جامعة أم القرى
UMM AL-QURA UNIVERSITY

Database Fundamentals

Child Care Centre

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Group work report:

	Amal	Bshayer	Haneen	Hamida
Identifying Entities	●		●	
Identifying Attributes			●	
Constraints On Relationships		●		
Business Role			●	
ER Model		●		
Report Phase I	●			
Mapping			●	●
normalization	●	●		
Report Phase II	●			
Create Tables			●	
Insert To	●			
Update				●
Select		●		●
Report Phase III	●	●		●

Phase I

Businesses Role:

- Each department can have multiple nannies, and each nanny belongs to one department.
  department has specific attributes : (DeptID, DeptName, DeptPhoneNumber, DeptFloor).

- Each nanny can have multiple children, and each child can have only one nanny. Each nanny has specific attributes (NannyID, NannyName, NannyAddress, NannyEmail, NannySalary, NannyPhoneNumber,).

- Each nanny can provide multiple services, and each service can be provided by multiple nannies. Each service has specific attributes (ServiceID, ServiceName, ServiceDescription).

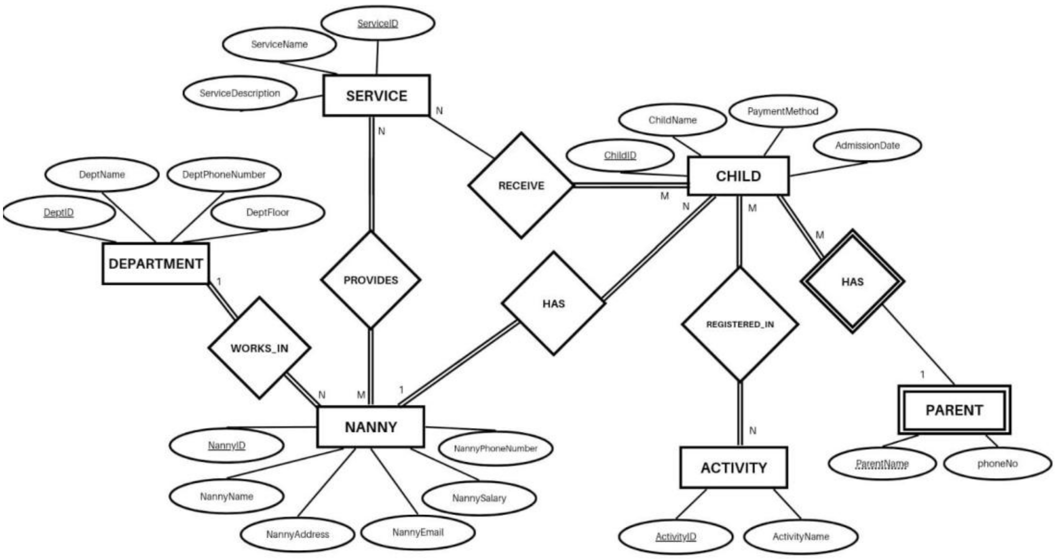
- Each child can be registered in multiple activities, and each activity can have multiple children. Each activity has specific attributes (ActivityID, ActivityName).

- Each child may receive multiple services or may not, and each service can be provided to multiple children.
  Each child has specific attributes (ChildID, ChildName, PaymentMethod, AdmissionDate,).

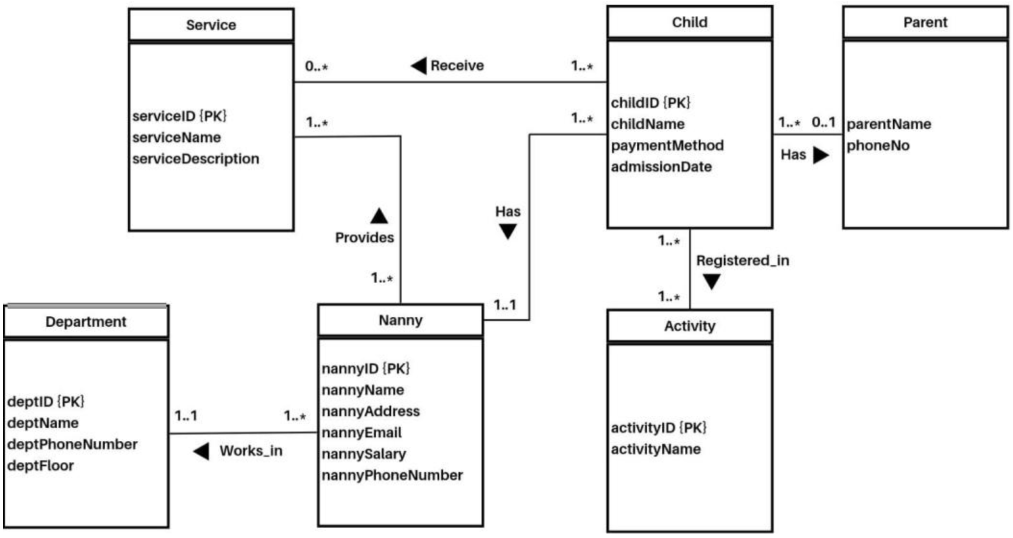
- Every child has one parents exist only for the child, and every parent has many children. Each parents has specific attributes (ParentsName, PhoneNo).

ER Model:

- Chen's Notation:



- UML Notation:



Phase II

Relational Schema:

• Regular entity types: CHILD, NANNY, ACTIVITY, SERVICE , DEPARTMENT.

Weak entity types: PARENT.

One-to-One: None.

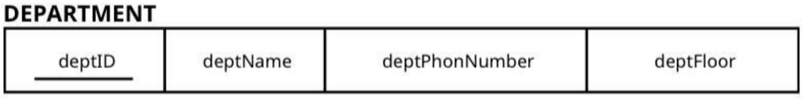
One-to-Many: WORKS_IN, HAS(NANNY & CHILD), HAS(PARENT & CHILD).

Many-to-Many: RECEIVE, REGISTERED_IN, PROVIDES.

Multi-valued attributes: None.

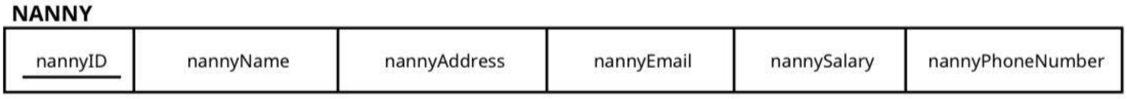
N-ary: None.

STEP 1: Mapping of Regular Entity Type



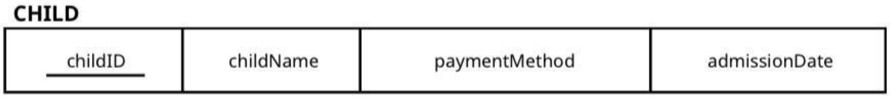
DEPARTMENT

deptID	deptName	deptPhonNumber	deptFloor



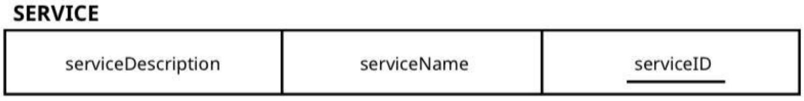
NANNY

nannyID	nannyName	nannyAddress	nannyEmail	nannySalary	nannyPhoneNumber



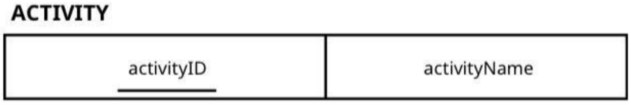
CHILD

childID	childName	paymentMethod	admissionDate



SERVICE

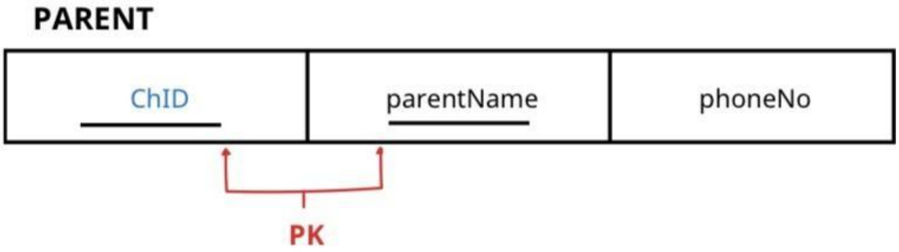
serviceDescription	serviceName	serviceID



ACTIVITY

activityID	activityName

Step 2: Mapping of Weak Entity Types



PARENT

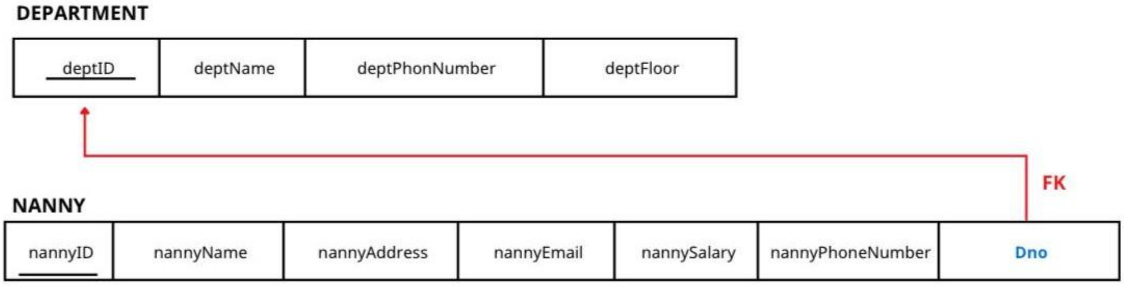
ChID	parentName	phoneNo

Step 3: Mapping of Binary 1:1 Relationship Types

None.

