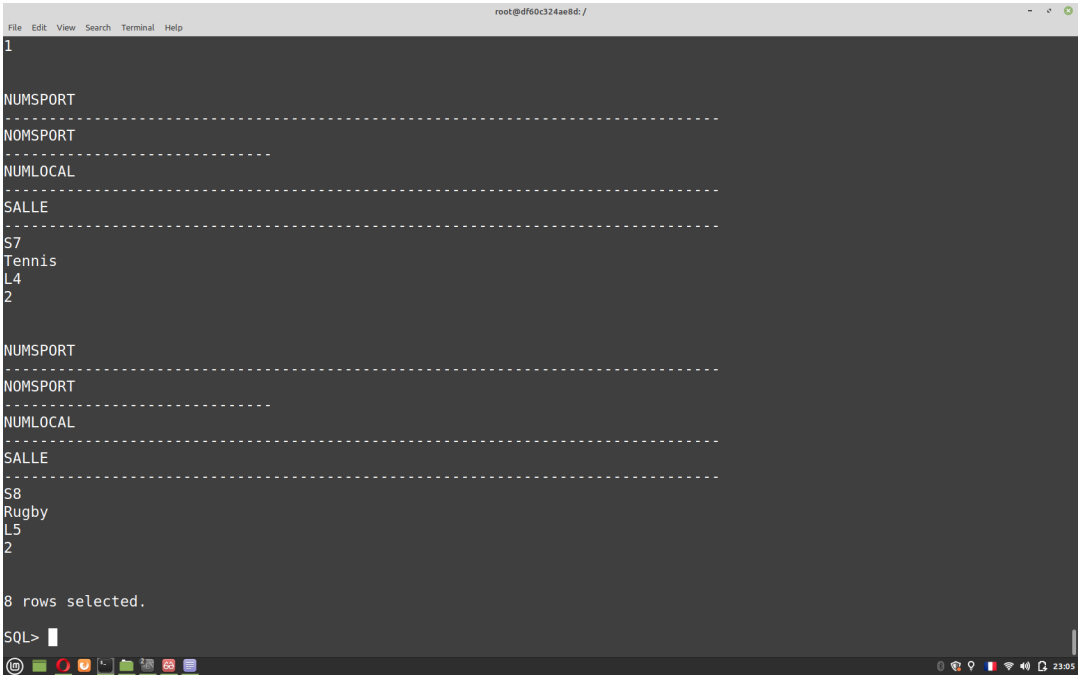

FIGURE 1.15: Query 2.1

Inscription (numSport, numEmploye, date, nbreHeures)

('S1', '101', '15-01-2017','3');
('S1', '100', '25-02-2019','6');
('S2', '100', '20-03-2017','3');
('S1', '104', '10-05-2019','4');
('S3', '102', '15-01-2018','4');
('S1', '103', '25-10-2017','6');
('S4', '100', '10-02-2019','6');
('S1', '107', '20-12-2018','8');
('S2', '104', '10-07-2019','4');
('S3', '100', '05-06-2019','6');
('S4', '105', '30-04-2017','6');
('S1', '102', '12-02-2019','6');
('S1', '106', '05-10-2018','6');
('S1', '105', '21-09-2019','4');
('S1', '105', '06-09-2021','4');

```
INSERT INTO Inscription VALUES('S1', '101', '15-01-2017',3);
INSERT INTO Inscription VALUES('S1', '100', '25-02-2019',6);
INSERT INTO Inscription VALUES('S2', '100', '20-03-2017',3);
INSERT INTO Inscription VALUES('S2', '104', '10-05-2019',4);
INSERT INTO Inscription VALUES('S3', '102', '15-01-2018',4);
INSERT INTO Inscription VALUES('S1', '103', '25-10-2017',6);
INSERT INTO Inscription VALUES('S4', '100', '10-02-2019',6);
INSERT INTO Inscription VALUES('S1', '107', '20-12-2018',8);
INSERT INTO Inscription VALUES('S2', '104', '10-07-2019',4);
INSERT INTO Inscription VALUES('S3', '100', '05-06-2019',6);
INSERT INTO Inscription VALUES('S4', '105', '30-04-2017',6);
INSERT INTO Inscription VALUES('S1', '102', '12-02-2019',6);
INSERT INTO Inscription VALUES('S1', '106', '05-10-2018',6);
INSERT INTO Inscription VALUES('S1', '105', '21-09-2019',4);
INSERT INTO Inscription VALUES('S1', '105', '06-09-2021',4);
```

