Solution Tutorial N°5:

Exercise 01 :

Here are the SQL commands to address each question:

1. Create the physical data model

```
CREATE TABLE Student (
    Num INT,
    LastName_S VARCHAR(50),
    FirstName_S VARCHAR(50),
    BirthDate DATE,
    PRIMARY KEY Num,
    FOREIGN KEY (ThesisNum) REFERENCES Thesis(ThesisNum)
    );

CREATE TABLE Teacher (
    Code INT,
    LastName_T VARCHAR(50),
    FirstName_T VARCHAR(50),
    Specialty VARCHAR(50),
    PRIMARY KEY Code
);

CREATE TABLE Thesis (
    ThesisNum INT,
    Title VARCHAR(255),
    Specialty VARCHAR(50),
PRIMARY KEY ThesisNum
);

CREATE TABLE Session (
    SessionNum INT,
    StartDate DATE,
    EndDate DATE,
```

PRIMARY KEY SessionNum

);

CREATE TABLE Defense (

   DefenseNum INT,

   ThesisNum INT,

   SessionNum INT,

   Decision VARCHAR(50),

   Mention VARCHAR(50),

  PRIMARY KEY DefenseNum,

   FOREIGN KEY (ThesisNum) REFERENCES Thesis(ThesisNum),

   FOREIGN KEY (SessionNum) REFERENCES Session(SessionNum)

);

2. Add the column DefenseDate to the Defense table

ALTER TABLE Defense ADD COLUMN DefenseDate DATE;

3. Add the column Rank to the Teacher table

ALTER TABLE Teacher ADD COLUMN Rank VARCHAR(50);

4. Delete the table Teacher

DROP TABLE Teacher;

5. Modify the title of the thesis with number 410

UPDATE Thesis

SET Title = 'Development of an E-commerce Website'

WHERE ThesisNum = 410;

6. Assign the mention "Excellent" to all theses defended in session number 2

UPDATE Defense

SET Mention = 'Excellent'

WHERE SessionNum = 2;

Exercise 02 :

1. **List all planes with a capacity greater than 350 passengers**

SELECT Num-plane, Name-plane

FROM PLANE

WHERE Cap > 350;

2. **What are the numbers and names of planes located in Constantine?**

SELECT Num-plane, Name-plane

FROM PLANE

WHERE Loc = 'Constantine';

3. What are the numbers of pilots on duty and the departure cities of their flights?

SELECT DISTINCT FLIGHT.Numpil, FLIGHT.City_Dep

FROM FLIGHT ;

4. Provide all information about the pilots in the company.

SELECT Numpil, Name-pil, Adr, Sal, Num-FL, Num-plane, City_Dep, City_Arr, H_Dep, H_Arr

FROM PILOT

INNER JOIN FLIGHT ON PILOT.Numpil = FLIGHT.Numpil;

5. What are the names of pilots residing in Algiers with a salary greater than 220,000 DA?

SELECT Name-pil

FROM PILOT

WHERE Adr = 'Algiers' AND Sal > 220000;

6. What are the planes (number and name) located in Constantine or with a capacity less than 350 passengers?

SELECT Num-plane, Name-plane

FROM PLANE

WHERE Loc = 'Constantine' OR Cap < 350;

7. List all flights departing from Constantine to Algiers after 6:00 PM.

SELECT Num-FL

FROM FLIGHT

WHERE City_Dep = 'Constantine' AND City_Arr = 'Algiers' AND H_Dep > '18:00:00';

8. What are the numbers of pilots who are not on duty?

SELECT Numpil

FROM PILOT

WHERE Numpil NOT IN (SELECT Numpil FROM FLIGHT);

9. **What are the flights (number, departure city) performed by pilots with numbers 100 and 204?**

SELECT Num-FL, City_Dep
FROM FLIGHT
WHERE Numpil IN (100, 204);

10. **Provide the numbers of flights departing from Constantine performed by pilots residing in Constantine.**

SELECT Num-FL
FROM PILOT
INNER JOIN FLIGHT ON PILOT.Numpil = FLIGHT.Numpil
Where FLIGHT. City_Dep = 'Constantine' AND PILOT.Adr = 'Constantine';

11. **What are the flights performed by a plane that is not located in Constantine?**

SELECT Num-FL
FROM FLIGHT
INNER JOIN PLANE ON FLIGHT.Num-plane= Plane.Num-plane
WHERE Loc < > 'Constantine';

12. **What are the pilots (number and name) ensuring at least one flight departing from Constantine with a plane of capacity greater than 300 seats?**

   SELECT DISTINCT Numpil, Name-pil
   FROM PILOT
   INNER JOIN (FLIGHT INNER JOIN PLANE ON FLIGHT.Num-plane = PLANE.Num-plane) ON PILOT.Numpil = FLIGHT.Numpil
   WHERE FLIGHT.City_Dep = 'Constantine' AND PLANE.Cap > 300;

13. **What are the names of pilots residing in Algiers with a salary greater than 220,000 DA and ensuring a flight departing from Constantine with an Airbus?**

SELECT DISTINCT Numpil, Name-pil

FROM PILOT

INNER JOIN (FLIGHT INNER JOIN PLANE ON FLIGHT.Num-plane = PLANE.Num-plane) ON PILOT.Numpil = FLIGHT.Numpil

WHERE PILOT.Adr= 'Algiers' AND PILOT.Sal >220000 AND FLIGHT.City_Dep = 'Constantine' AND PLANE.Name-plane= 'Airbus' ;

14. What are the flight numbers performed either departing from or arriving in Constantine with a plane located in Algiers?

