



## **ITM 301 FINAL PROJECT**

### **Data Base Management**

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## ***1. Interview Report:***

Date	12/10/2022 at 6:00 pm
Participation	Wassim Abbass
Duration	35 mins

Time	Questions	Answers
3 min	How many departments do you operate?	We mainly have five departments in our company that are IT, HR, Marketing, Accounting, and finance.
3 min	What information do you keep about the departments that you have?	It is important for us to keep track of the number of employees that work in the department, the name of the department, and the department number.
1 min	What types of employees do you hire? (Regular employee, manager.....)	The employees that we hire can be managers, supervisors, or regular employees depending on their skills and experience.
4 min	Can an employee work in more than one department or a manager to manage more than one department?	No, an employee can work in only one department. In addition, every department should be managed by only one manager and the reason is for enhancing the efficiency and the productivity of the employees.
1 min	How can employees finish their tasks?	Every regular employee should join a team that is responsible for many tasks.
2 min	What information do you keep about the tasks and the teams?	We keep the number of employees that are working in the team and the team

		number. As for the tasks, we store the task number and the date of the task completed.
2 min	How are the teams and tasks organized?	All the teams are supervised by a supervisor to get their tasks completed.
3 min	What information do you store about your employees?	We keep personnel information about our employees such as the EmployeeID, First Name, Last Name, Phone number, Address, and the department number that they work in.
3 min	How does the information that you store about the managers and supervisors differ?	The information that we keep about the managers is the number of years they have spent in the department that they manage and the salary. However, for the supervisor we want to know the number of employees they are supervising and their salary.
2 min	What information do you store about your customers?	We keep their Customer ID, first name, last name, phone number, address.

4 min	What are the services that you offer?	We offer 5 different types of services that are Telematics solutions for sensors and tracking devices, IT solutions, Software Solutions, Power Backup and Microsoft business solutions.
2 min	What information do you keep about the services that you offer?	The main information that we need for services is the number of the service, name of the service, cost and type.
2 min	How do you organize the services?	All the services offered by our company are organized by the Network Operations Center (NOC) team.

## ***2. Scenario:***

One of the top ISPs in Lebanon, Pros Services reaches out to host all content providers at their data center and is a turnkey provider of high-quality internet services including IPTV, smart homes, and IOT solutions. Pros Services, an ISP with a license from the Ministry of Telecommunications since 2008, has prospered over the course of 14 years in business, building a reputation for high-quality work, and intends to keep improving its standing in the sector. Pros Services quickly expanded to become one of the top businesses in Lebanon supplying the market with the ideal ingredient combination of IT and business solutions thanks to a group of extremely skilled managers and staff.

The company operates through 500+ links it has installed all over Lebanon focusing on 5 main zones Beirut, South Lebanon, Beqaa', North Lebanon, and Mount Lebanon. Pros-Services operates the most robust and powerful platforms. Their services include but are not limited to solutions for power backup, telematics (tracking devices, sensors), software, hardware (Cisco servers), and Microsoft business solutions. The services come complete with a bandwidth management system that provides detailed usage reports and allows managing the client service better than anyone in the field can.

Therefore, if a client experiences technical difficulties, the business would be liable for resolving the issue and giving the client the remedy immediately. The personnel would be operating and working in teams to perform their jobs since all departments inside the corporation operate the services as a whole sector. Each department has a manager, and each team has a supervisor.

Additionally, due to the ongoing progress of technology in this digital era, it is essential for the business to have all its internal systems updated and upgraded to stay abreast of new developments. Due to the company's use of such sophisticated technologies, business-to-business and individual consumer

interactions account for most of its transactions, which benefits it by allowing it to interact with its primary target market. Customers call the business after closing a contract searching for answers in a certain area. The firm then performs an interview with them to discuss the issue and perform the necessary analysis before giving the client the required solution. And based on the circumstances, the business would make the client an offer that contained the right and optimal remedies. Finally, a firm employee physically contacts the customer, installs the required software, and instructs and mentors the client on how to use the product.

### **3. Business Rules:**

- 1)An employee must work in one department.
- 2)A department must contain many employees.
- 3)A department must operate many services.
- 4)A service must be operated by many departments.
- 5)A service may be an IT solution.
- 6)A service may be a power backup solution.
- 7)A service may be a telematics solution.
- 8)A service may be a software solution.
- 9)A service may be a Microsoft business solution.
- 10)A service may be sold to many customers.
- 11)A customer may purchase many services.
- 12)An employee may be a regular employee.
- 13)An employee may be a manager.
- 14)An employee may be a supervisor.
- 15)A manager must manage one department.
- 16)A department must be managed by one manager.
- 17)A regular employee must work in one team.
- 18)A team must contain many regular employees.

- 19) A team must have a supervisor.
- 20) A supervisor must supervise one team.
- 21) A task must be completed by one team.
- 22) A team may complete many tasks.

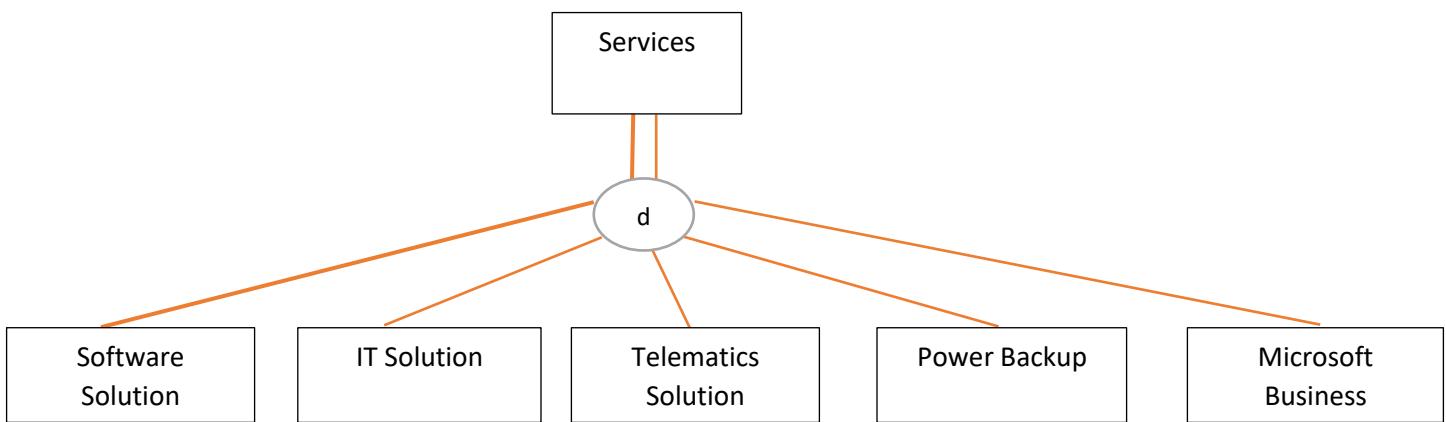
#### ***4. Description Of Entities:***

- ❖ **Services:** The components of a service are its name, its cost, its category, and its special service number (identifier). The offered service kinds are represented by the subtypes of the services entity, which is a super-type.
- ❖ **Department:** Departments consist of a department name, a special department number (identifier), and the number of personnel. These divisions include the departments of IT, HR, accounting, marketing, and finance. And a manager oversees each department.
- ❖ **Employee:** An employee is a person who works for a certain department and is identified by their unique employer identity, first and last names, addresses, phone numbers, and employee type. Employee entity is a supertype, and employee kinds are represented by its subtypes.
- ❖ **IT Solutions:** Every IT solution is provided to address a specific IT issue. (Subtype of services)
- ❖ **Power Backup:** Each Backup power solution has a set amount of time that it may be used. (Subtype of services)
- ❖ **Software Solution:** Every software option comes with unique software advantages. (Subtype of services)
- ❖ **Telematics Solution:** Every Telematics solution is practical for a device, according to the term. (Subtype of services)

- ❖ **Microsoft Business:** A description is provided for each license. (Subtype of services)
- ❖ **Manager:** Each manager lists their pay and the number of years they have worked in the department. Each manager also oversees a certain department. (Subtype of employee)
- ❖ **Supervisor:** Each supervisor oversees several employees and gets paid. And each manager oversees one squad. (Subtype of employee)
- ❖ **Regular employee:** Regular employees are paid a wage and are a part of a team. (Subtype of employee)
- ❖ **Team:** Each has a distinct team number and a certain number of personnel. Each Team is assigned tasks.
- ❖ **Task:** Each task is identified by a primary key (task number) and includes the date it was finished
- ❖ **Customer:** Consists of the customer's first and last name, address, and phone number in addition to a special customer identification.

## ***5. Relational Schema:***

May be:



Since a service type can be a power backup solution, telematics solution, software solution, IT solution, or Microsoft Business, the services entity in this relationship acts as a super-type with sub-types that represent the many types of services.

Operates:



Since a department is responsible for running every service the firm offers, and since every department in the organization is responsible for running every service, there are many to many links between departments and services.

Purchase:



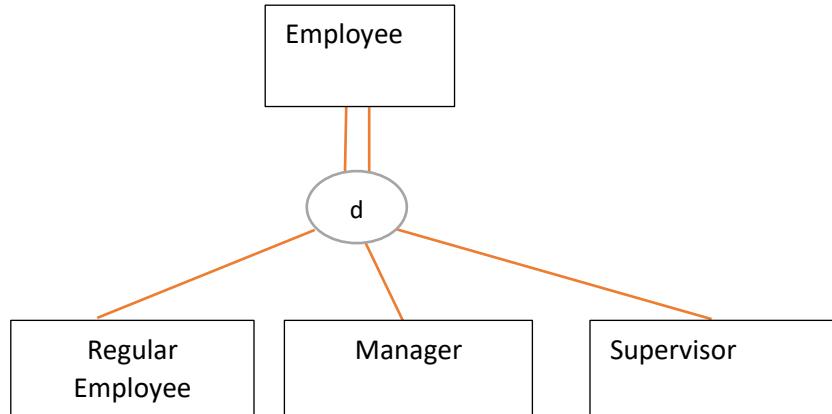
Since a consumer may buy several services and multiple customers may be given a service, the connection between the customer and the service is one of many to many.