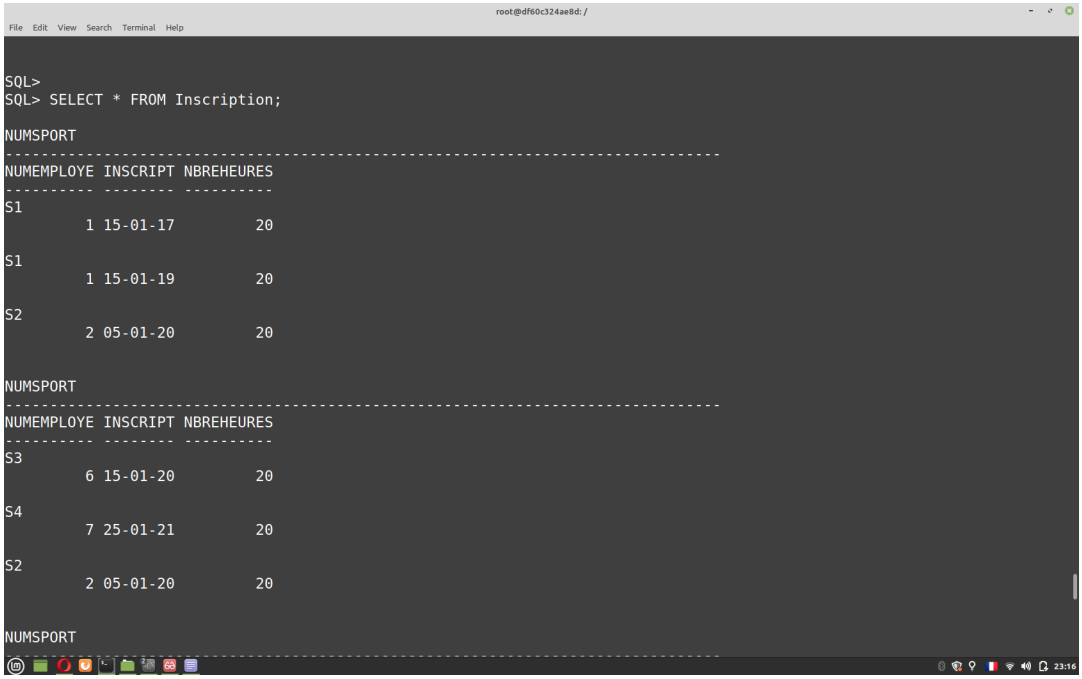

FIGURE 1.16: Query 3.1

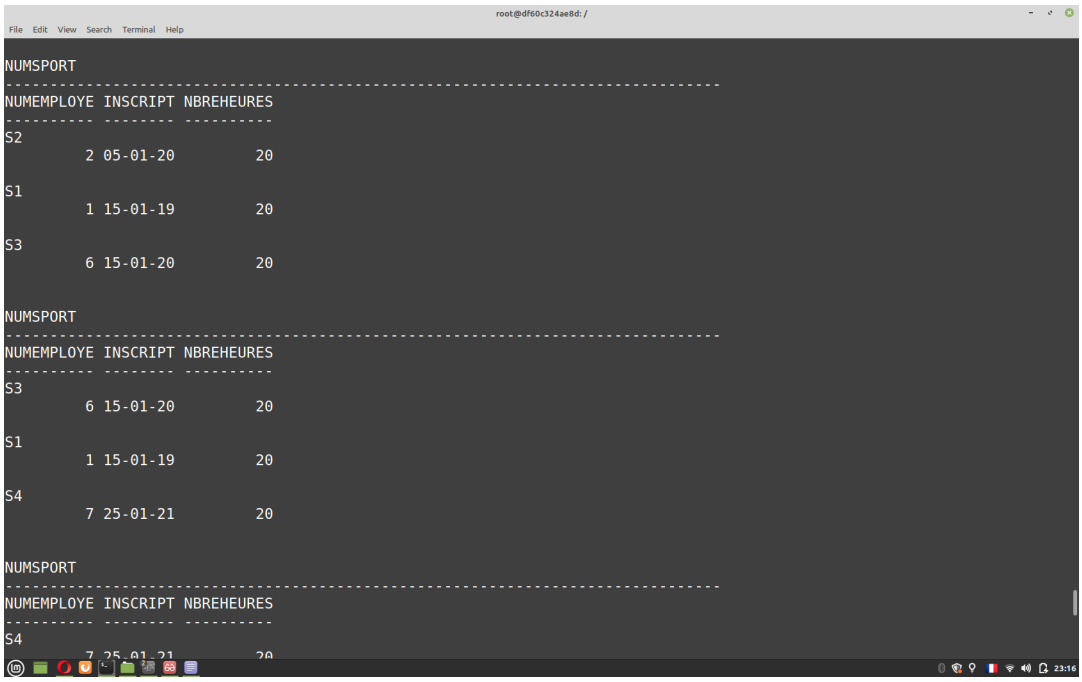

FIGURE 1.17: Query 3.2

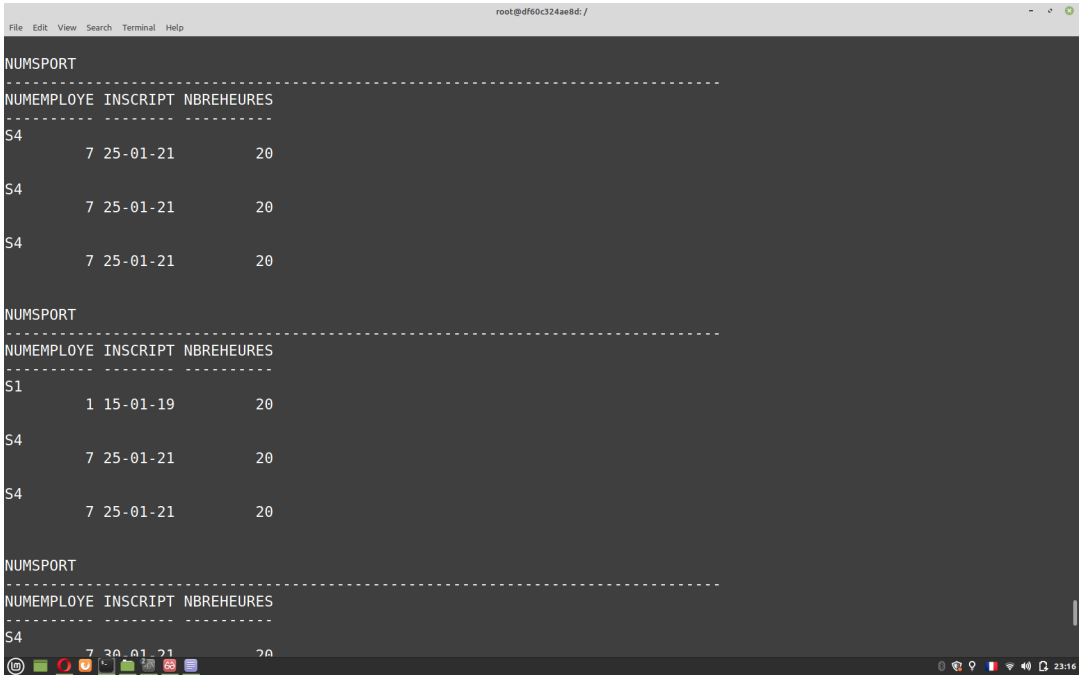

FIGURE 1.18: Query 3.3

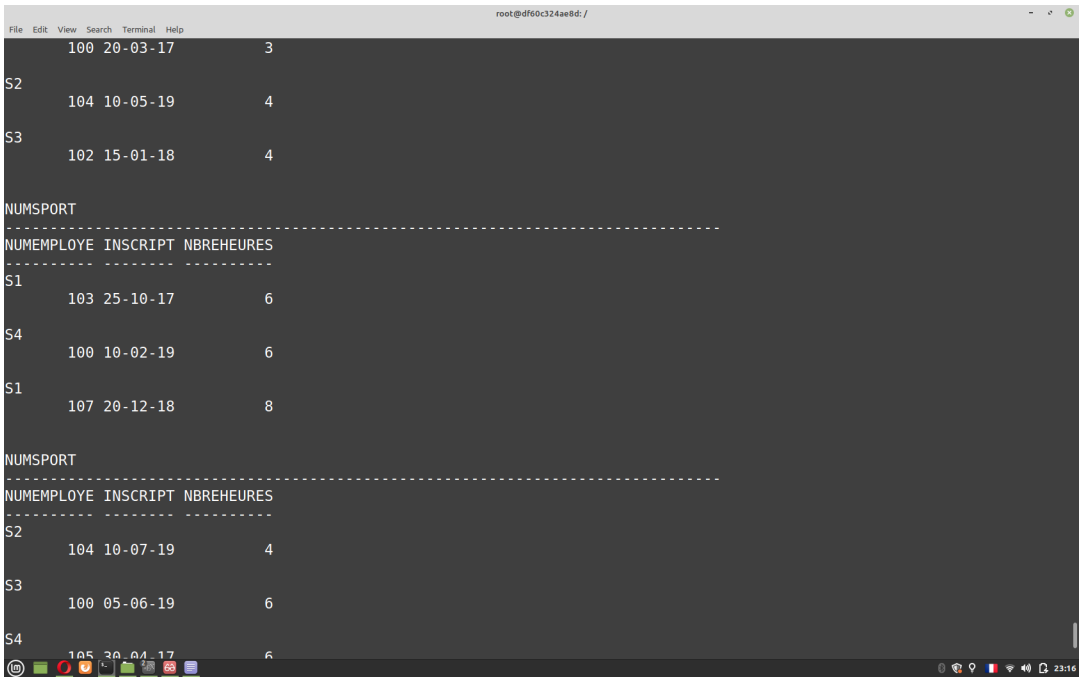

FIGURE 1.19: Query 3.4

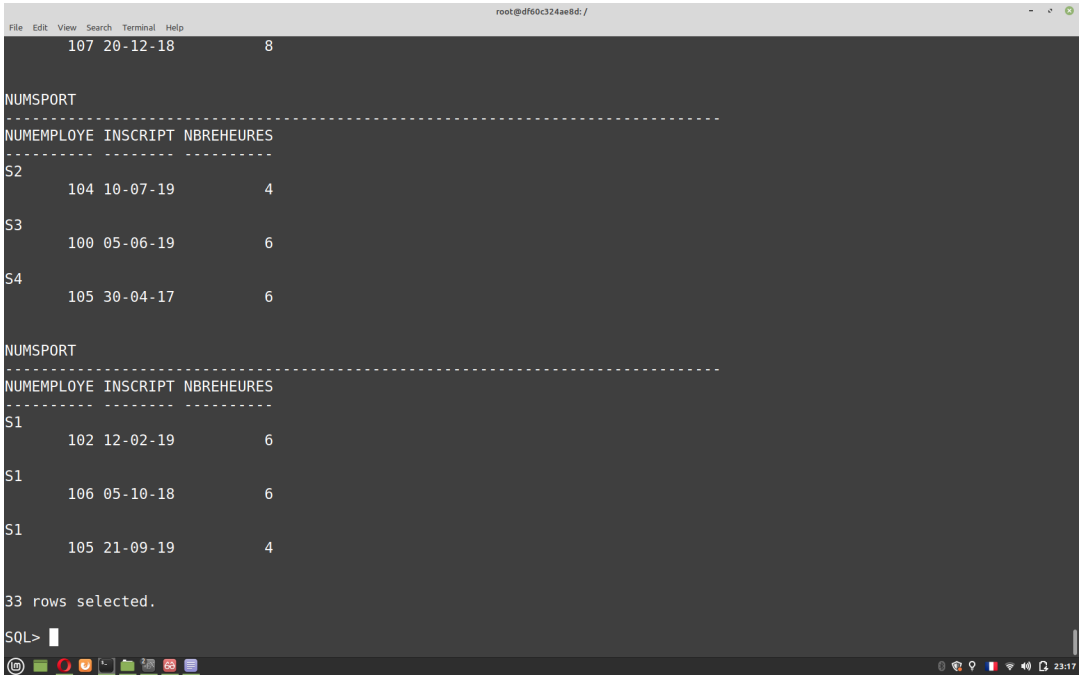

FIGURE 1.20: Query 3.5

Local-de-Sport (numLocal, nomLocal)

('L1', 'Competition');