Step 4: Mapping of Binary 1:N Relationship

WORKS_IN relationship type:



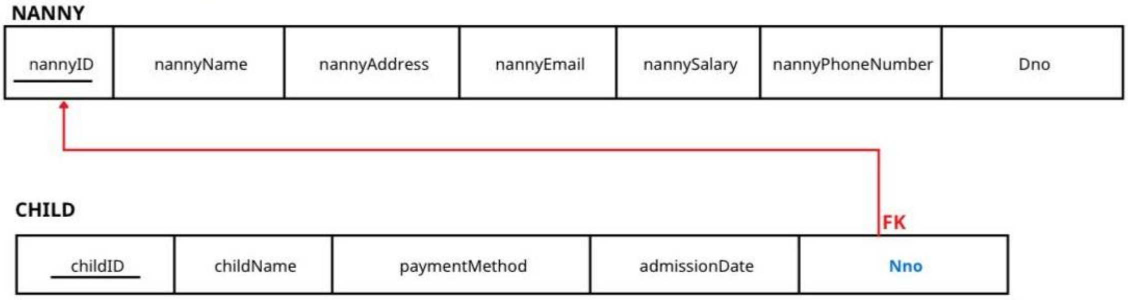
DEPARTMENT

deptID	deptName	deptPhonNumber	deptFloor

NANNY

nannyID	nannyName	nannyAddress	nannyEmail	nannySalary	nannyPhoneNumber	Dno

HAS relationship type:



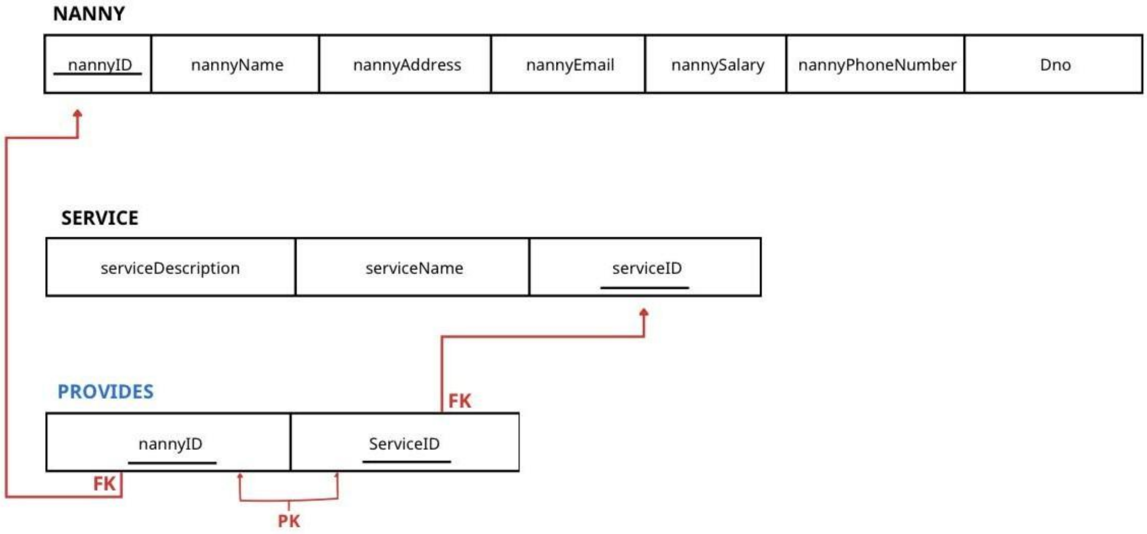
NANNY

nannyID	nannyName	nannyAddress	nannyEmail	nannySalary	nannyPhoneNumber	Dno

CHILD

childID	childName	paymentMethod	admissionDate	Nno

Step 5: Mapping of Binary M:N Relationship



NANNY

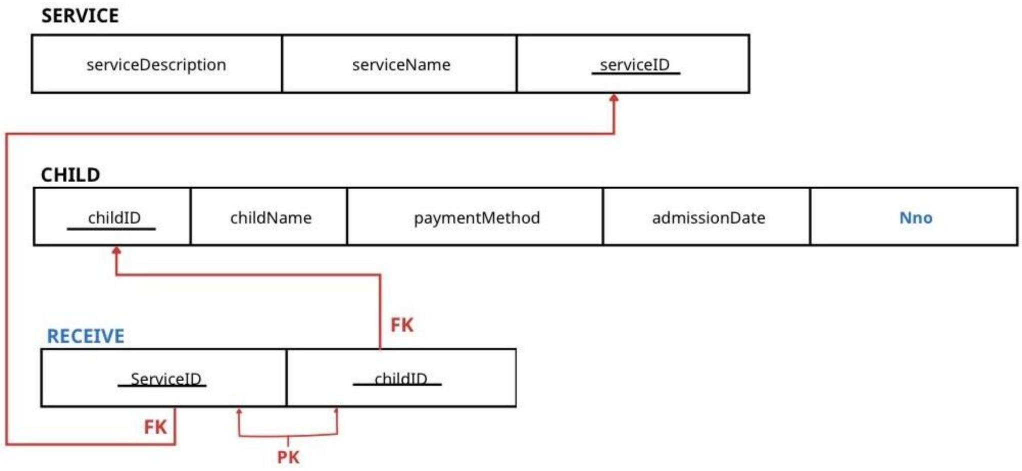
nannyID	nannyName	nannyAddress	nannyEmail	nannySalary	nannyPhoneNumber	Dno

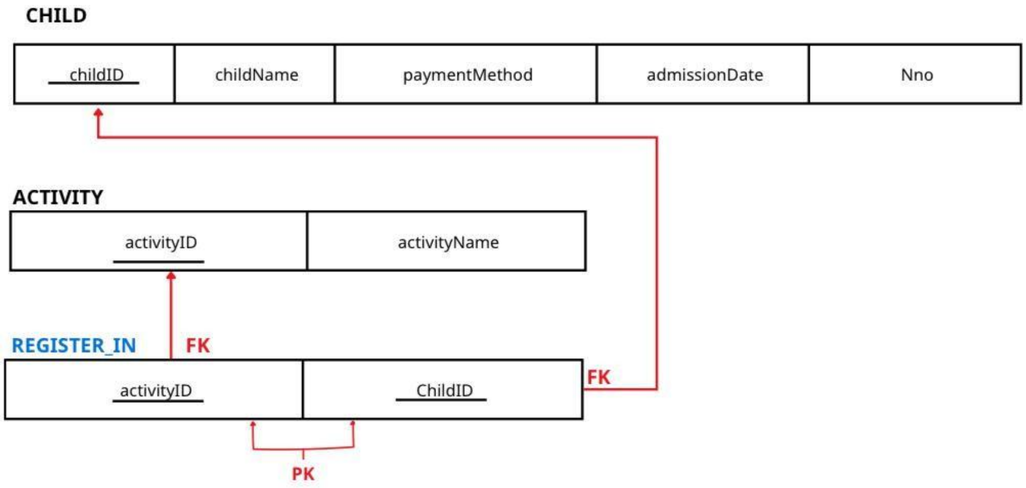
SERVICE

serviceDescription	serviceName	serviceID

PROVIDES

nannyID	ServiceID





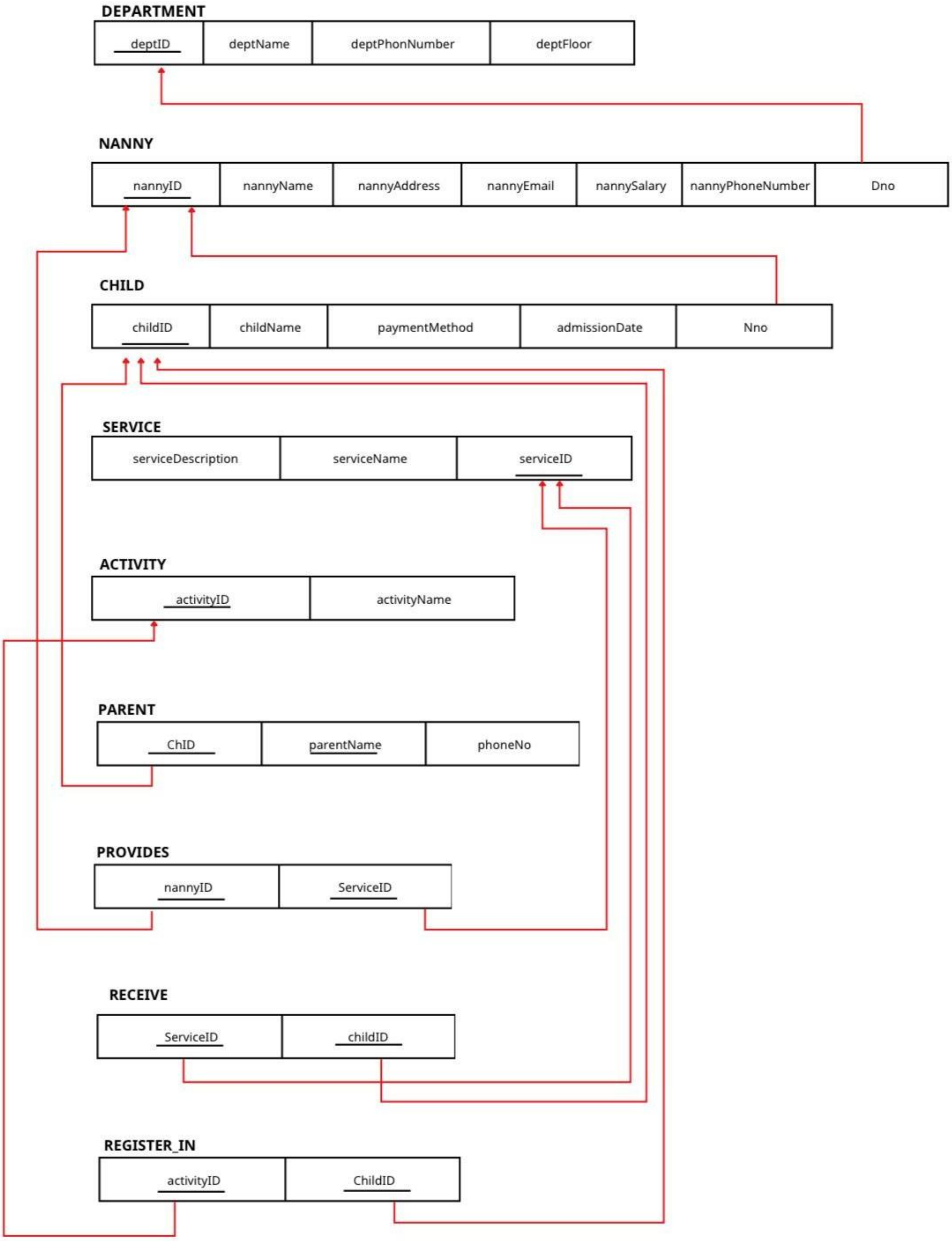
Step 6: Mapping of Multivalued Attributes