Works for:



There must be a "works for" link established between both the department entity as well as the employee entity for each department to have multiple workers. Every one of the entities is fully involved since each department needs personnel, and those individuals must all be employed by that department. Additionally, a department has many people working for it, and a worker may only work for one department at a time, therefore the connection is one to many.

May be:



An employee may be a normal employee, a manager, or a supervisor in this relationship. The employee entity is indeed a super-type with sub-types that reflect the various employee kinds in the business.

### Manages:



There is a link between a manager (employee) and a department since a manager oversees a department. One manager oversees one department, which is under the direction of one manager. It is a one-to-one relationship as a result.

### Supervises:



A team is overseen by a supervisor, hence there is a link between the team and the supervisor (employee). One supervisor oversees a single team, but one supervisor oversees one team. It is a one-to-one relationship as a result.

Works for:



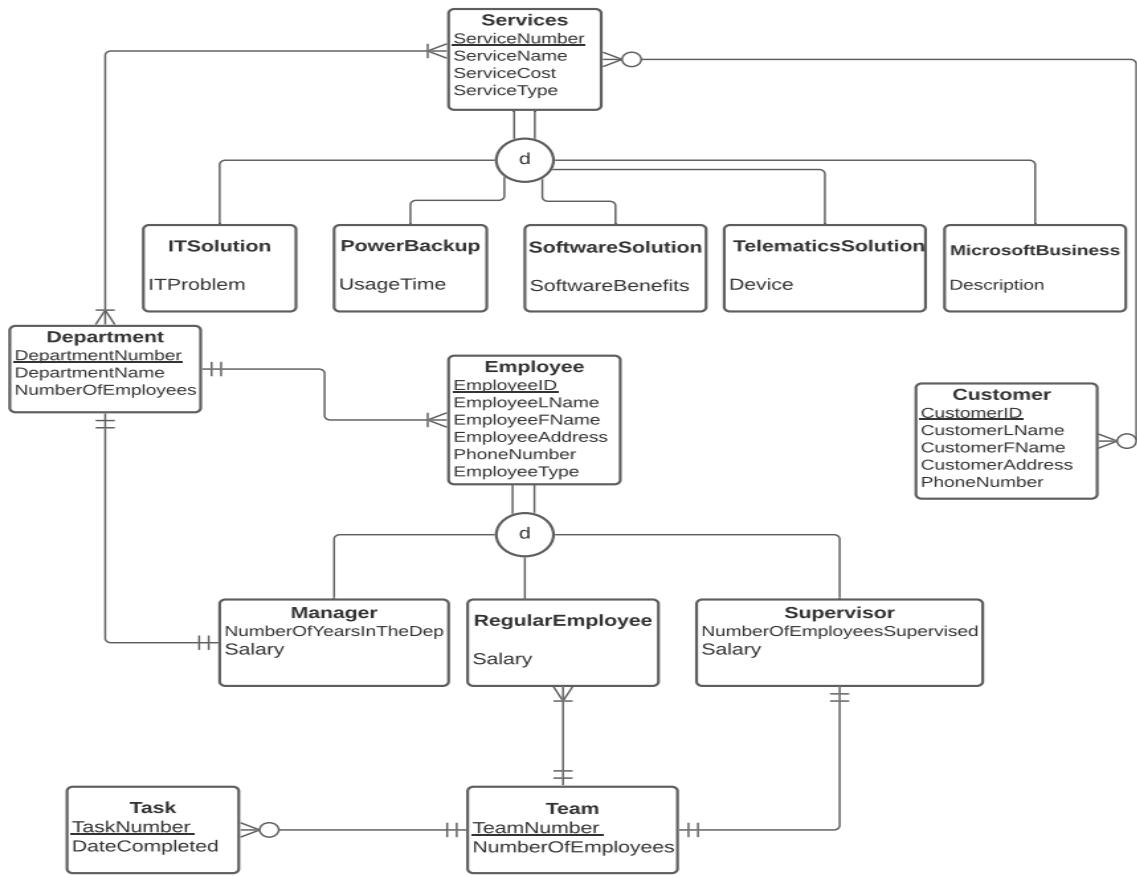
There must be a "works for" link established seen between team entity and regular employee subtype for each team to have several regular workers working for it. Because all teams require regular employees and because all regular employees must be employed by a certain Team, every one of the entities seems to have a 100% participation. A team also has several regular employees working for it, and as a regular employee may only work for one department, the connection is one to many.

Completes:

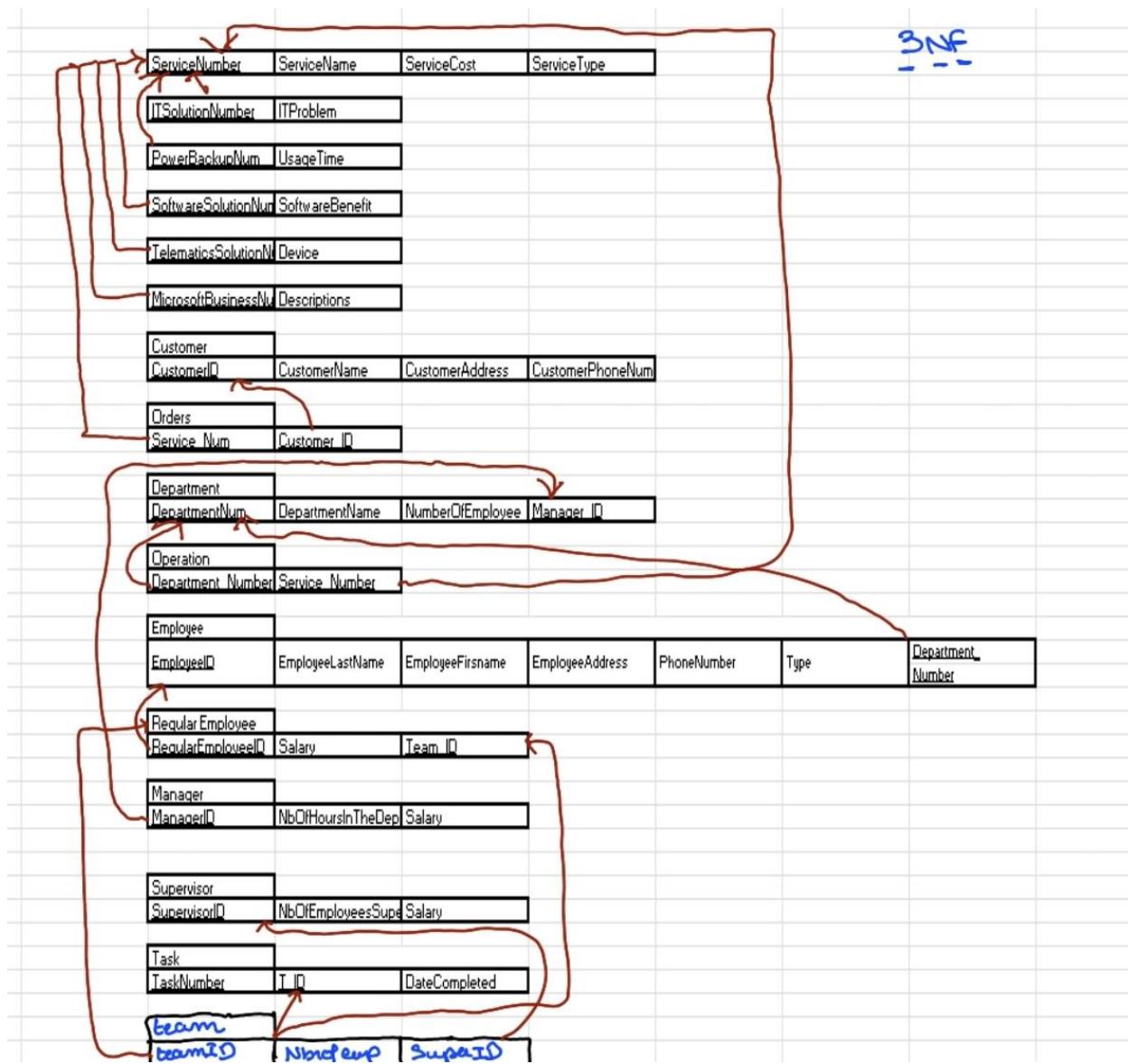


Since each team must finish several tasks, a completes link in between team entity and the task entity must be established since each job must be completed by a different team. It is a one-to-many relationship as a result.