('L2', 'Victoire');
('L3', 'Challenge');

```
INSERT INTO Locale_de_Sport VALUES('L1', 'Competition');
INSERT INTO Locale_de_Sport VALUES('L2', 'Victoire');
INSERT INTO Locale_de_Sport VALUES('L3', 'Challenge');
```

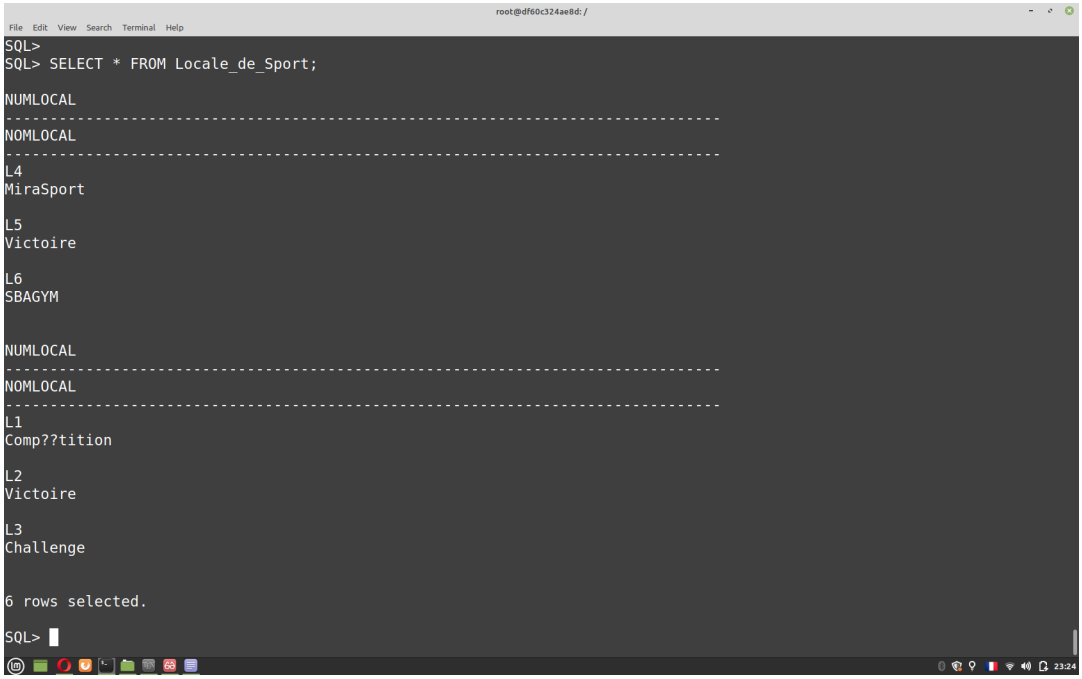

FIGURE 1.21: Query 4.1

1.2.2 2. Une fois les tables crées et alimentées, implémentez les requêtes SQL exprimées dans la partie 1.

1. Donnez les numéros, noms et prénoms des employés inscrits dans les sports gérés par le local de nom «Victoire».

```
SELECT DISTINCT e.numEmploye, e.nom, e.prenom
 FROM Employe e
INNER JOIN Inscription i
 ON e.numEmploye = i.numEmploye
INNER JOIN Sport s
 ON i.numSport = s.numSport
INNER JOIN Locale_de_Sport l
 ON s.numLocal = l.numLocal
WHERE l.nomLocal = 'Victoire';
```