SELECT FLIGHT.Num-FL

FROM FLIGHT

INNER JOIN PLANE ON FLIGHT. Num-plane = PLANE.Num-plane

WHERE (FLIGHT.City_Dep = 'Constantine' OR FLIGHT.City_Arr = 'Constantine') AND PLANE.Loc = 'Algiers';

15. What are the pilots (number, name) living in the same city as the pilot named Ali?

SELECT Num-pil, Name-pil

FROM PILOT WHERE Adr IN (SELECT Adr FROM PILOT WHERE Name-pil= 'Ali') ;

16. What are the numbers of pilots on duty different from that of Ali?

SELECT Num-pil

FROM PILOT

INNER JOIN FLIGHT ON PILOT.Numpil = FLIGHT.Numpil

WHERE Name-pil <> 'Ali' ;

17. What are the cities served from the arrival city of a flight departing from Algiers?

SELECT City_Dep

FROM FLIGHT

WHERE City_Dep IN (SELECT City_Arr FROM FLIGHT WHERE City_Dep='Algiers')

;

18. What are the planes (their numbers) located in the same city as the plane with number 100?

SELECT Num-plane
FROM PLANE
WHERE Loc in (SELECT Loc FROM PLANE WHERE Num-plane=100) ;

19. What are the numbers and names of pilots residing in the same city as the pilot Ali and earning a salary higher than Ali's?

SELECT P1.Numpil, P1.Name-pil
FROM PILOT P1
JOIN PILOT P2 ON P1.Adr = P2.Adr
WHERE P2.Name-pil = 'Ali' AND P1.Sal > P2.Sal;
Or the following solution:
SELECT Num-pil, Name-pil
FROM PILOT WHERE Adr IN (SELECT Adr FROM PILOT WHERE Name-pil= 'Ali')
AND Sal> (SELECT Sal FROM PILOT WHERE Name-pil= 'Ali');

20. What are the numbers and names of pilots who perform a flight departing from their city of residence?

SELECT PILOT.Num-pil, PILOT.Name-pil
FROM PILOT
INNER JOIN FLIGHT ON PILOT.Numpil = FLIGHT.Numpil
WHERE PILOT.Adr= FLIGHT.City_Dep;

Exercise 03:

1. Titles of films with a duration greater than or equal to two hours.

SELECT Title
FROM FILM
WHERE Duration >= 120;

2. **Names of cities hosting a cinema named "Elmodjahed."**

SELECT CITY.CityName
FROM CITY
INNER JOIN CINEMA ON CITY.CodePostal = CINEMA.#CodePostal
WHERE CINEMA.CinemaName = 'Elmodjahed';

3. **Names of cinemas located in Oran or containing at least one room with more than 100 seats.**

SELECT CINEMA.CinemaName
FROM CITY INNER JOIN(CINEMA LEFT JOIN ROOM ON CINEMA.CinemaNum
= ROOM.CinemaNum)ON CITY.CodePostal = CINEMA.CodePostal
WHERE CITY.CityName='Oran' OR ROOM.Capacity>100

4. **Name, address, and city of cinemas where the film "Famous Star" is playing during week 18.**

SELECT CINEMA.CinemaName, CINEMA.Address, CITY.CityName
FROM CITY
INNER JOIN (CINEMA INNER JOIN (ROOM INNER JOIN (SCREENING INNER
JOIN FILM ON SCREENING.ExploitationNum = FILM.ExploitationNum) ON
ROOM.RoomNum = SCREENING.RoomNum) ON CINEMA.CinemaNum =
ROOM.CinemaNum) ON CINEMA.CodePostal = CITY.CodePostal
WHERE FILM.Title = 'Famous Star' AND SCREENING.WeekNum = 18;

5. **Exploitation numbers of films screened in all rooms.**

SELECT ExploitationNum
FROM SCREENING
INNER JOIN (ROOM INNER JOIN CINEMA ON ROOM.CinemaNum =
CINEMA.CinemaNum)
ON SCREENING.RoomNum= ROOM.RoomNum
GROUP BY ExploitationNum, CinemaNum, RoomNum
HAVING (COUNT(RoomNum)) = (SELECT (COUNT(RoomNum))
FROM ROOM

ORDER BY CinemaNum, RoomNum)

6. Titles of movies that have not been screened.

SELECT Title
FROM FILM
WHERE FILM. ExploitationNum NOT IN (SELECT ExploitationNum FROM
SCREENING)

Exercise 04:

1. Provide the total quantity of products ordered.

SELECT SUM(Quantity)
FROM ORDER

2. What is the value of the largest quantity ordered?
SELECT MAX(Quantity)
FROM ORDER

3. What are the order numbers that require an additional quantity of 50 products to exceed 100 products?
SELECT OrderNum
FROM ORDER
WHERE Quantity<100 AND (Quantity+50)>100