## 6. Enhanced ER-Diagram:

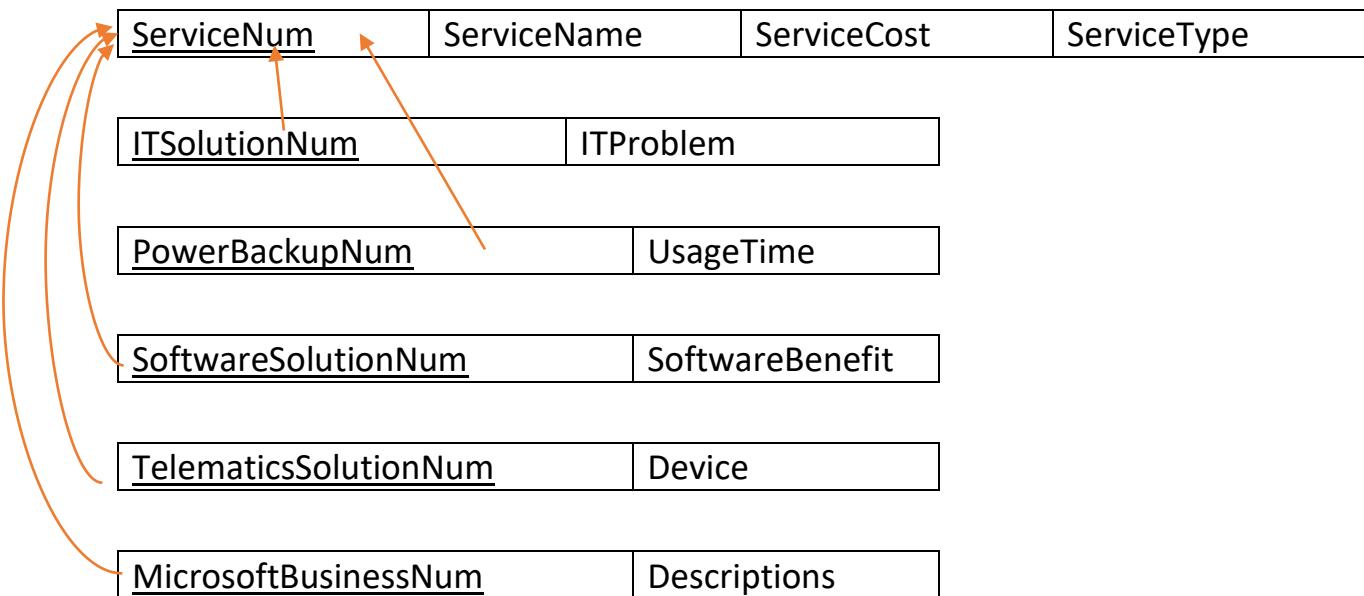


## 7. Schema Diagram:



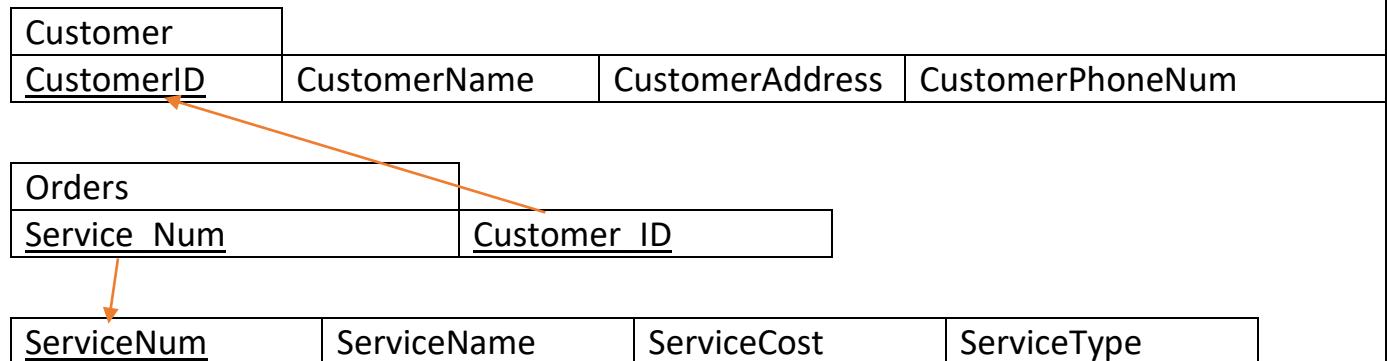
## **8. Mapping:**

May be:



The supertype is the services entity, while the subtypes are Microsoft Business, Telematics Solution, Software Solution, Power Backup Solution, and IT Solution. Each subtype's main key additionally contains a foreign key that is referred to via the supertype services. Because of this, an arrow is shown connecting the primary key of each subtype to the key of the supertype.

Purchase:



The customer entity and the services entity have a many-to-many relationship, thus a new relation named order is made with a composite primary key (both primary keys of services and customer). Because of this, an arrow is seen connecting each component of the composite primary key to the primary keys for the relations between services and consumers.

### Operate:

<u>ServiceNum</u>	ServiceName	ServiceCost	ServiceType
Operation			
<u>Department Number</u>	<u>Service Number</u>		
Department			
<u>DepartmentNum</u>	DepartmentName	NumberOfEmployees	<u>Manager_ID</u>

The department entity and the service entity have a many-to-many relationship; as a result, a new relation named operation is constructed with a composite key made up of both the department and service primary keys. Because of this, an arrow is shown leading from either end of the composite primary key towards the department and service relations primary key.

### Work in:

Department						
<u>DepartmentNum</u>	DepartmentName	NumberOfEmployees	<u>Manager_ID</u>			
Employee						
<u>EmployeeID</u>	EmployeeLastName	EmployeeFirstName	EmployeeAddress	PhoneNumber	Type	<u>Department_Number</u>

The department entity and employee entity have a one-to-many connection. As a result, the primary key on one side is now a foreign key on the other. This explains

why an arrow points from the department relation's primary key to the foreign key in the employee relation.

May be:

Employee	EmployeeID	EmployeeLastName	EmployeeFirstname	EmployeeAddress	PhoneNumber	Type	DepartmentNumber
Regular Employee	RegularEmployeeID			Salary	Team_ID		
Manager	ManagerID			NbOfHoursInTheDepartment	Salary		
Supervisor	SupervisorID			NbOfEmployeesSupervised	Salary		

Regular Employee, Supervisor, and Manager are the subtypes under the super-type of the employee entity. Each subtype additionally has a main key that is a foreign key that is linked to the super-type of employee. Because of this, an arrow is seen connecting the primary key of each subtype to the key to the super-type.

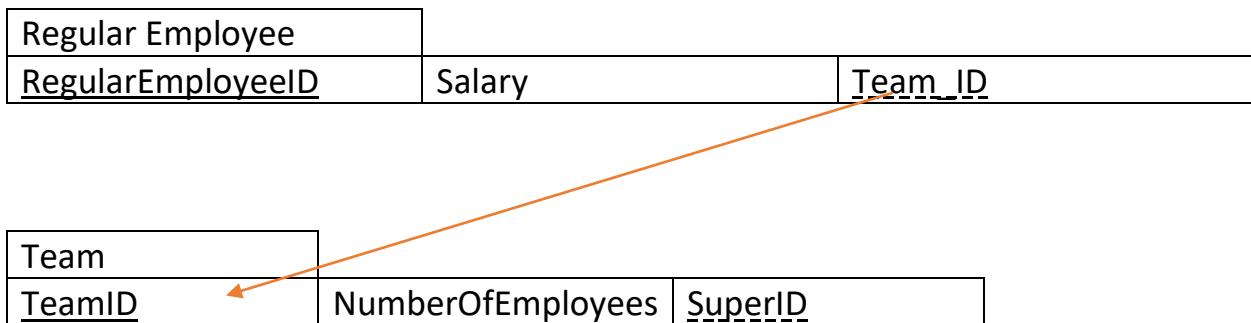
Manages:

Manager	ManagerID	NbOfHoursInTheDepartment	Salary
Department	DepartmentNum	DepartmentName	NumberOfEmployees
			Manager_ID

The manager entity and the department entity have a one-to-one connection. Since the relation is required on both sides, the main key on one side may turn

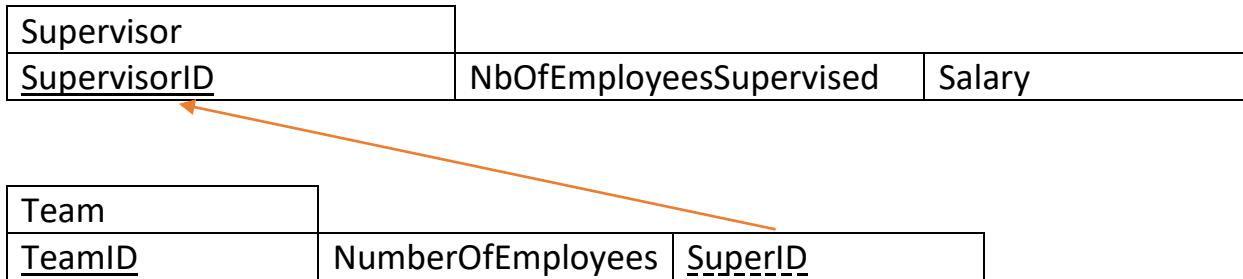
into a foreign key on the other. Because of this, an arrow is seen from the department relation's foreign key to the manager relation's primary key.

Work in:



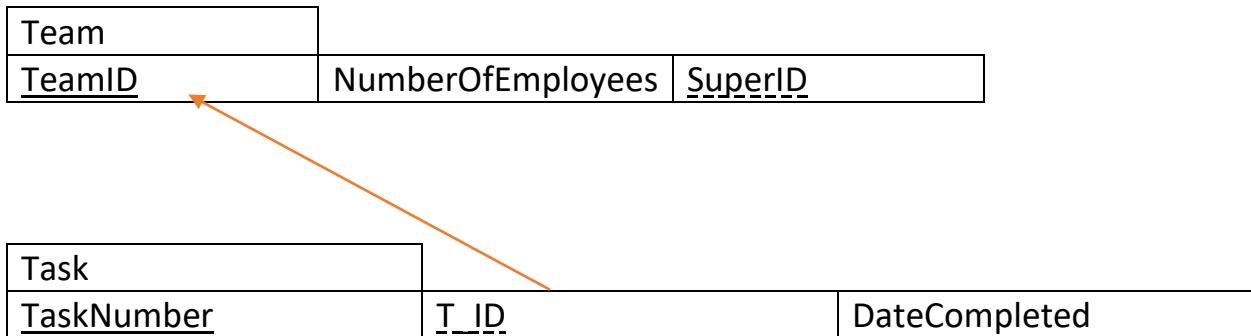
The team entity and the Regular employee entity have a one-to-many connection. The primary key on one side changes to a foreign key on another. Therefore, the team entity's main key is converted to a foreign key in the standard employee entity. The arrow connecting the standard employee entity to the team entity may be seen as a result.