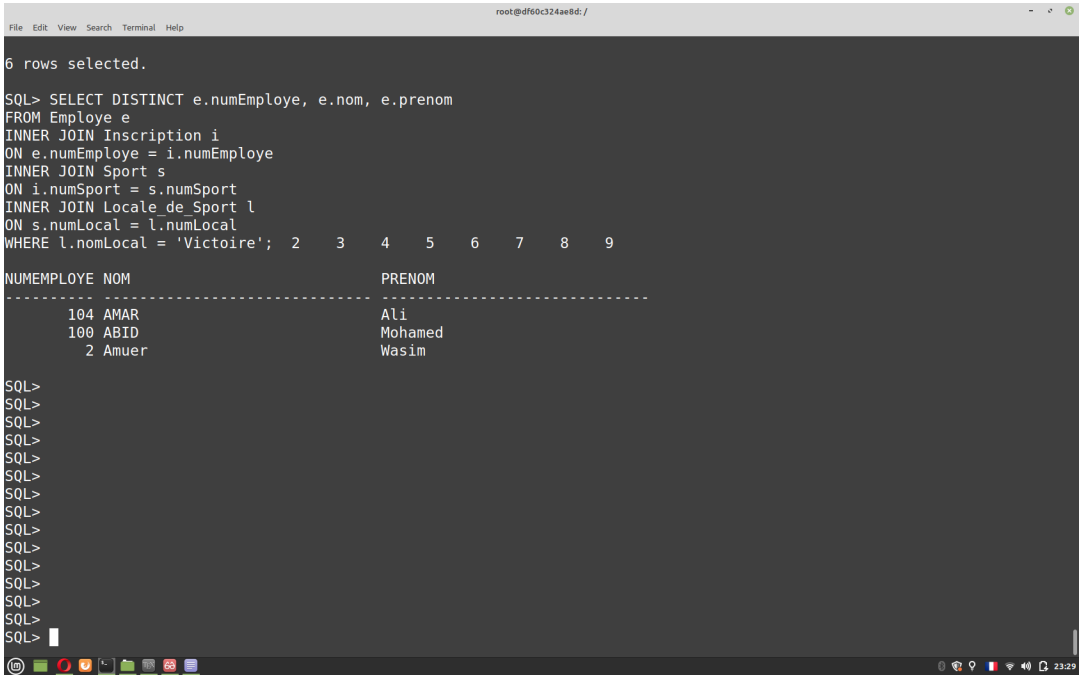

FIGURE 1.22: Query 6.1

2. Donnez les numéros des employés qui ne sont inscrits à aucun sport du Local n° 1.

```
SELECT DISTINCT e.numEmploye
FROM Employe e
INNER JOIN Inscription i
ON e.numEmploye = i.numEmploye
INNER JOIN Sport s
ON i.numSport = s.numSport
INNER JOIN Locale_de_Sport l
ON s.numLocal = l.numLocal
WHERE l.numLocal <> '1'
ORDER BY e.numEmploye;
```

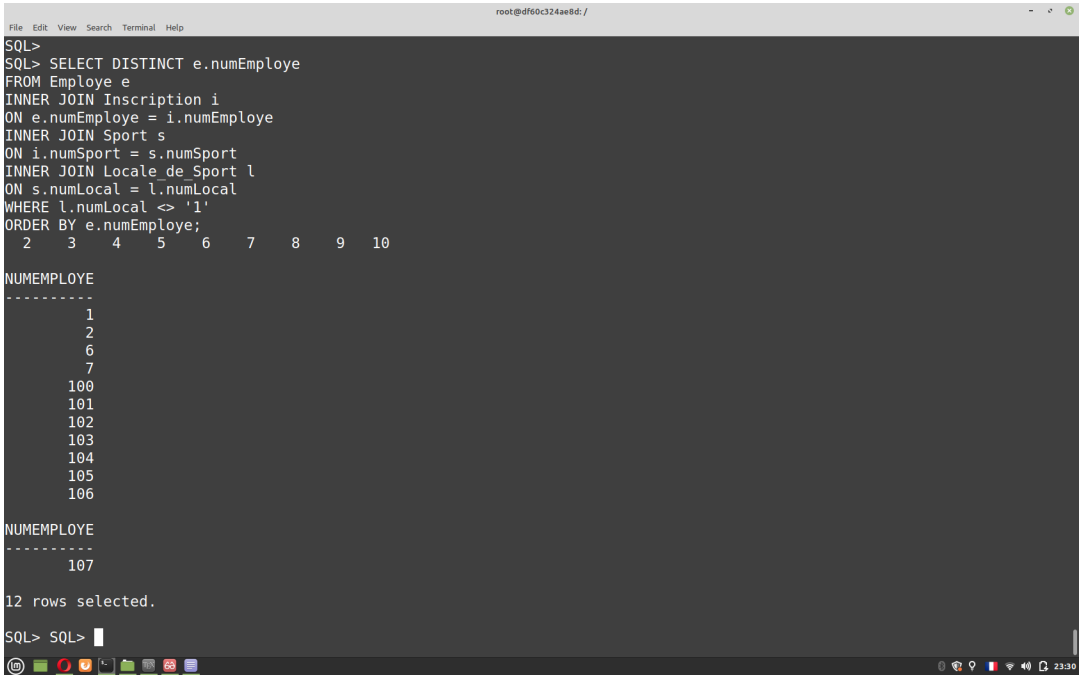

FIGURE 1.23: Query 6.2

3. Numéros des sports assurés dans les salles 1 ou 2.

```
SELECT numSport FROM Sport WHERE Salle = '1' OR Salle = '2';
```