None.

Step 7: Mapping of N-ary Relationship

None.

Final Mapping:



DEPARTMENT

deptID	deptName	deptPhonNumber	deptFloor

NANNY

nannyID	nannyName	nannyAddress	nannyEmail	nannySalary	nannyPhoneNumber	Dno

CHILD

childID	childName	paymentMethod	admissionDate	Nno

SERVICE

serviceDescription	serviceName	serviceID

ACTIVITY

activityID	activityName

PARENT

ChID	parentName	phoneNo

PROVIDES

nannyID	ServiceID

RECEIVE

ServiceID	childID

REGISTER_IN

activityID	ChildID

Normalization:

DEPARTMENT

deptID	deptName	deptPhonNumber	deptFloor

- **1NF (No Multivalued Attributes)**
- **2NF (No Partial Dependency)**
- **3NF (No Transitive Dependency)**

NANNY

nannyID	nannyName	nannyAddress	nannyEmail	nannySalary	nannyPhoneNumber	Dno

- **1NF (No Multivalued Attributes)**
- **2NF (No Partial Dependency)**
- **3NF (No Transitive Dependency)**

CHILD

childID	childName	paymentMethod	admissionDate	Nno

- **1NF (No Multivalued Attributes)**
- **2NF (No Partial Dependency)**
- **3NF (No Transitive Dependency)**

SERVICE

serviceID	serviceName	serviceDescription

- **1NF (No Multivalued Attributes)**
- **2NF (No Partial Dependency)**
- **3NF (No Transitive Dependency)**

ACTIVITY

activityID	activityName

- **1NF (No Multivalued Attributes)**
- **2NF (No Partial Dependency)**
- **3NF (No Transitive Dependency)**

PARENT

ChID	ParentName	PhonNo

- **1NF (No Multivalued Attributes)**
- **2NF (No Partial Dependency)**
- **3NF (No Transitive Dependency)**

PROVIDES

nannyID	ServiceID

- **1NF (No Multivalued Attributes)**
- **2NF (No Partial Dependency)**
- **3NF (No Transitive Dependency)**

RECEIVE

ServiceID	childID

- **1NF (No Multivalued Attributes)**
- **2NF (No Partial Dependency)**
- **3NF (No Transitive Dependency)**

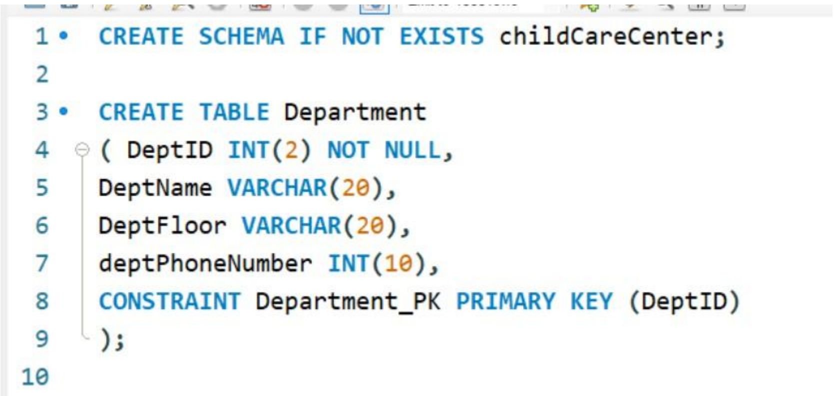
REGISTER_IN

activityID	childID

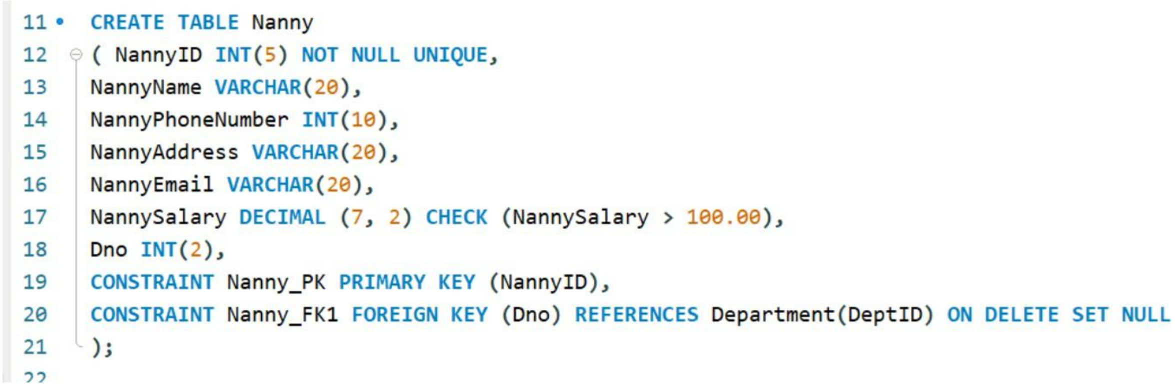
- **1NF (No Multivalued Attributes)**
- **2NF (No Partial Dependency)**
- **3NF (No Transitive Dependency)**

Phase III

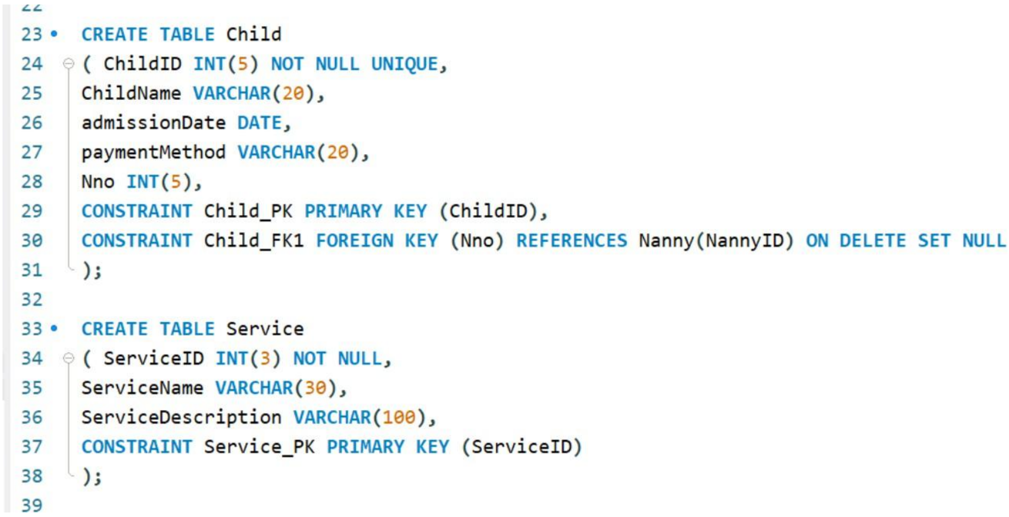
Create Schema and Tables:



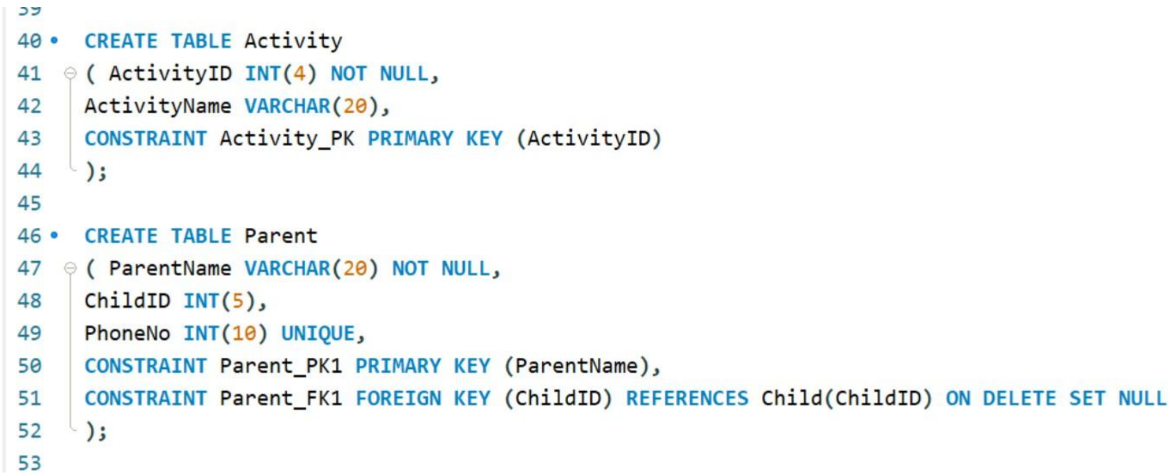
```sql
CREATE SCHEMA IF NOT EXISTS childCareCenter;

CREATE TABLE Department
( DeptID INT(2) NOT NULL,
DeptName VARCHAR(20),
DeptFloor VARCHAR(20),
deptPhoneNumber INT(10),
CONSTRAINT Department_PK PRIMARY KEY (DeptID)
);

```



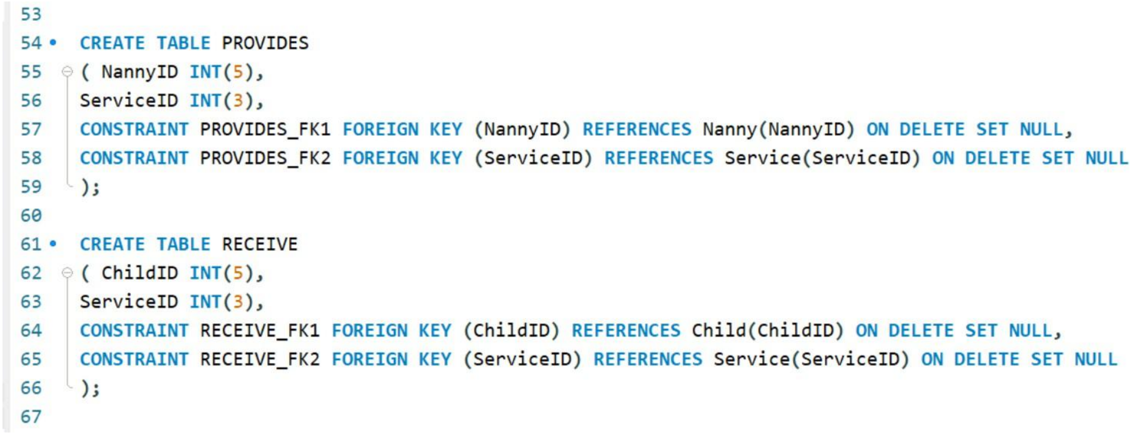
```sql
CREATE TABLE Nanny
( NannyID INT(5) NOT NULL UNIQUE,
NannyName VARCHAR(20),
NannyPhoneNumber INT(10),
NannyAddress VARCHAR(20),
NannyEmail VARCHAR(20),
NannySalary DECIMAL (7, 2) CHECK (NannySalary > 100.00),
Dno INT(2),
CONSTRAINT Nanny_PK PRIMARY KEY (NannyID),
CONSTRAINT Nanny_FK1 FOREIGN KEY (Dno) REFERENCES Department(DeptID) ON DELETE SET NULL
);
```



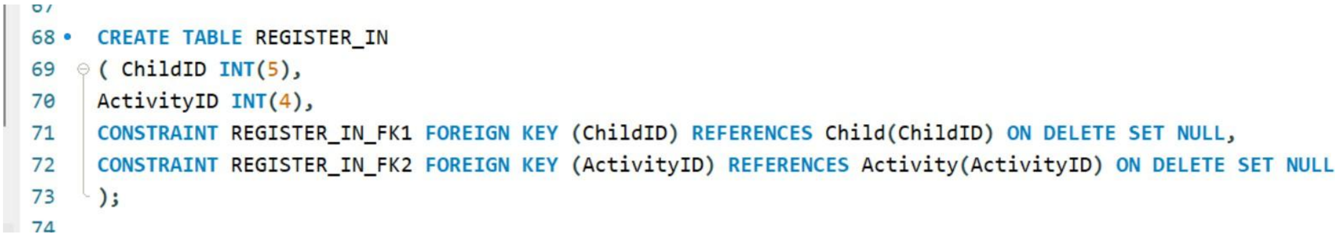
```sql
CREATE TABLE Child
( ChildID INT(5) NOT NULL UNIQUE,
ChildName VARCHAR(20),
admissionDate DATE,
paymentMethod VARCHAR(20),
Nno INT(5),
CONSTRAINT Child_PK PRIMARY KEY (ChildID),
CONSTRAINT Child_FK1 FOREIGN KEY (Nno) REFERENCES Nanny(NannyID) ON DELETE SET NULL
);

CREATE TABLE Service
( ServiceID INT(3) NOT NULL,
ServiceName VARCHAR(30),
ServiceDescription VARCHAR(100),
CONSTRAINT Service_PK PRIMARY KEY (ServiceID)
);

```



```sql
CREATE TABLE Activity
( ActivityID INT(4) NOT NULL,
ActivityName VARCHAR(20),
CONSTRAINT Activity_PK PRIMARY KEY (ActivityID)
);

CREATE TABLE Parent
( ParentName VARCHAR(20) NOT NULL,
ChildID INT(5),
PhoneNo INT(10) UNIQUE,
CONSTRAINT Parent_PK1 PRIMARY KEY (ParentName),
CONSTRAINT Parent_FK1 FOREIGN KEY (ChildID) REFERENCES Child(ChildID) ON DELETE SET NULL
);
```



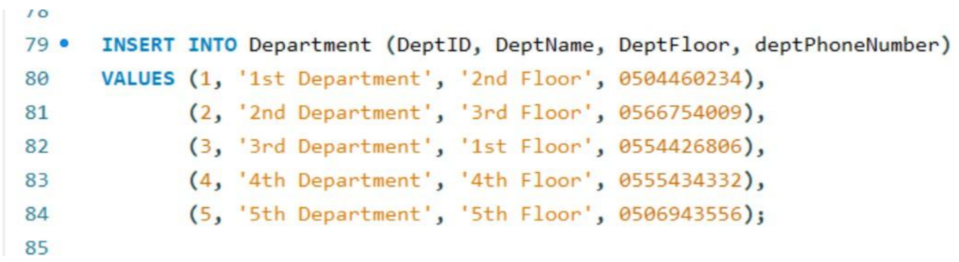
```sql
CREATE TABLE PROVIDES
( NannyID INT(5),
ServiceID INT(3),
CONSTRAINT PROVIDES_FK1 FOREIGN KEY (NannyID) REFERENCES Nanny(NannyID) ON DELETE SET NULL,
CONSTRAINT PROVIDES_FK2 FOREIGN KEY (ServiceID) REFERENCES Service(ServiceID) ON DELETE SET NULL
);

CREATE TABLE RECEIVE
( ChildID INT(5),
ServiceID INT(3),
CONSTRAINT RECEIVE_FK1 FOREIGN KEY (ChildID) REFERENCES Child(ChildID) ON DELETE SET NULL,
CONSTRAINT RECEIVE_FK2 FOREIGN KEY (ServiceID) REFERENCES Service(ServiceID) ON DELETE SET NULL
);
```



```sql
CREATE TABLE REGISTER_IN
( ChildID INT(5),
ActivityID INT(4),
CONSTRAINT REGISTER_IN_FK1 FOREIGN KEY (ChildID) REFERENCES Child(ChildID) ON DELETE SET NULL,
CONSTRAINT REGISTER_IN_FK2 FOREIGN KEY (ActivityID) REFERENCES Activity(ActivityID) ON DELETE SET NULL
);
```

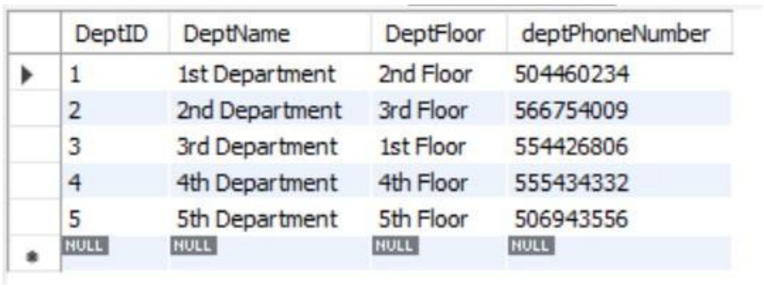
Insert To:

1- Department Table:



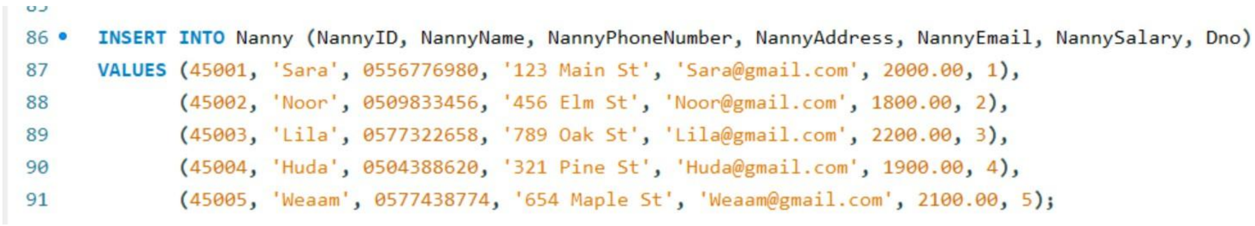
```sql
INSERT INTO Department (DeptID, DeptName, DeptFloor, deptPhoneNumber)
VALUES (1, '1st Department', '2nd Floor', 0504460234),
       (2, '2nd Department', '3rd Floor', 0566754009),
       (3, '3rd Department', '1st Floor', 0554426806),
       (4, '4th Department', '4th Floor', 0555434332),
       (5, '5th Department', '5th Floor', 0506943556);
```

Result:



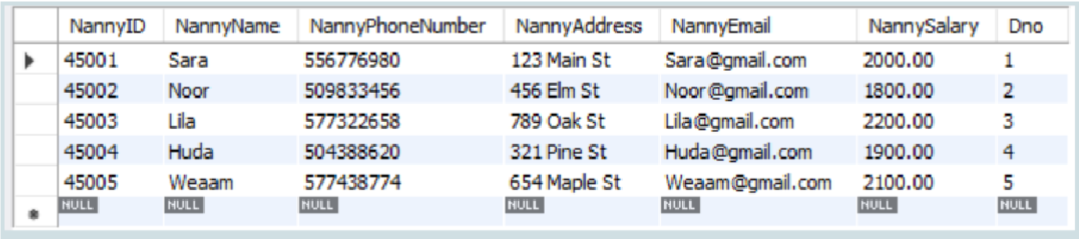
	DeptID	DeptName	DeptFloor	deptPhoneNumber
▶	1	1st Department	2nd Floor	504460234
	2	2nd Department	3rd Floor	566754009
	3	3rd Department	1st Floor	554426806
	4	4th Department	4th Floor	555434332
	5	5th Department	5th Floor	506943556
*	NULL	NULL	NULL	NULL

2- Nanny Table:



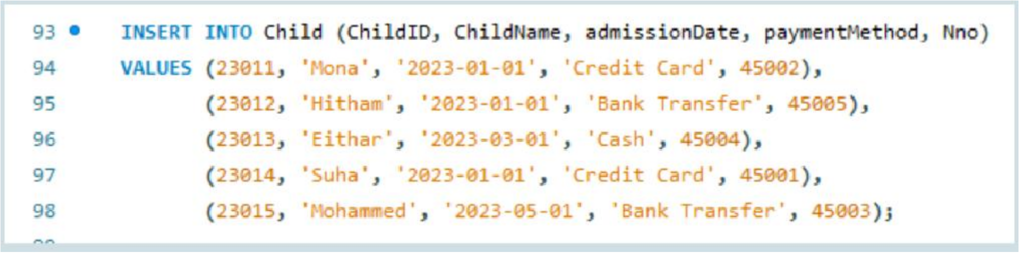
```sql
INSERT INTO Nanny (NannyID, NannyName, NannyPhoneNumber, NannyAddress, NannyEmail, NannySalary, Dno)
VALUES (45001, 'Sara', 0556776980, '123 Main St', 'Sara@gmail.com', 2000.00, 1),
       (45002, 'Noor', 0509833456, '456 Elm St', 'Noor@gmail.com', 1800.00, 2),
       (45003, 'Lila', 0577322658, '789 Oak St', 'Lila@gmail.com', 2200.00, 3),
       (45004, 'Huda', 0504388620, '321 Pine St', 'Huda@gmail.com', 1900.00, 4),
       (45005, 'Weaam', 0577438774, '654 Maple St', 'Weaam@gmail.com', 2100.00, 5);
```

Result:



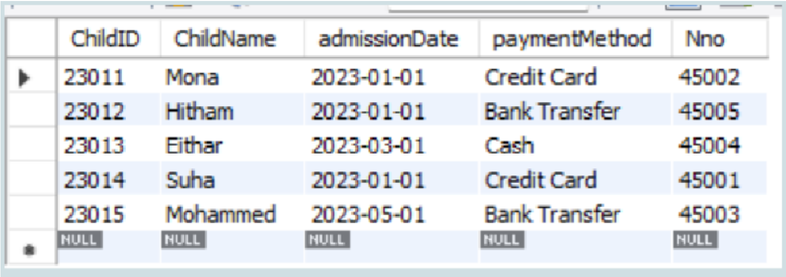
	NannyID	NannyName	NannyPhoneNumber	NannyAddress	NannyEmail	NannySalary	Dno
▶	45001	Sara	556776980	123 Main St	Sara@gmail.com	2000.00	1
	45002	Noor	509833456	456 Elm St	Noor@gmail.com	1800.00	2
	45003	Lila	577322658	789 Oak St	Lila@gmail.com	2200.00	3
	45004	Huda	504388620	321 Pine St	Huda@gmail.com	1900.00	4
	45005	Weaam	577438774	654 Maple St	Weaam@gmail.com	2100.00	5
*	NULL	NULL	NULL	NULL	NULL	NULL	NULL

3- Child Table:



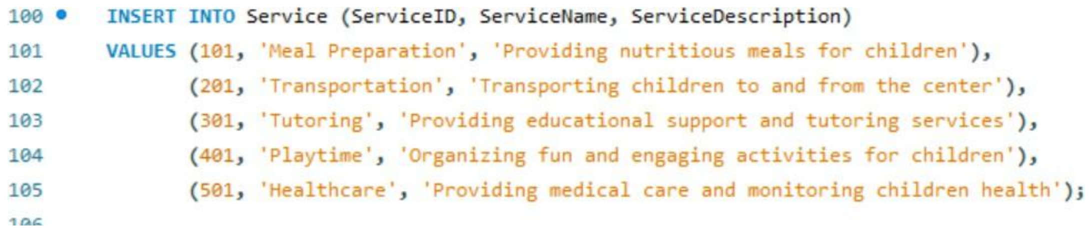
```sql
INSERT INTO Child (ChildID, ChildName, admissionDate, paymentMethod, Nno)
VALUES (23011, 'Mona', '2023-01-01', 'Credit Card', 45002),
       (23012, 'Hitham', '2023-01-01', 'Bank Transfer', 45005),
       (23013, 'Eithar', '2023-03-01', 'Cash', 45004),
       (23014, 'Suha', '2023-01-01', 'Credit Card', 45001),
       (23015, 'Mohammed', '2023-05-01', 'Bank Transfer', 45003);
```

Result:



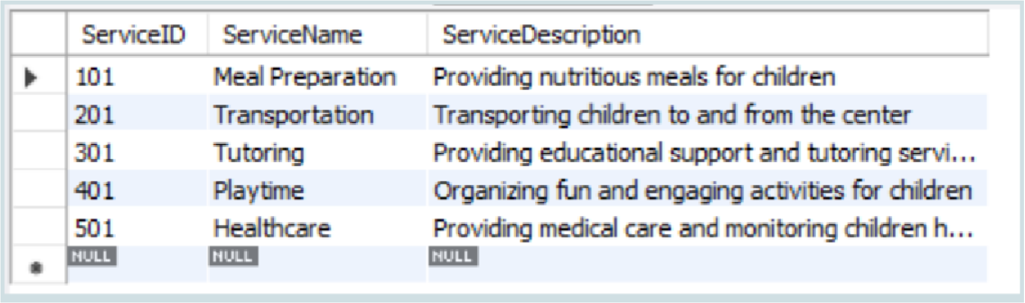
ChildID	ChildName	admissionDate	paymentMethod	Nno
23011	Mona	2023-01-01	Credit Card	45002
23012	Hitham	2023-01-01	Bank Transfer	45005
23013	Eithar	2023-03-01	Cash	45004
23014	Suha	2023-01-01	Credit Card	45001
23015	Mohammed	2023-05-01	Bank Transfer	45003
NULL	NULL	NULL	NULL	NULL

4- Service Table:



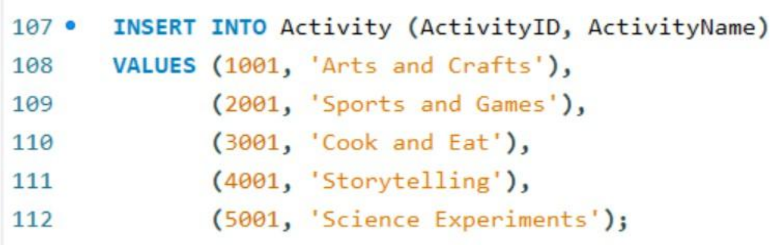
```
INSERT INTO Service (ServiceID, ServiceName, ServiceDescription)
VALUES (101, 'Meal Preparation', 'Providing nutritious meals for children'),
       (201, 'Transportation', 'Transporting children to and from the center'),
       (301, 'Tutoring', 'Providing educational support and tutoring services'),
       (401, 'Playtime', 'Organizing fun and engaging activities for children'),
       (501, 'Healthcare', 'Providing medical care and monitoring children health');
```

Result:



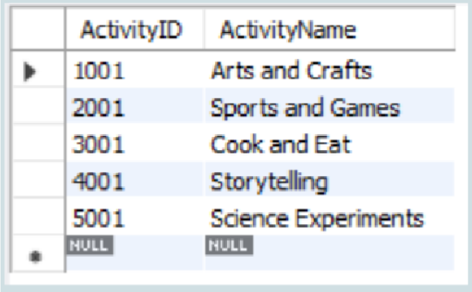
ServiceID	ServiceName	ServiceDescription
101	Meal Preparation	Providing nutritious meals for children
201	Transportation	Transporting children to and from the center
301	Tutoring	Providing educational support and tutoring servi...
401	Playtime	Organizing fun and engaging activities for children
501	Healthcare	Providing medical care and monitoring children h...
NULL	NULL	NULL

5- Activity Table:



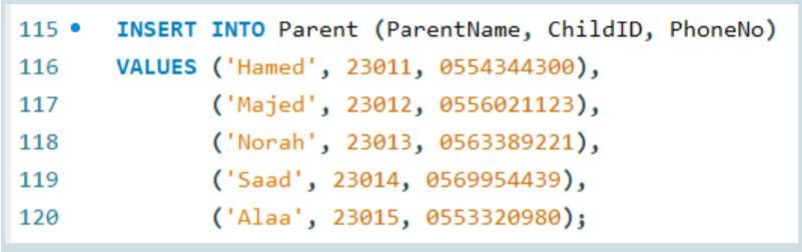
```
INSERT INTO Activity (ActivityID, ActivityName)
VALUES (1001, 'Arts and Crafts'),
       (2001, 'Sports and Games'),
       (3001, 'Cook and Eat'),
       (4001, 'Storytelling'),
       (5001, 'Science Experiments');
```

Result:



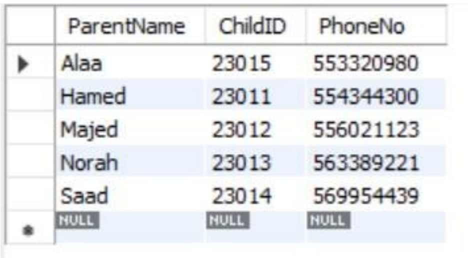
ActivityID	ActivityName
1001	Arts and Crafts
2001	Sports and Games
3001	Cook and Eat
4001	Storytelling
5001	Science Experiments
NULL	NULL

6- Parent Table:



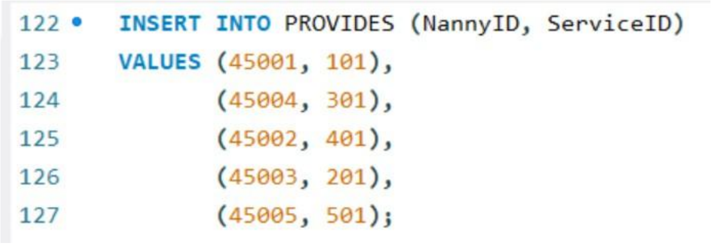
```sql
INSERT INTO Parent (ParentName, ChildID, PhoneNo)
VALUES ('Hamed', 23011, 0554344300),
       ('Majed', 23012, 0556021123),
       ('Norah', 23013, 0563389221),
       ('Saad', 23014, 0569954439),
       ('Alaa', 23015, 0553320980);
```

Result:



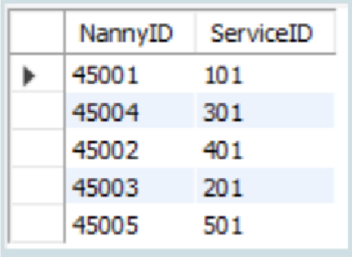
ParentName	ChildID	PhoneNo
Alaa	23015	553320980
Hamed	23011	554344300
Majed	23012	556021123
Norah	23013	563389221
Saad	23014	569954439
NULL	NULL	NULL

7- Provides Table:



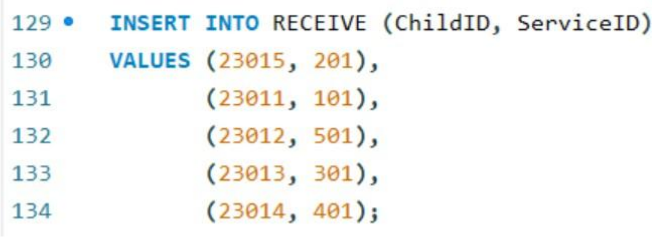
```sql
INSERT INTO PROVIDES (NannyID, ServiceID)
VALUES (45001, 101),
       (45004, 301),
       (45002, 401),
       (45003, 201),
       (45005, 501);
```

Result:



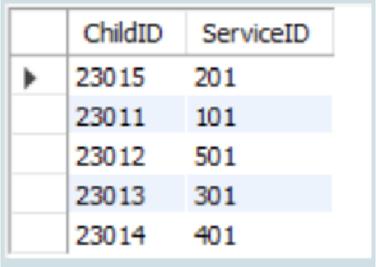
NannyID	ServiceID
45001	101
45004	301
45002	401
45003	201
45005	501

8- Receive Table:



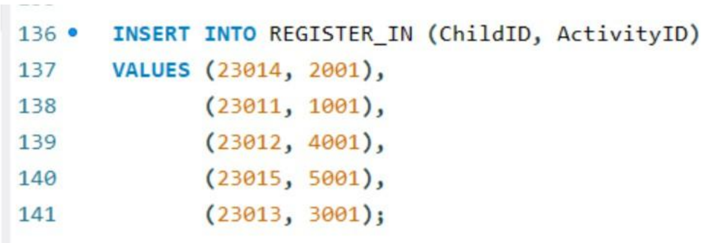
```sql
INSERT INTO RECEIVE (ChildID, ServiceID)
VALUES (23015, 201),
       (23011, 101),
       (23012, 501),
       (23013, 301),
       (23014, 401);
```

Result:



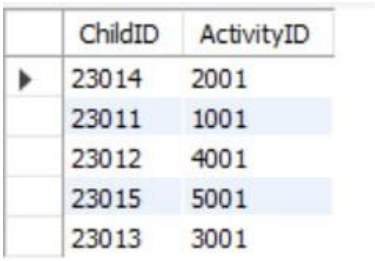
ChildID	ServiceID
23015	201
23011	101
23012	501
23013	301
23014	401

9- Register_in Table:



```
INSERT INTO REGISTER_IN (ChildID, ActivityID)
VALUES (23014, 2001),
       (23011, 1001),
       (23012, 4001),
       (23015, 5001),
       (23013, 3001);
```

Result:

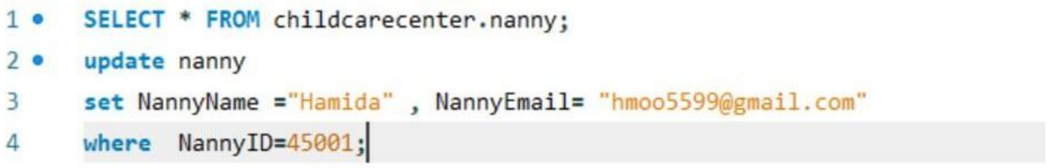


ChildID	ActivityID
23014	2001
23011	1001
23012	4001
23015	5001
23013	3001

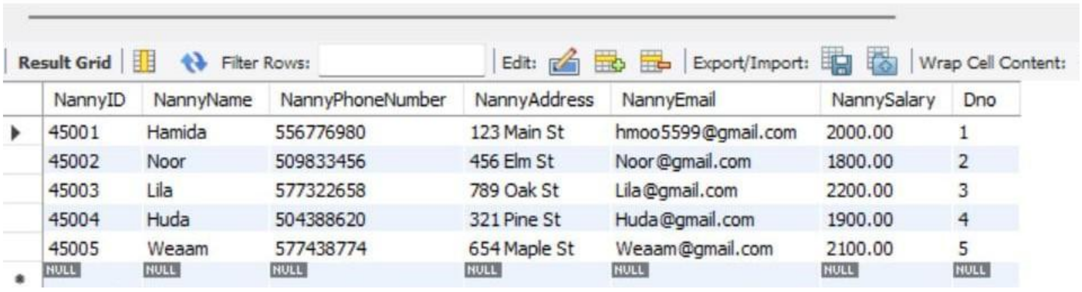
UPDATE and **DELETE:**

-using UPDATE:

#Change nannyName to Hamida and nannyEmail to hmoo5599@gmail.com where nannyID=45001.



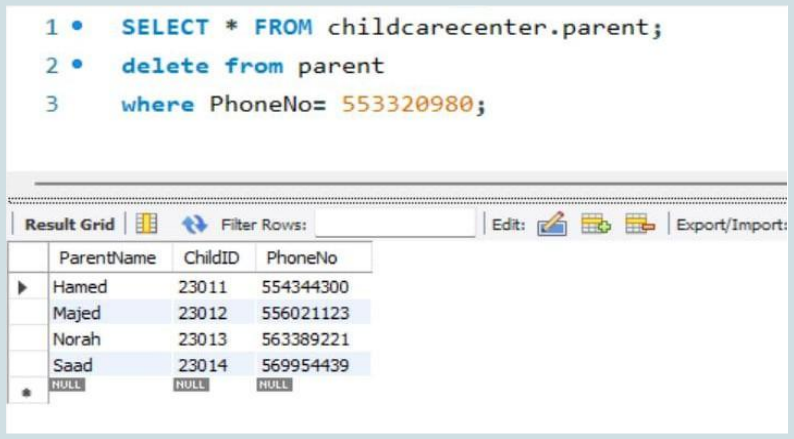
```
SELECT * FROM childcarecenter.nanny;
update nanny
set NannyName ="Hamida" , NannyEmail= "hmoo5599@gmail.com"
where  NannyID=45001;
```



NannyID	NannyName	NannyPhoneNumber	NannyAddress	NannyEmail	NannySalary	Dno
45001	Hamida	556776980	123 Main St	hmoo5599@gmail.com	2000.00	1
45002	Noor	509833456	456 Elm St	Noor@gmail.com	1800.00	2
45003	Lila	577322658	789 Oak St	Lila@gmail.com	2200.00	3
45004	Huda	504388620	321 Pine St	Huda@gmail.com	1900.00	4
45005	Weaam	577438774	654 Maple St	Weaam@gmail.com	2100.00	5
NULL	NULL	NULL	NULL	NULL	NULL	NULL

-using DELETE:

#Delete the row whose phone NO= 553320980.