Supervise:



The supervisor entity and the team entity have a one-to-one connection. Given that the relation is necessary on both sides, the primary key on one side may turn into a foreign key on the other. As a result, the team entity now uses the supervisor entity's primary key as a foreign key. Because of this, an arrow is shown from the team entity to the supervisor entity's primary key.

Completes:



The team entity and the task entity are connected in a one-to-many relationship. On one side, the primary key changes into a foreign key on the other. As a result, the task entity's foreign key for the team entity's primary key. The primary key of said team entity is shown by an arrow that leads from the task entity.

## **9. Normalized Schema:**

Services: **3rd Normal form**

<u>ServiceNum</u>	ServiceName	ServiceCost	ServiceType
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IT Solution: **3rd Normal form**

<u>ITSolutionNum</u>	ITProblem
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Power Backup: **3rd Normal form**

<u>PowerBackupNumber</u>	UsageTime
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Software Solution: **3rd Normal form**

<u>SoftwareSolutionNum</u>	SoftwareBenefit
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Telematics Solution: **3rd Normal form**

<u>TelematicsSolutionNum</u>	Device
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Microsoft Business: **3rd Normal form**

<u>MicrosoftBusinessNum</u>	Descriptions
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Customer: **3rd Normal form**

<u>CustomerID</u>	CustomerName	CustomerAddress	CustomerPhoneNumber
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Order: **3rd Normal form**

<u>ServiceNum</u>	<u>ServiceName</u>	<u>ServiceCost</u>	<u>ServiceType</u>
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Department: **3rd Normal form**

<u>DepartmentNum</u>	<u>DepartmentName</u>	<u>NumberOfEmployees</u>	<u>Manager_ID</u>
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Operation: **3rd Normal form**

<u>Department Number</u>	<u>Service Number</u>
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Employee: **3rd Normal form**

<u>EmployeeID</u>	<u>EmployeeLastName</u>	<u>EmployeeFirstName</u>	<u>EmployeeAddress</u>	<u>Department_Number</u>	Type
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Regular Employee: **3rd Normal form**

<u>RegularEmployeeID</u>	<u>Salary</u>	<u>Team_ID</u>
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Supervisor: **3rd Normal form**

<u>SupervisorID</u>	<u>NumberOfEmployeesSupervised</u>	<u>Salary</u>
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Manager: **3rd Normal form**

<u>ManagerID</u>	<u>NumberOfHoursInTheDepartment</u>	<u>Salary</u>
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Team: **3rd Normal form**

<u>TeamID</u>	<u>NumberOfEmployees</u>	<u>SuperID</u>
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Task: **3rd Normal form**

<u>TaskNumber</u>	<u>T_ID</u>	<u>DateCompleted</u>
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All the relations are in the 3rd normal form since there are no multivalued attributes, no partial dependencies, and no transitive dependencies.

## **10. Table Creation:**

Customer:

	CustomerID	CustomerLastName	CustomerFirstName	CustomerAddress	CustomerPhoneNumber
Data Type	Nchar	Varchar	Varchar	Varchar	Nchar
Length	18	20	20	20	16
Null	No	No	No	Yes	Yes
PK/FK	Primary Key	No	No	No	No

Department:

	DepartmentNum	DepartmentName	NumberOfEmployees	Manager_ID
Data Type	Integer	Varchar	Integer	Nchar
Length	4	20	4	18
Null	No	No	No	Yes
PK/FK	PK	No	No	FK

Employee:

	EmployeeID	EmployeeLastName	EmployeeFirstName	EmployeeAddress	EmployeePhoneNum	Department_Number	Type
Data Type	Nchar	Varchar	Varchar	Varchar	Nchar	Integer	Varchar
Length	18	20	20	50	22	4	20
Null	No	No	No	Yes	Yes	Yes	Yes
PK/FK	Primary Key	No	No	No	No	Foreign Key	No

Manager:

	ManagerID	NumberOfHoursInDepartment	Salary
Data Type	Nchar	Integer	Integer
Length	18	4	20
Null	No	Yes	Yes
PK/FK	Primary Key	No	No

Regular Employee:

	RegularEmployeeID	Team_ID	Salary
Data Type	Nchar	Integer	Integer
Length	18	4	20
Null	No	No	Yes
PK/FK	Primary key	Foreign Key	No

## Supervisor:

SupervisorID		NumberOfEmployeesSupervised	Salary
<b>Data Type</b>	Nchar	Integer	Integer
<b>Length</b>	18	4	20
<b>Null</b>	No	yes	Yes
<b>PK/FK</b>	Primary Key/Foreign Key	No	No

## Operation:

Department_Number		Service_Number
<b>Data Type</b>	Integer	Integer
<b>Length</b>	4	4
<b>Null</b>	No	No
<b>PK/FK</b>	Primary Key/Foreign Key	Primary Key/Foreign Key

## Team:

TeamID		SuperID	NumberOfEmployees
<b>Data Type</b>	Integer	Nchar	Integer
<b>Length</b>	4	18	4
<b>Null</b>	No	No	Yes
<b>PK/FK</b>	Primary Key	Foreign Key	No

## Task:

TaskNumber		T_ID	DateCompleted
<b>Data Type</b>	Integer	Integer	Varchar
<b>Length</b>	4	4	20
<b>Null</b>	No	No	Yes
<b>PK/FK</b>	Primary Key	Foreign Key	No

## Service:

ServiceNum		ServiceName	ServiceCost	ServiceType
<b>Data Type</b>	integer	Varchar	Varchar	Varchar
<b>Length</b>	4	20	20	20
<b>Null</b>	No	No	Yes	Yes
<b>PK/FK</b>	Primary Key	No	No	No

## IT Solution:

ITSolutionNum		ITProblem
<b>Data Type</b>	Integer	Varchar
<b>Length</b>	4	20
<b>Null</b>	No	Yes

<b>PK/FK</b>	Primary Key/Foreign Key	No
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## Microsoft Business:

	<b>MicrosoftBusinessNum</b>	<b>Descriptions</b>
<b>Data Type</b>	Integer	Varchar
<b>Length</b>	4	20
<b>Null</b>	No	Yes
<b>PK/FK</b>	Primary Key/Foreign Key	No

## Power Backup:

	<b>PowerBackupNum</b>	<b>UsageTime</b>
<b>Data Type</b>	Integer	Float
<b>Length</b>	4	20
<b>Null</b>	No	Yes
<b>PK/FK</b>	Primary Key/Foreign Key	No

## Software Solution:

	<b>SoftwareSolutionNum</b>	<b>SoftwareBenefit</b>
<b>Data Type</b>	Integer	Varchar
<b>Length</b>	4	20
<b>Null</b>	No	Yes
<b>PK/FK</b>	Primary Key/ Foreign Key	No

## Telematics Solutions:

	<b>TelematicsSolutionNum</b>	<b>Device</b>
<b>Data Type</b>	Integer	Varchar
<b>Length</b>	4	20
<b>Null</b>	No	Yes
<b>PK/FK</b>	Primary Key/Foreign Key	No

## Order:

	<b>Service_Num</b>	<b>Customer_ID</b>
<b>Data Type</b>	Integer	Nchar
<b>Length</b>	4	18
<b>Null</b>	No	No
<b>PK/FK</b>	Primary Key	Primary Key/Foreign Key

## **11. SQL Management Studio Tables:**

Table Creation:

1-Table concerning Employees:

```
Create Table Employee (
EmployeeID NCHAR (9) NOT null,
EmployeeLastName varchar (20) not null,
EmployeeFirstName varchar (20) not null,
EmployeeAddress varchar (50),
EmployeePhoneNum nchar (11),
Department_Number integer,
EmployeeType varchar (20),
Primary key (EmployeeID),
Foreign key ( Department_Number) references Department);
```

```
Create table Supervisor (
SupervisorID nchar (9) not null,
NumberOfEmployeeSupervised integer ,
Salary Integer,
Primary key (SupervisorID),
Foreign key (SupervisorID) references employee);
```

```
Create Table RegularEmployee (
RegularEmployeeID nchar (9) not null,
Team_ID integer not null,
Salary integer,
Primary Key (RegularEmployeeID),
Foreign key (RegularEmployeeID) references employee ,
Foreign key (Team_ID) references Team);
```

```
Create Table Manager (
ManagerID nchar (9) not null,
NumberOfHoursInDepartment integer,
Salary integer,
Primary key (ManagerID),
Foreign key (ManagerID) references employee);
```

```
Create Table Team (
TeamID integer not null,
SuperID nchar (9) not null,
NumberOfEmployees integer,
Primary key (TeamID),
Foreign key ( SuperID) references supervisor );
```

```
Create table Department (
DepartmentNum integer not null,
DepartmentName varchar (20) not null,
NumberOfEmployees integer not null,
Primary key (DepartmentNum));
```

```
Create Table Task (
TaskNumber integer not null,
T_ID integer not null,
DateCompleted varchar (20),
Primary key ( TaskNumber),
Foreign key ( T_ID) references Team);
```

```
Create table Operation (
Department_Number integer not null,
Service_Number integer not null,
Primary key ( Department_Number, Service_Number),
Foreign key ( Department_Number) references department,
Foreign key (Service_Number) references Service);
```