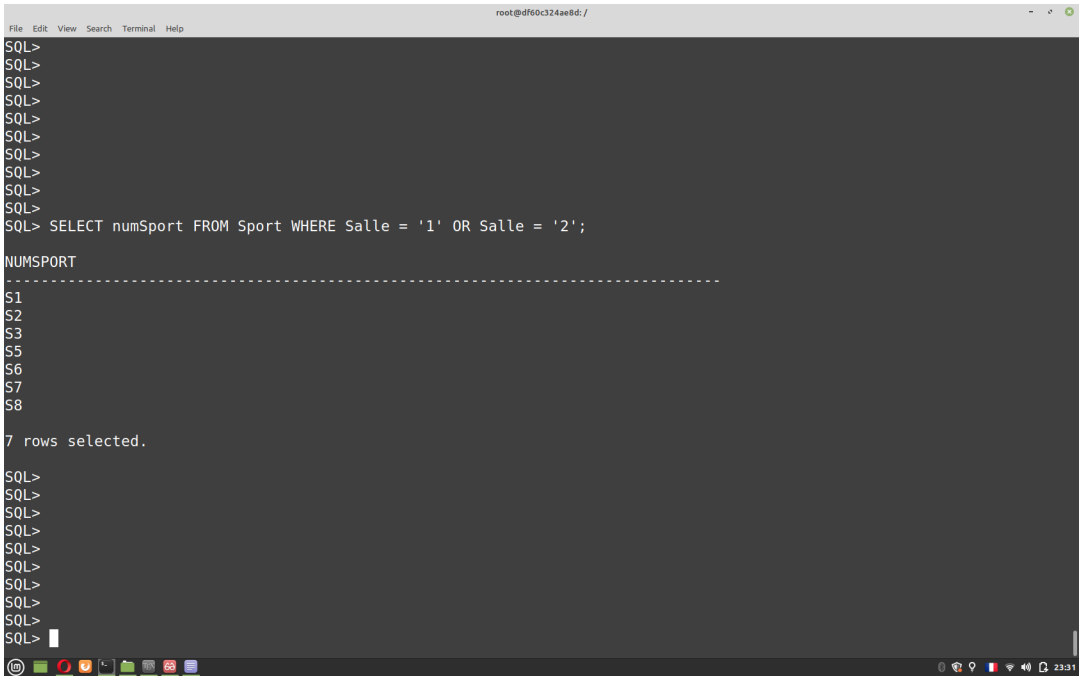

FIGURE 1.24: Query 3

4. Numéros des sports aux quels sont inscrits tous les employés.

```
select numSport from Sport s, Inscription i
where s.numSport = r.numSport
group by numSport
having count(*) = (select count(*) from Inscription)
```

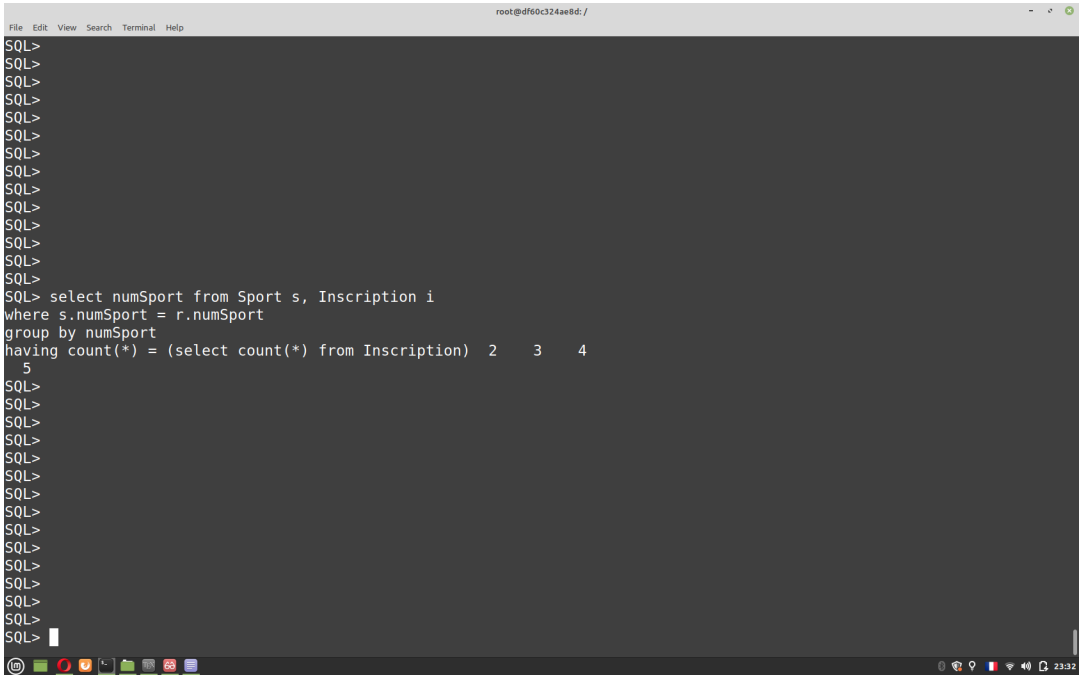

FIGURE 1.25: Query 6.4

5. Numéros des employés inscrits à tout sport du local n° 1.

```
select numEmploye, nbreHeures
from Inscription i , Sport s
where i.numSport = s.numSport
AND numLocal = '1'
group by numEmploye
having count(*) = (select count(*) from Inscription)
```