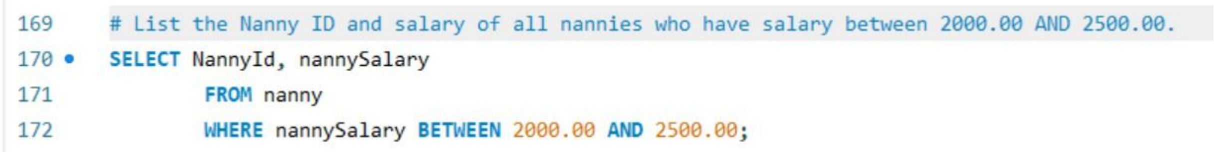


```
SELECT * FROM childcarecenter.parent;
delete from parent
where PhoneNo= 553320980;
```

ParentName	ChildID	PhoneNo
Hamed	23011	554344300
Majed	23012	556021123
Norah	23013	563389221
Saad	23014	569954439
NULL	NULL	NULL

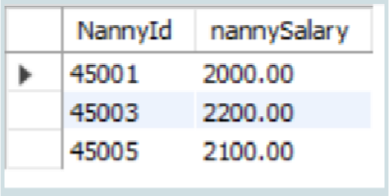
SELECT Statement:

- using WHERE:



```
# List the Nanny ID and salary of all nannies who have salary between 2000.00 AND 2500.00.
SELECT NannyId, nannySalary
            FROM nanny
            WHERE nannySalary BETWEEN 2000.00 AND 2500.00;
```

Result:

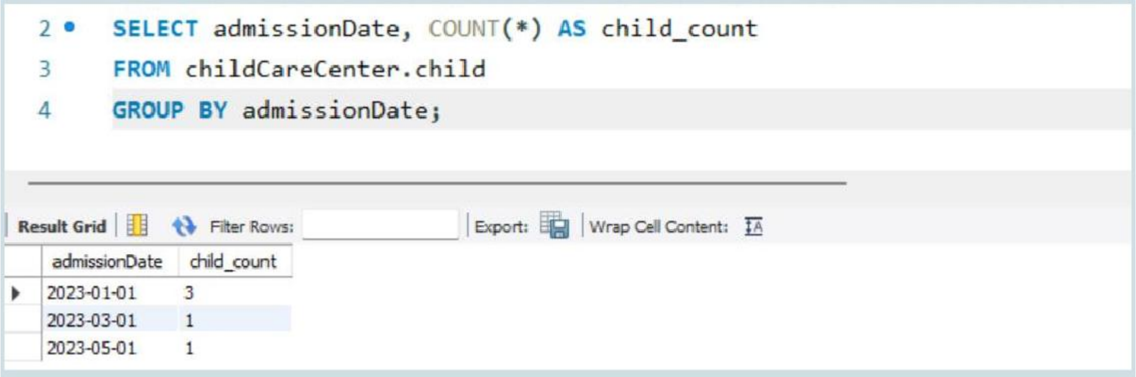


NannyId	nannySalary
45001	2000.00
45003	2200.00
45005	2100.00

- using GROUP BY:

1-

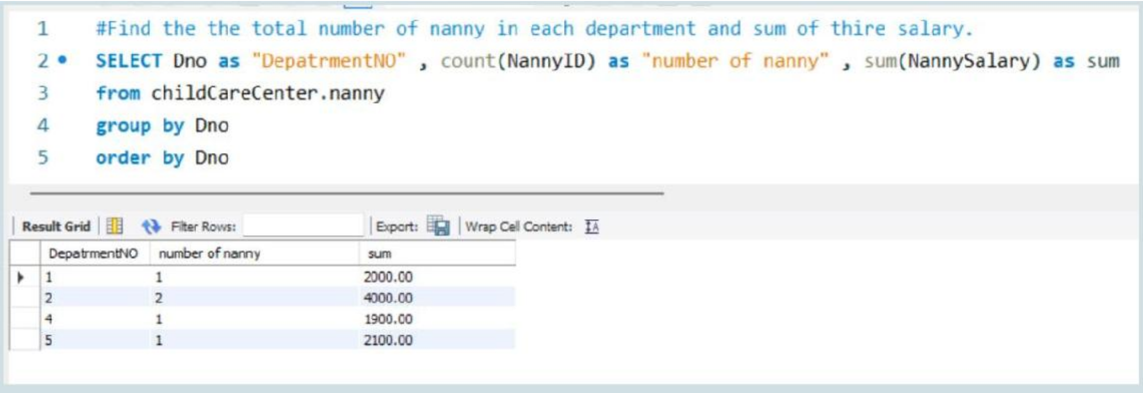
#Find the total number of children on each admission date.



```
SELECT admissionDate, COUNT(*) AS child_count
FROM childCareCenter.child
GROUP BY admissionDate;
```

admissionDate	child_count
2023-01-01	3
2023-03-01	1
2023-05-01	1

2-

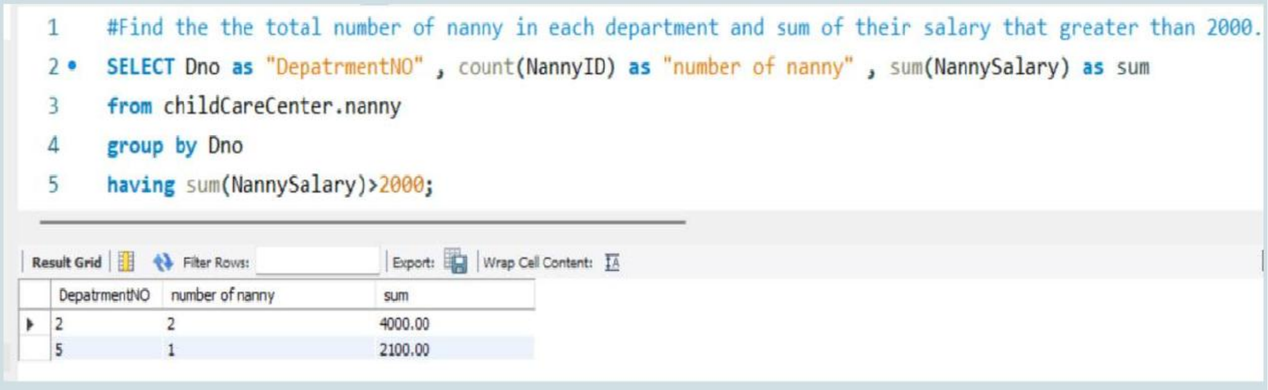


```sql
#Find the the total number of nanny in each department and sum of thire salary.
SELECT Dno as "DepatrmentNO" , count(NannyID) as "number of nanny" , sum(NannySalary) as sum
from childCareCenter.nanny
group by Dno
order by Dno
```

DepatrmentNO	number of nanny	sum
1	1	2000.00
2	2	4000.00
4	1	1900.00
5	1	2100.00

- using HAVING:

1-

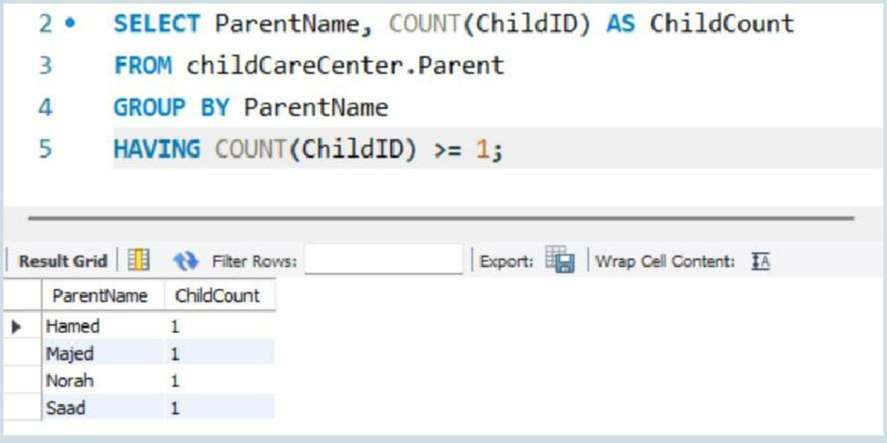


```sql
#Find the the total number of nanny in each department and sum of their salary that greater than 2000.
SELECT Dno as "DepatrmentNO" , count(NannyID) as "number of nanny" , sum(NannySalary) as sum
from childCareCenter.nanny
group by Dno
having sum(NannySalary)>2000;
```

DepatrmentNO	number of nanny	sum
2	2	4000.00
5	1	2100.00

2-

#Find the total number of children in each parent who have at least one child.