2-Tables concerning Customers:

```
Create table Customer (
CustomerID nchar (9) not null,
CustomerLastName varchar (20) not null,
CustomerFirstName varchar (20) not null,
CustomerAddress varchar (20) ,
CustomerPhoneNum nchar (8) ,
Primary key (CustomerID));

Create table Orders (
Service_Num integer not null,
Customer_ID nchar (9) not null,
Primary key (Service_Num, Customer_ID),
Foreign key (Customer_ID) references Customer,
Foreign key (Service_Num) references service);
```

3-Tables concerning Services:

```
Create table service(
ServiceNum integer not null,
ServiceName varchar(20) not null,
ServiceCost integer,
ServiceType varchar (20),
Primary key(ServiceNum));

Create table TelematicsSolution (
TelematicsSolutionNum integer not null,
Device varchar (20),
Primary key (TelematicsSolutionNum),
Foreign key (TelematicsSolutionNum) references service);

Create table ITSolution(
ITSolutionNum integer not null,
ITProblem varchar (20),
Primary key (ITSolutionNum),
Foreign key (ITSolutionNum) references service);
```

```
Create table PowerBackup (
PowerBackupNum integer not null,
UsageTime float,
Primary key(PowerBackupNum),
Foreign key (PowerBackupNum) references service);
```

```
Create table SoftwareSolution (
SoftwareSolutionNum integer not null,
SoftwareBenefit varchar (20),
Primary key (SoftwareSolutionNum),
Foreign key(SoftwareSolutionNum) references service);
```

```
Create table MicrosoftBusiness (
MicrosoftBusinessNum integer not null,
Descriptions varchar (20),
Primary key (MicrosoftBusinessNum),
Foreign key (MicrosoftBusinessNum) references service);
```

**Note: table creation order in SQL differs since tables that carry dependencies should be created first.**

## **12. SQL Management Studio Table Description:**

### 1-Employee:

Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation				
EmployeeID	nchar	no	18			no	(n/a)	(n/a)	SQL_Latin1_General_CP1_CI_AS				
EmployeeLastName	varchar	no	20			no	no	no	SQL_Latin1_General_CP1_CI_AS				
EmployeeFirstName	varchar	no	20			no	no	no	SQL_Latin1_General_CP1_CI_AS				
EmployeeAddress	varchar	no	50			yes	no	yes	SQL_Latin1_General_CP1_CI_AS				
EmployeePhoneNum	nchar	no	22			yes	(n/a)	(n/a)	SQL_Latin1_General_CP1_CI_AS				
Department_Number	int	no	4	10	0	yes	(n/a)	(n/a)	NULL				
EmployeeType	varchar	no	20			yes	no	yes	SQL_Latin1_General_CP1_CI_AS				
Identity		Seed	Increment	Not For Replication									
No identity column defined.		NULL	NULL	NULL									
RowGuidCol													
No rowguidcol column defined.													
Data_located_on_filegroup													
PRIMARY													
index_name		index_description			index_keys								
PK_Employee_7AD04FF1D718E504		clustered, unique, primary key located on PRIMARY			EmployeeID								
constraint_type	constraint_name		delete_action	update_action	status_enabled	status_for_replication	constraint_keys						
FOREIGN KEY	FK_Employee_Depart_656C112C		No Action	No Action	Enabled	Is_For_Replication	Department_Number						
PRIMARY KE...	PK_Employee_7AD04FF1D718E...	(n/a)	(n/a)	(n/a)	(n/a)	(n/a)	REFERENCES ProServices.dbo.Department (Department...						
EmployeeID													
Table is referenced by foreign key													
1	ProServices.dbo.Manager: FK_Manager_Manager_71...												
2	ProServices.dbo.RegularEmployee: FK-RegularEm_Re...												
3	ProServices.dbo.Supervisor: FK_Superviso_Super_68...												

### 2-Supervisor:

Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation				
SupervisorID	nchar	no	18			no	(n/a)	(n/a)	SQL_Latin1_General_CP1_CI_AS				
NumberOfEmployeeSupervised	int	no	4	10	0	yes	(n/a)	(n/a)	NULL				
Salary	varchar	no	20			yes	no	yes	SQL_Latin1_General_CP1_CI_AS				
Identity		Seed	Increment	Not For Replication									
No identity column defined.		NULL	NULL	NULL									
RowGuidCol													
No rowguidcol column defined.													
Data_located_on_filegroup													
PRIMARY													
index_name		index_description			index_keys								
PK_Supervis_6FAABDAF576EFCFF		clustered, unique, primary key located on PRIMARY			SupervisorID								
constraint_type	constraint_name		delete_action	update_action	status_enabled	status_for_replication	constraint_keys						
FOREIGN KEY	FK_Superviso_Super_68487DD7		No Action	No Action	Enabled	Is_For_Replication	SupervisorID						
PRIMARY KE...	PK_Supervis_6FAABDAF576EF...	(n/a)	(n/a)	(n/a)	(n/a)	(n/a)	REFERENCES ProServices.dbo.Employee (EmployeeID)						
SupervisorID													
Table is referenced by foreign key													
1	ProServices.dbo.Team: FK_Team_SuperID_6B24EA82												

### 3-Regular Employee:

	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	RegularEmployeeID	nchar	no	18			no	(n/a)	(n/a)	SQL_Latin1_General_CI_AS
2	Team_ID	int	no	4	10	0	no	(n/a)	(n/a)	NULL
3	Salary	int	no	4	10	0	yes	(n/a)	(n/a)	NULL
Identity										
1	No identity column defined.	Seed	Increment	Not For Replication						
RowGuidCol										
1	No rowguidcol column defined.									
Data_located_on_filegroup										
1	PRIMARY									
index_name index_description index_keys										
1	PK__RegularE__6FF63F503430E899	clustered, unique, primary key located on PRIMARY								
	constraint_type constraint_name			delete_action	update_action	status_enabled	status_for_replication		constraint_keys	
1	FOREIGN KEY	FK__RegularEm__Regul__6E01572D		No Action	No Action	Enabled	Is_For_Replication		RegularEmployeeID	
2									REFERENCES ProServices.dbo.Employee (EmployeeID)	
3	FOREIGN KEY	FK__RegularEm__Team__6EF57B...		No Action	No Action	Enabled	Is_For_Replication		Team_ID	
4									REFERENCES ProServices.dbo.Team (TeamID)	
5	PRIMARY KE...	PK__RegularE__6FF63F503430E899	(n/a)	(n/a)	(n/a)	(n/a)	(n/a)		RegularEmployeeID	

### 4-Manager:

	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	ManagerID	nchar	no	18			no	(n/a)	(n/a)	SQL_Latin1_General_CI_AS
2	NumberOfHoursInDepartment	int	no	4	10	0	yes	(n/a)	(n/a)	NULL
3	Salary	int	no	4	10	0	yes	(n/a)	(n/a)	NULL
Identity										
1	No identity column defined.	Seed	Increment	Not For Replication						
RowGuidCol										
1	No rowguidcol column defined.									
Data_located_on_filegroup										
1	PRIMARY									
index_name index_description index_keys										
1	PK__Manager__3BA2AA81A13B4E1F	clustered, unique, primary key located on PRIMARY								
	constraint_type constraint_name			delete_action	update_action	status_enabled	status_for_replication		constraint_keys	
1	FOREIGN KEY	FK__Manager__Manager__71D1E811		No Action	No Action	Enabled	Is_For_Replication		ManagerID	
2									REFERENCES ProServices.dbo.Employee (EmployeeID)	
3	PRIMARY KE...	PK__Manager__3BA2AA81A13B4E1F	(n/a)	(n/a)	(n/a)	(n/a)	(n/a)		ManagerID	
Table is referenced by foreign key										
1	ProServices.dbo.Department.FK_Departmen...									

## 5-Team:

	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	TeamID	int	no	4	10	0	no	(n/a)	(n/a)	NULL
2	SuperID	nchar	no	18			no	(n/a)	(n/a)	SQL_Latin1_General_CI_AS
3	NumberOfEmployees	int	no	4	10	0	yes	(n/a)	(n/a)	NULL
Identity										
1	No identity column defined.		Seed	NULL	Increment	NULL	Not For Replication			
RowGuidCol										
1	No rowguidcol column defined.									
Data_located_on_filegroup										
1	PRIMARY									
index_name index_description index_keys										
1	PK_Team_123AE7B9D97951D6						clustered, unique, primary key located on PRIMARY	TeamID		
constraint_type constraint_name delete_action update_action status_enabled status_for_replication constraint_keys										
1	FOREIGN KEY	FK_Team_SuperID_6B24EA82	No Action		No Action		Enabled	Is_For_Replication	SuperID	
2									REFERENCES ProServices.dbo.Supervisor (SupervisorID)	
3	PRIMARY KE...	PK_Team_123AE7B9D97951D6	(n/a)		(n/a)		(n/a)	(n/a)	TeamID	
Table is referenced by foreign key										
1	ProServices.dbo.RegularEmployee: FK-RegularEm...									
2	ProServices.dbo.Task: FK_Task_T_ID_74AE54BC									

## 6-Department:

	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	DepartmentNum	int	no	4	10	0	no	(n/a)	(n/a)	NULL
2	DepartmentName	varchar	no	20			no	no	(n/a)	SQL_Latin1_General_CI_AS
3	NumberOfEmpl...	int	no	4	10	0	no	(n/a)	(n/a)	NULL
4	Manager_ID	nchar	no	18			yes	(n/a)	(n/a)	SQL_Latin1_General_CI_AS
Identity										
1	No identity column defined.		Seed	NULL	Increment	NULL	Not For Replication			
RowGuidCol										
1	No rowguidcol column defined.									
Data_located_on_filegroup										
1	PRIMARY									
index_name index_description index_keys										
1	PK_Departme_189540E10DD5E6D9						clustered, unique, primary key located on PRIMARY	DepartmentNum		
constraint_type constraint_name delete_action update_action status_enabled status_for_replication constraint_keys										
1	FOREIGN KEY	FK_Departmen_Manag_75A278F5	No Action		No Action		Enabled	Is_For_Replication	Manager_ID	
2									REFERENCES ProServices.dbo.Manager (ManagerID)	
3	PRIMARY KE...	PK_Departme_189540E10DD5E6...	(n/a)		(n/a)		(n/a)	(n/a)	DepartmentNum	
Table is referenced by foreign key										
1	ProServices.dbo.Employee: FK_Employee_Depart...									
2	ProServices.dbo.Operation: FK_Operation_Depar...									