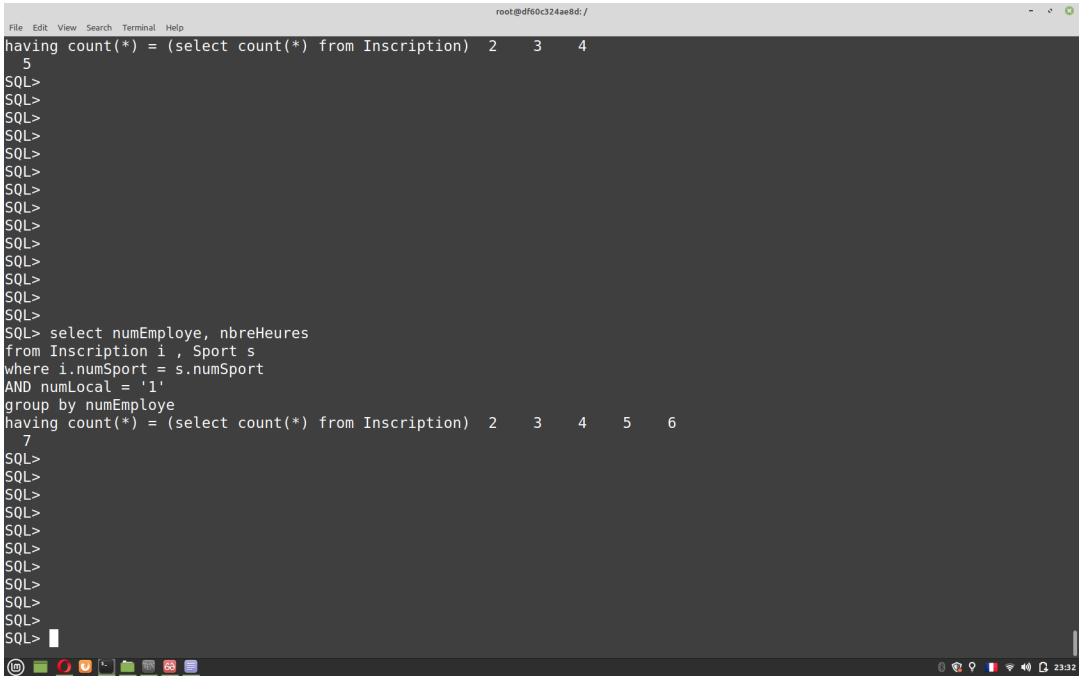

FIGURE 1.26: Query 6.5

1.2.3 3. Utilisez la commande explain plan pour calculer les coûts d'exécutions des requêtes. Comparez et commentez les résultats.