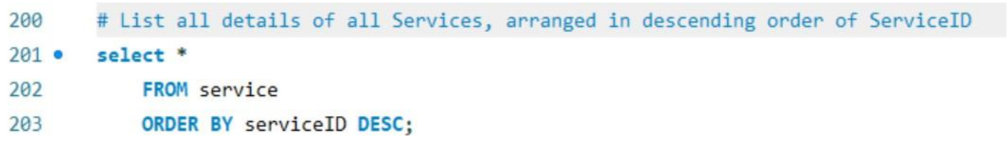


```sql
SELECT ParentName, COUNT(ChildID) AS ChildCount
FROM childCareCenter.Parent
GROUP BY ParentName
HAVING COUNT(ChildID) >= 1;
```

ParentName	ChildCount
Hamed	1
Majed	1
Norah	1
Saad	1

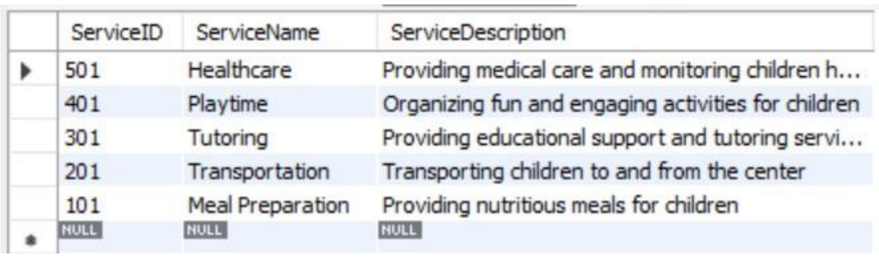
- using ORDER BY:

1-



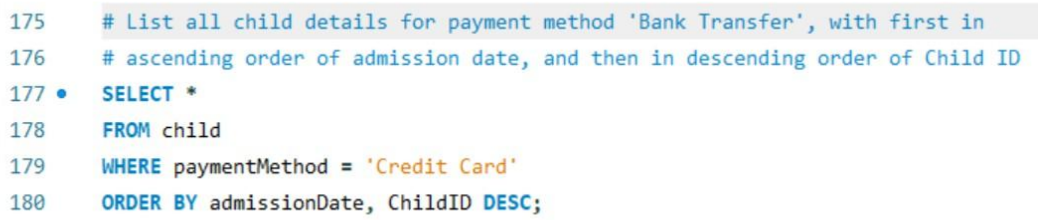
```
# List all details of all Services, arranged in descending order of ServiceID
select *
    FROM service
    ORDER BY serviceID DESC;
```

Result:



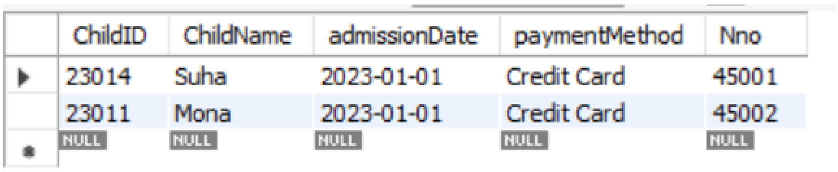
	ServiceID	ServiceName	ServiceDescription
▶	501	Healthcare	Providing medical care and monitoring children h...
	401	Playtime	Organizing fun and engaging activities for children
	301	Tutoring	Providing educational support and tutoring servi...
	201	Transportation	Transporting children to and from the center
	101	Meal Preparation	Providing nutritious meals for children
*	NULL	NULL	NULL

2-



```
# List all child details for payment method 'Bank Transfer', with first in
# ascending order of admission date, and then in descending order of Child ID
SELECT *
FROM child
WHERE paymentMethod = 'Credit Card'
ORDER BY admissionDate, ChildID DESC;
```

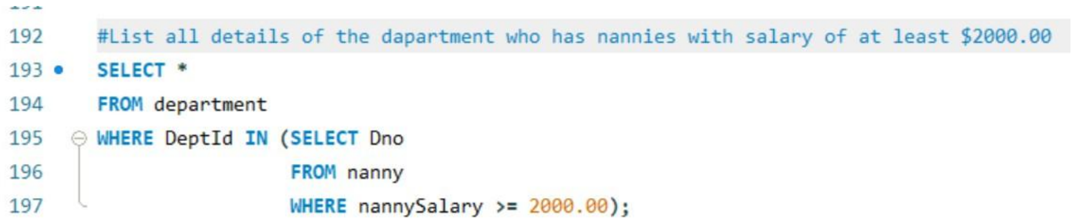
Result:



	ChildID	ChildName	admissionDate	paymentMethod	Nno
▶	23014	Suha	2023-01-01	Credit Card	45001
	23011	Mona	2023-01-01	Credit Card	45002
*	NULL	NULL	NULL	NULL	NULL

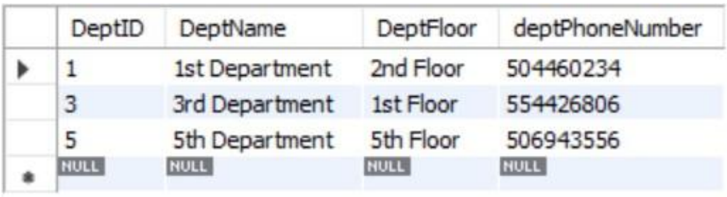
- using Subqueries:

1-



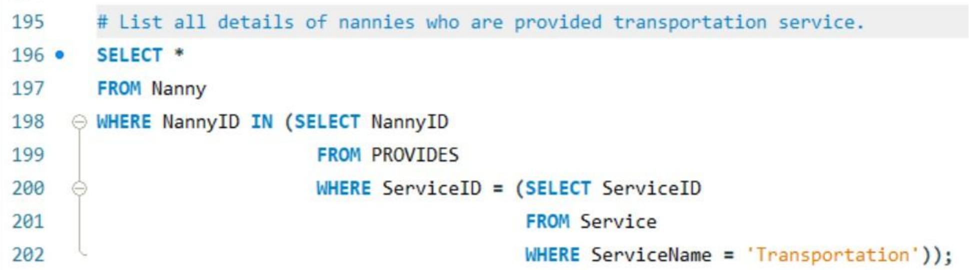
```
#List all details of the dapartment who has nannies with salary of at least $2000.00
SELECT *
FROM department
WHERE DeptId IN (SELECT Dno
                FROM nanny
                WHERE nannySalary >= 2000.00);
```

Result:



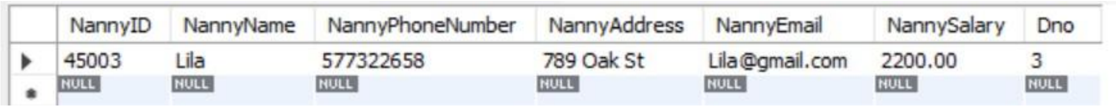
	DeptID	DeptName	DeptFloor	deptPhoneNumber
▶	1	1st Department	2nd Floor	504460234
	3	3rd Department	1st Floor	554426806
	5	5th Department	5th Floor	506943556
*	NULL	NULL	NULL	NULL

2-



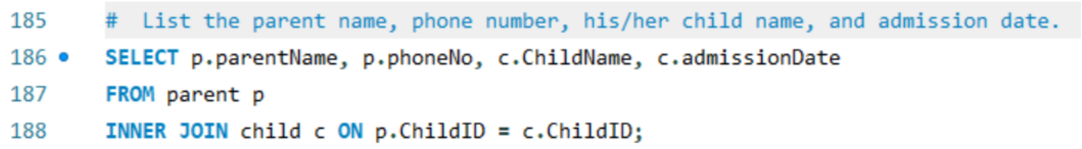
```
# List all details of nannies who are provided transportation service.
SELECT *
FROM Nanny
WHERE NannyID IN (SELECT NannyID
                  FROM PROVIDES
                  WHERE ServiceID = (SELECT ServiceID
                                     FROM Service
                                     WHERE ServiceName = 'Transportation'));
```

Result:



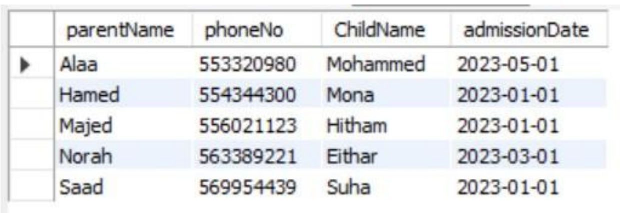
NannyID	NannyName	NannyPhoneNumber	NannyAddress	NannyEmail	NannySalary	Dno
45003	Lila	577322658	789 Oak St	Lila@gmail.com	2200.00	3
NULL	NULL	NULL	NULL	NULL	NULL	NULL

- using JOIN:



```
#  List the parent name, phone number, his/her child name, and admission date.
SELECT p.parentName, p.phoneNo, c.ChildName, c.admissionDate
FROM parent p
INNER JOIN child c ON p.ChildID = c.ChildID;
```

Result:



parentName	phoneNo	ChildName	admissionDate
Alaa	553320980	Mohammed	2023-05-01
Hamed	554344300	Mona	2023-01-01
Majed	556021123	Hitham	2023-01-01
Norah	563389221	Eithar	2023-03-01
Saad	569954439	Suha	2023-01-01