## 7-Task:

	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	TaskNumber	int	no	4	10	0	no	(n/a)	(n/a)	NULL
2	T_ID	int	no	4	10	0	no	(n/a)	(n/a)	NULL
3	DateCompleted	varchar	no	20			yes	no	yes	SQL_Latin1_General_CI_AS
	Identity		Seed	Increment	Not For Replication					
1	No identity column defined.		NULL	NULL	NULL					
	RowGuidCol									
1	No rowguidcol column defined.									
	Data_located_on_filegroup									
1	PRIMARY									
	index_name		index_description				index_keys			
1	PK_Task_6601A97D1515FEF6		clustered, unique, primary key located on PRIMARY				TaskNumber			
	constraint_type	constraint_name		delete_action	update_action	status_enabled	status_for_replication		constraint_keys	
1	FOREIGN KEY	FK_Task_T_ID_74AE54BC		No Action	No Action	Enabled	Is_For_Replication		T_ID	
2									REFERENCES ProServices.dbo.Team (TeamID)	
3	PRIMARY KE...	PK_Task_6601A97D1515...		(n/a)	(n/a)	(n/a)	(n/a)		TaskNumber	

## 8-Operation:

	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	Department_Number	int	no	4	10	0	no	(n/a)	(n/a)	NULL
2	Service_Number	int	no	4	10	0	no	(n/a)	(n/a)	NULL
	Identity		Seed	Increment	Not For Replication					
1	No identity column defined.		NULL	NULL	NULL					
	RowGuidCol									
1	No rowguidcol column defined.									
	Data_located_on_filegroup									
1	PRIMARY									
	index_name		index_description				index_keys			
1	PK_Operatio_BD90A266B5F2E0A9		clustered, unique, primary key located on PRIMARY				Department_Number, Service_Number			
	constraint_type	constraint_name		delete_action	update_action	status_enabled	status_for_replication		constraint_keys	
1	FOREIGN KEY	FK_Operation_Depar_619B8048		No Action	No Action	Enabled	Is_For_Replication		Department_Number	
2									REFERENCES ProServices.dbo.Department (Department...	
3	FOREIGN KEY	FK_Operation_Servi_628FA481		No Action	No Action	Enabled	Is_For_Replication		Service_Number	
4									REFERENCES ProServices.dbo.service (ServiceNum)	
5	PRIMARY KE...	PK_Operatio_BD90A266B5F2E...		(n/a)	(n/a)	(n/a)	(n/a)		Department_Number, Service_Number	

## 9-Customer:

	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	CustomerID	nchar	no	18			no	(n/a)	(n/a)	SQL_Latin1_General_CI_AS
2	CustomerLastName	varchar	no	20			no	no	no	SQL_Latin1_General_CI_AS
3	CustomerFirstName	varchar	no	20			no	no	no	SQL_Latin1_General_CI_AS
4	CustomerAddress	varchar	no	20			yes	no	yes	SQL_Latin1_General_CI_AS
5	CustomerPhoneN...	nchar	no	16			yes	(n/a)	(n/a)	SQL_Latin1_General_CI_AS
	Identity	Seed	Increment	Not For Replication						
1	No identity column defined.	NULL	NULL	NULL						
	RowGuidCol									
1	No rowguidcol column defined.									
	Data_located_on_filegroup									
1	PRIMARY									
	index_name		index_description				index_keys			
1	PK_Customer_A4AE64B88C576C49		clustered, unique, primary key located on PRIMARY				CustomerID			
	constraint_type	constraint_name		delete_action	update_action	status_enabled	status_for_replication			
1	PRIMARY KEY (clustered)	PK_Customer_A4AE64B88C576C49	(n/a)	(n/a)	(n/a)	(n/a)	(n/a)			
	Table is referenced by foreign key									
1	ProServices.dbo.Orders: FK_Orders_Customer_5B...									

## 10-Order:

	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	Service_Num	int	no	4	10	0	no	(n/a)	(n/a)	NULL
2	Customer_ID	nchar	no	18			no	(n/a)	(n/a)	SQL_Latin1_General_CI_AS
	Identity	Seed	Increment	Not For Replication						
1	No identity column defined.	NULL	NULL	NULL						
	RowGuidCol									
1	No rowguidcol column defined.									
	Data_located_on_filegroup									
1	PRIMARY									
	index_name		index_description				index_keys			
1	PK_Orders_97330F1D9FE306E6		clustered, unique, primary key located on PRIMARY				Service_Num, Customer_ID			
	constraint_type	constraint_name		delete_action	update_action	status_enabled	status_for_replication			
1	FOREIGN KEY	FK_Orders_Customer_5BE2A6F2	No Action	No Action	Enabled	Is_For_Replication	Customer_ID			
2							REFERENCES ProServices.dbo.Customer (CustomerID)			
3	FOREIGN KEY	FK_Orders_Service_5CD6CB2B	No Action	No Action	Enabled	Is_For_Replication	Service_Num			
4							REFERENCES ProServices.dbo.service (ServiceNum)			
5	PRIMARY KE...	PK_Orders_97330F1D9FE306E6	(n/a)	(n/a)	(n/a)	(n/a)	(n/a)			

## 11-Service:

	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	ServiceNum	int	no	4	10	0	no	(n/a)	(n/a)	NULL
2	ServiceName	varchar	no	20			no	no	no	SQL_Latin1_General_CI_AS
3	ServiceCost	int	no	4	10	0	yes	(n/a)	(n/a)	NULL
4	ServiceType	varchar	no	20			yes	no	yes	SQL_Latin1_General_CI_AS
	Identity	Seed	Increment	Not For Replication						
1	No identity column defined.	NULL	NULL	NULL						
	RowGuidCol									
1	No rowguidcol column defined.									
	Data_located_on_filegroup									
1	PRIMARY									
	index_name	index_description			index_keys					
1	PK_service_746476E36AF7B752	clustered, unique, primary key located on PRIMARY			ServiceNum					
	constraint_type	constraint_name	delete_action		update_action	status_enabled	status_for_replication	constraint_keys		
1	PRIMARY KEY (clustered)	PK_service_746476E36AF7B752	(n/a)		(n/a)	(n/a)	(n/a)	ServiceNum		
Table is referenced by foreign key										
1	ProServices dbo ITSolution: FK_ITSolution_ITSol...									
2	ProServices dbo MicrosoftBusiness: FK__Microsoft...									
3	ProServices dbo Operation: FK_Operation_Servi...									
4	ProServices dbo Orders: FK_Orders_Service_5...									
5	ProServices dbo PowerBackup: FK_PowerBack_...									
6	ProServices dbo SoftwareSolution: FK_SoftwareS...									
7	ProServices dbo TelematicsSolution: FK_Telemati...									

## 12-TelematicSolutions:

	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	TelematicsSolutionNum	int	no	4	10	0	no	(n/a)	(n/a)	NULL
2	Device	varchar	no	20			yes	no	yes	SQL_Latin1_General_CI_AS
	Identity	Seed	Increment	Not For Replication						
1	No identity column defined.	NULL	NULL	NULL						
	RowGuidCol									
1	No rowguidcol column defined.									
	Data_located_on_filegroup									
1	PRIMARY									
	index_name	index_description			index_keys					
1	PK_Telemati_721DE3A87B9C9419	clustered, unique, primary key located on PRIMARY			TelematicsSolutionNum					
	constraint_type	constraint_name	delete_action		update_action	status_enabled	status_for_replication	constraint_keys		
1	FOREIGN KEY	FK_Telematic_Telem_4BAC3F29	No Action		No Action	Enabled	Is_For_Replication	TelematicsSolutionNum		
2								REFERENCES ProServices.dbo.service (ServiceNum)		
3	PRIMARY KE...	PK_Telemati_721DE3A87B9C94...	(n/a)		(n/a)	(n/a)	(n/a)	TelematicsSolutionNum		

## 13-ITsolution:

	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	ITSolutionNum	int	no	4	10	0	no	(n/a)	NULL	
2	ITProblem	varchar	no	20			yes	no	yes	SQL_Latin1_General_CI_AS
Identity										
1	No identity column defined.	NULL	NULL	NULL						
RowGuidCol										
1	No rowguidcol column defined.									
Data_located_on_filegroup										
1	PRIMARY									
index_name		index_description			index_keys					
1	PK_ITSol_55105EB308C3AA2B		clustered, unique, primary key located on PRIMARY					ITSolutionNum		
constraint_type		constraint_name	delete_action		update_action	status_enabled	status_for_replication	constraint_keys		
1	FOREIGN KEY	FK_ITSol_ITSol_4E88ABD4	No Action		No Action	Enabled	Is_For_Replication	ITSolutionNum		
2								REFERENCES ProServices.dbo.service (ServiceNum)		
3	PRIMARY KE...	PK_ITSol_55105EB308C3A...	(n/a)		(n/a)	(n/a)	(n/a)	ITSolutionNum		