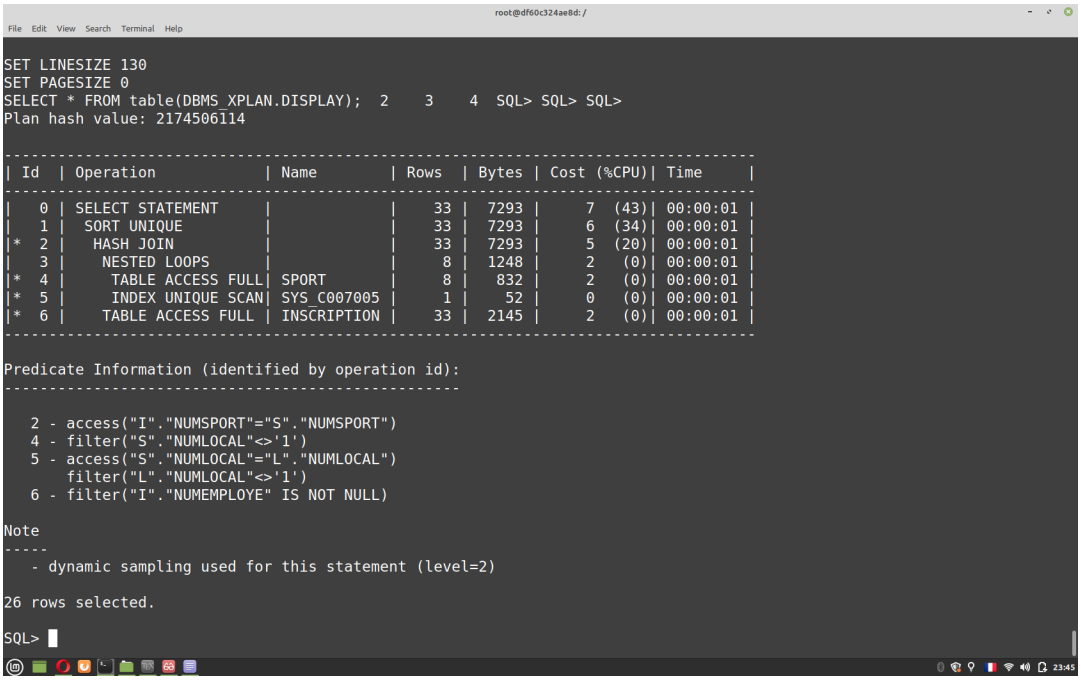

FIGURE 1.27: Query 7.1

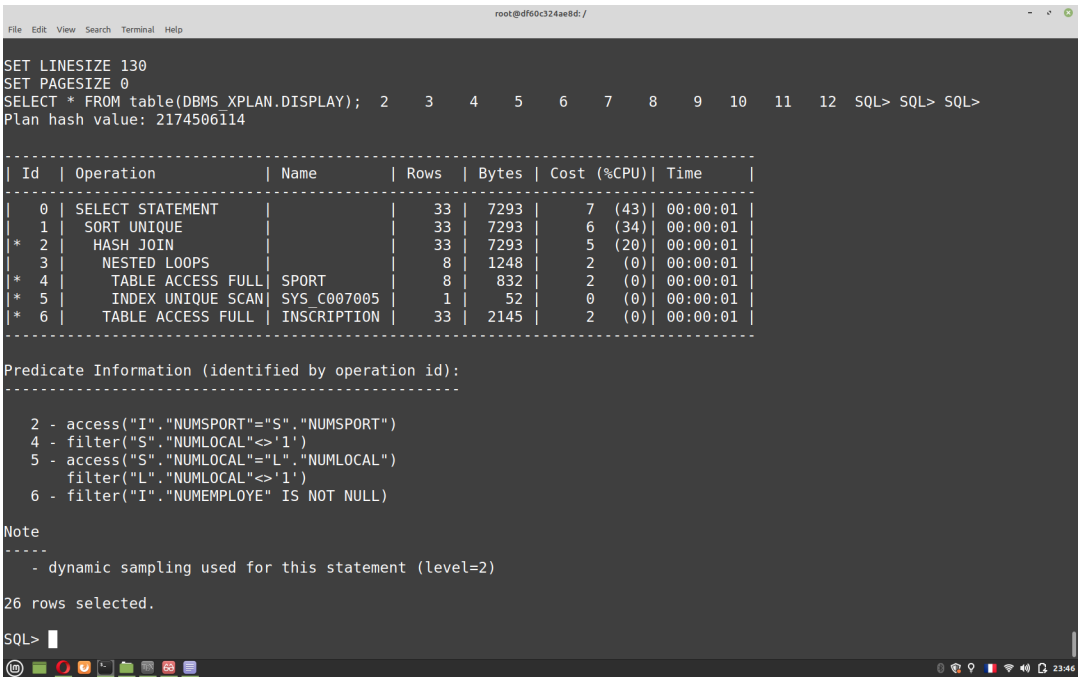

FIGURE 1.28: Query 7.2

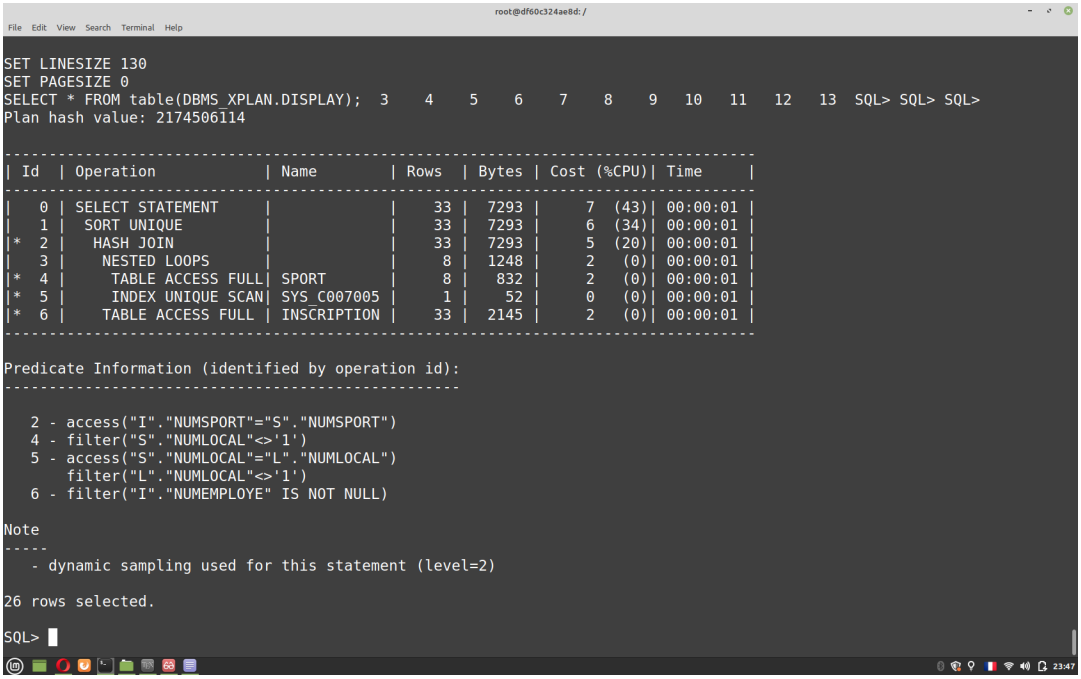

FIGURE 1.29: Query 7.2