## 14-PowerBackup:

	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	PowerBackupNum	int	no	4	10	0	no	(n/a)	(n/a)	NULL
2	UsageTime	float	no	8	53	NULL	yes	(n/a)	(n/a)	NULL
Identity										
1	No identity column defined.	NULL	NULL	NULL						
RowGuidCol										
1	No rowguidcol column defined.									
Data_located_on_filegroup										
1	PRIMARY									
index_name		index_description			index_keys					
1	PK_PowerBac_43A91824309D1774		clustered, unique, primary key located on PRIMARY					PowerBackupNum		
constraint_type		constraint_name	delete_action		update_action	status_enabled	status_for_replication	constraint_keys		
1	FOREIGN KEY	FK_PowerBack_Power_5165187F	No Action		No Action	Enabled	Is_For_Replication	PowerBackupNum		
2								REFERENCES ProServices.dbo.service (ServiceNum)		
3	PRIMARY KE...	PK_PowerBac_43A91824309D17...	(n/a)		(n/a)	(n/a)	(n/a)	PowerBackupNum		

## 15-SoftwareSolution:

	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	SoftwareSolutionNum	int	no	4	10	0	no	(n/a)	(n/a)	NULL
2	SoftwareBenefit	varchar	no	20			yes	no	yes	SQL_Latin1_General_CI_AS
Identity										
1	No identity column defined.	NULL	NULL	NULL						
RowGuidCol										
1	No rowguidcol column defined.									
Data_located_on_filegroup										
1	PRIMARY									
index_name		index_description			index_keys					
1	PK_Software_3FC7BB9F7449E4D2									
clustered, unique, primary key located on PRIMARY										
constraint_type constraint_name		delete_action		update_action		status_enabled		status_for_replication		constraint_keys
1	FOREIGN KEY	FK_SoftwareS_Softw_5441852A		No Action		No Action	Enabled	Is_For_Replication		SoftwareSolutionNum
2										REFERENCES ProServices.dbo.service (ServiceNum)
3	PRIMARY KE...	PK_Software_3FC7BB9F7449E...	(n/a)		(n/a)		(n/a)	(n/a)		SoftwareSolutionNum

## 16-MicrosoftBusiness:

	Name	Owner	Type	Created_datetime						
1	MicrosoftBusiness	dbo	user table	2022-12-11 01:09:23.140						
Column_name										
Type										
Computed										
Length										
Prec										
Scale										
Nullable										
(n/a)										
TrimTrailingBlanks										
(n/a)										
FixedLenNullInSource										
NULL										
Collation										
SQL_Latin1_General_CI_AS										
Identity										
Seed										
Increment										
Not For Replication										
1	No identity column defined.	NULL	NULL	NULL						
RowGuidCol										
1	No rowguidcol column defined.									
Data_located_on_filegroup										
1	PRIMARY									
index_name		index_description								
1	PK_Microsoft_2FF76170C9DBB030									
clustered, unique, primary key located on PRIMARY										
index_keys										
1										
constraint_type constraint_name		delete_action		update_action		status_enabled		status_for_replication		constraint_keys
1	FOREIGN KEY	FK_Microsoft_Micro_571DF1D5		No Action		No Action	Enabled	Is_For_Replication		MicrosoftBusinessNum
2										REFERENCES ProServices.dbo.service (ServiceNum)
3	PRIMARY KE...	PK_Microsoft_2FF76170C9DBB...	(n/a)		(n/a)		(n/a)	(n/a)		MicrosoftBusinessNum

### **13. SQL Management Studio Insert into Tables:**

```
Insert into Employee
```

```
Values
```

```
('0001', 'Khoury', 'Jean', 'Beirut', '76828671', '2', 'RegularEmployee'),  
('0002', 'Berkachi', 'Antoine', 'Byblos', '71783756', '1', 'Supervisor'),  
('0003', 'Ramada', 'Hadi', 'Byblos', '03804824', '4', 'RegularEmployee'),  
('0004', 'Rahal', 'Rozan', 'Beirut', '78709685', '5', 'RegularEmployee'),  
('0005', 'Zeinab', 'Tiya', 'Tripoli', '79384756', '3', 'Manager'),  
('0006', 'Hammoud', 'Haya', 'Beirut', '03102856', '2', 'RegularEmployee'),  
('0007', 'Houri', 'Salim', 'Byblos', '71123908', '3', 'Supervisor'),  
('0008', 'Itani', 'Adam', 'Beirut', '81234567', '2', 'Manager'),  
('0009', 'Hassan', 'Jamil', 'Sayda', '76987463', '5', 'RegularEmployee'),  
('0010', 'Daher', 'Kevin', 'Beirut', '03908213', '1', 'Manager'),  
('0011', 'Hajjar', 'Matilda', 'Sour', '76867489', '2', 'RegularEmployee'),  
('0012', 'Karazi', 'Mira', 'Byblos', '81109876', '4', 'Supervisor'),  
('0013', 'Keyrouz', 'Mariam', 'Sour', '76123123', '5', 'Manager'),  
('0014', 'Zoor', 'Maya', 'Tripoli', '03234234', '2', 'Supervisor'),  
('0015', 'Messi', 'Lionel', 'Beirut', '81345345', '4', 'Manager'),  
('0016', 'Nader', 'Halim', 'Byblos', '76678678', '5', 'Supervisor'),  
('0017', 'Sabra', 'Omar', 'Sayda', '03908746', '2', 'RegularEmployee'),  
('0018', 'Osta', 'Ralph', 'Beirut', '79109876', '1', 'RegularEmployee'),  
('0019', 'Ismail', 'Hassan', 'Beirut', '81230196', '5', 'RegularEmployee'),  
('0020', 'Merouch', 'Lynn', 'Beirut', '78912378', '4', 'RegularEmployee');
```

```
Insert into Supervisor
```

```
Values ('0002', '3', '5000'), ('0007', '2', '2000'),  
('0012', '4', '4400'), ('0014', '3', '4600');
```

```
Insert into RegularEmployee
```

```
Values ('0003', '001', '1700'), ('0004', '001', '1200'),  
('0006', '001', '2100'),  
('0009', '002', '2600'), ('0011', '002', '2200'), ('0017', '003', '1900'),  
('0018', '004', '2000'), ('0019', '005', '2100'), ('0020', '005', '2300');
```

```
Insert into Manager
```

```
Values ('0005', '6', '4500'), ('0008', '1', '3000'), ('0010', '4', '6000'),  
('0013', '2', '3900'), ('0015', '2', '4500');
```

```
Insert into Team
Values ('001','0002','6'), ('002','0007','1'), ('003','0012','4'),
('004','0014','2'), ('005','0014','5');
```

```
Insert into Department
Values ('1','IT','7'), ('02','HR','2'), ('3','Marketing','5'),
('4','Finance','3'), ('5','Accounting','3');
```

```
Insert into Task
Values ('1','1','21/12/2021'), ('2','2','9/4/2012'),
('3','3','4/2/2017'),
('4','4','1/1/2010'), ('5','5','24/7/2018');
```

```
Insert into Operation
values
('1','02'),('2','21'),('3','18'),('4','05'),('5','16'),('1','11'),('2',
'07'),
('3','03'),('4','17'),('5','10'),('1','04'),('2','14'),('3','15');
```

```
Insert into Customer
Values ('00000001','Nabha','Rashid','Beirut','03775631'),
('20000002','Nassif','Lara','Beirut','76701752'),
('20000003','Rizk','Romanos','Baabda','71123456'),
('00000004','Haddad','Karl','Sour','70312450'),
('00000005','Jawde','Joseph','Byblos','78423570'),
('00000006','helou','Elie','Byblos','78423570');
```

```
Insert into Orders
values ('22','00000001'), ('04','00000002'), ('19','00000003'),
('06','00000004'), ('09','00000006');
```

```
Insert into service
Values ('01','ServiceProvider','100','MicrosoftBusiness'),
('02','GPS','200','TelematicsSolution'),
('03','SocialInformation','150','ITSolution'),
('04','ProcessControl','130','ITSolution'),
('05','Yahoo','80','SoftwareSolution'),
('06','Windows','70','SoftwareSolution'),
('07','Batteries','200','PowerBackup'), ('08', 'Sensor',
'220','TelematicsSolution'),
('09','EngineGednerator','200','PowerBackupSolution'), ('10',
'Photoshop', '50','SoftwareSolution'),
('11','EntrepriseAgreement', '170','MicrosoftBusiness'),
('12','Geotab','300','TelematicsSolution'),
('13','Google','50','SoftwareSolution'),
('14','GIS','300','TelematicsSolution'),
('15','DataWarehouse','260','ITSolution'),
('16','DecisionSupport','240','ITSolution'),
('17','SelectPlusLiscencing','150','MicrosoftBusiness'),
('18','ERP','400','ITSolution'),
('19','FireFox','20','SoftwareSolution'),
('20','AMS','90','TelematicsSolution'),
('21','UPS','100','PowerBackupSolution'),
('22','APS','200','PowerBackupSolution'),
('23','OpenLiscenicing','150','MicrosoftBusiness');
```

```
Insert into TelematicsSolution
Values
('02','Car'),('08','Safe'),('14','Car'),('12','Computer'),('20',
'Phone');
```

```
Insert into ITSolution
Values ('03','InformationLack'), ('04','Inconsistency'),
('15','Redundancy'), ('16','Undetermination'),
('18', 'WeakWorkProcess');
```

```
Insert into PowerBackup
Values ('07','6'), ('21', '15'), ('22', '20'), ('09', '10');
```

```

Insert into SoftwareSolution
Values ('06','Practical'), ('05','WideSource'), ('10',
'ModifyImages'), ('13','WideSource'),
('19','PrivateBrowsing');

```

```

Insert into MicrosoftBusiness
Values ('01', 'SeveralServices'), ('23',
'LifeTimeLiscence'), ('17', 'LargeOrganizations'),
('11', 'OnlineServices');

```

## ***14. SQL Management Studio Populated Tables:***

1-Employee:

	EmployeeID	EmployeeLastName	EmployeeFirstName	EmployeeAddress	EmployeePhoneNum	Department_Number	EmployeeType
1	0001	Khoury	Jean	Beirut	76828671	2	RegularEmployee
2	0002	Berkachi	Antoine	Byblos	71783756	1	Supervisor
3	0003	Ramada	Hadi	Byblos	03804824	4	RegularEmployee
4	0004	Rahal	Rozan	Beirut	78709685	5	RegularEmployee
5	0005	Zeinab	Tiya	Tripoli	79384756	3	Manager
6	0006	Hammoud	Haya	Beirut	03102856	2	RegularEmployee
7	0007	Hourい	Salim	Byblos	71123908	3	Supervisor
8	0008	Itani	Adam	Beirut	81234567	2	Manager
9	0009	Hassan	Jamil	Sayda	76987463	5	RegularEmployee
10	0010	Daher	Kevin	Beirut	03908213	1	Manager
11	0011	Hajjar	Matilda	Sour	76867489	2	RegularEmployee
12	0012	Karazi	Mira	Byblos	81109876	4	Supervisor
13	0013	Keyrouz	Mariam	Sour	76123123	5	Manager
14	0014	Zoor	Maya	Tripoli	03234234	2	Supervisor
15	0015	Messi	Lionel	Beirut	81345345	4	Manager
16	0016	Nader	Halim	Byblos	76678678	5	Supervisor
17	0017	Sabra	Omar	Sayda	03908746	2	RegularEmployee
18	0018	Osta	Ralph	Beirut	79109876	1	RegularEmployee
19	0019	Ismail	Hassan	Beirut	81230196	5	RegularEmployee
20	0020	Merouch	Lynn	Beirut	78912378	4	RegularEmployee

## 2-Supervisor:

	SupervisorID	NumberOfEmployeeSupervised	Salary
1	0002	3	5000
2	0007	2	2000
3	0012	4	4400
4	0014	3	4600

## 3-Regular Employee:

	RegularEmployeeID	Team_ID	Salary
1	0003	1	1700
2	0004	1	1200
3	0006	1	2100
4	0009	2	2600
5	0011	2	2200
6	0017	3	1900
7	0018	4	2000
8	0019	5	2100
9	0020	5	2300

## 4-Manager:

	ManagerID	NumberOfHoursInDepartment	Salary
1	0005	6	4500
2	0008	1	3000
3	0010	4	6000
4	0013	2	3900
5	0015	2	4500

## 5-Team:

	TeamID	SuperID	NumberOfEmployees
1	1	0002	6
2	2	0007	1
3	3	0012	4
4	4	0014	2
5	5	0014	5

## 6-Department:

	DepartmentNum	DepartmentName	NumberOfEmployees	Manager_ID
1	1	IT	7	0010
2	2	HR	2	0008
3	3	Marketing	5	0005
4	4	Finance	3	0015
5	5	Accounting	3	0013

## 7-Task:

	TaskNumber	T_ID	DateCompleted
1	1	1	21/12/2021
2	2	2	9/4/2012
3	3	3	4/2/2017
4	4	4	1/1/2010
5	5	5	24/7/2018

## 8-Operation:

	Department_Number	Service_Number
1	1	2
2	1	4
3	1	11
4	2	7
5	2	14
6	2	21
7	3	3
8	3	15
9	3	18
10	4	5
11	4	17
12	5	10
13	5	16

## 9-Customer:

	CustomerID	CustomerLastName	CustomerFirstName	CustomerAddress	CustomerPhoneNum
1	000000001	Nabha	Rashid	Beirut	03775631
2	000000002	Nassif	Lara	Beirut	76701752
3	000000003	Rizk	Romanos	Baabda	71123456
4	000000004	Haddad	Karl	Sour	70312450
5	000000005	Jawde	Joseph	Byblos	78423570
6	000000006	helou	Elie	Byblos	78423570

## 10-Order:

	Service_Num	Customer_ID
1	4	000000002
2	6	000000004
3	9	000000006
4	19	000000003
5	22	000000001

## 11-Service:

	ServiceNum	ServiceName	ServiceCost	ServiceType
1	1	ServicesProvider	100	MicrosoftBusiness
2	2	GPS	200	TelematicsSolution
3	3	SocialInformation	150	ITSolution
4	4	ProcessControl	130	ITSolution
5	5	Yahoo	80	SoftwareSolution
6	6	Windows	70	SoftwareSolution
7	7	Batteries	200	PowerBackup
8	8	Sensor	220	TelematicsSolution
9	9	EngineGednerator	200	PowerBackupSolution
10	10	Photoshop	50	SoftwareSolution
11	11	EnterpriseAgreement	170	MicrosoftBusiness
12	12	Geotab	300	TelematicsSolution
13	13	Google	50	SoftwareSolution
14	14	GIS	300	TelematicsSolution
15	15	DataWarehouse	260	ITSolution
16	16	DecisionSupport	240	ITSolution
17	17	SelectPlusLiscencing	150	MicrosoftBusiness
18	18	ERP	400	ITSolution
19	19	FireFox	20	SoftwareSolution
20	20	AMS	90	TelematicsSolution
21	21	UPS	100	PowerBackupSolution
22	22	APS	200	PowerBackupSolution
23	23	OpenLiscenicing	150	MicrosoftBusiness

## 12-TelematicSolutions:

	TelematicsSolutionNum	Device
1	2	Car
2	8	Safe
3	12	Computer
4	14	Car
5	20	Phone

### 13-ITsolution:

	ITSolutionNum	ITProblem
1	3	InformationLack
2	4	Inconsistency
3	15	Redundancy
4	16	Undetermination
5	18	WeakWorkProcess

### 14-PowerBackup:

	PowerBackupNum	UsageTime
1	7	6
2	9	10
3	21	15
4	22	20

### 15-SoftwareSolution:

	SoftwareSolutionNum	SoftwareBenefit
1	5	WideSource
2	6	Practical
3	10	ModifyImages
4	13	WideSource
5	19	PrivateBrowsing

### 16-MicrosoftBusiness:

	MicrosoftBusinessNum	Descriptions
1	1	SeveralServices
2	11	OnlineServices
3	17	LargeOrganizations
4	23	LifeTimeLiscence

## **15. SQL Management Studio Queries**

1-For Description:

```
EXEC sp_help 'Employee'  
EXEC sp_help 'Supervisor'  
EXEC sp_help 'RegularEmployee'  
EXEC sp_help 'dbo.Manager'  
EXEC sp_help 'Team'  
EXEC sp_help 'Department'  
EXEC sp_help 'Task'  
EXEC sp_help 'Operation'  
EXEC sp_help 'Service'  
EXEC sp_help 'TelematicsSolution'  
EXEC sp_help 'ITSolution'  
EXEC sp_help 'PowerBackup'  
EXEC sp_help 'SoftwareSolution'  
EXEC sp_help 'MicrosoftBusiness'
```

2-Query to show tables data:

```
select *  
from Employee  
  
select*  
from Supervisor
```

```
select*  
from RegularEmployee
```

```
select*  
from Manager
```

```
select*  
from Team
```

```
select *  
from Department
```

```
select*  
from Task
```

```
select *  
from Operation
```

```
select *  
from Customer
```

```
select *  
from orders
```

```
select*  
from Service
```

```
select*  
from TelematicsSolution
```

```
select *
from ITSolution
```

```
select*
from PowerBackup
```

```
select*
from SoftwareSolution
```

```
select*
from MicrosoftBusiness
```

### 3-Custom Queries:

```
--retrieve first and last name of every employee:
select EmployeeFirstName, EmployeeLastName
from Employee
```

	EmployeeFirstName	EmployeeLastName
1	Jean	Khoury
2	Antoine	Berkachi
3	Hadi	Ramada
4	Rozan	Rahal
5	Tiya	Zeinab
6	Haya	Hammoud
7	Salim	Houri
8	Adam	Itani
9	Jamil	Hassan
10	Kevin	Daher
11	Matilda	Hajjar
12	Mira	Karazi
13	Mariam	Keyrouz
14	Maya	Zoor
15	Lionel	Messi
16	Halim	Nader
17	Omar	Sabra
18	Ralph	Osta
19	Hassan	Ismail
20	Lynn	Merouch

```
--retrieve the name of accounting department  
select EmployeeFirstName, EmployeeLastName  
from Employee  
where EmployeeType = 'Manager' and department_Number = '5'
```

	EmployeeFirstName	EmployeeLastName
1	Mariam	Keyrouz

```
--Group each service type and count the number of services offered in them  
select ServiceType, count(*)  
from service  
group by serviceType
```

	ServiceType	(No column name)
1	ITSolution	5
2	MicrosoftBusiness	4
3	PowerBackup	1
4	PowerBackupSolution	3
5	SoftwareSolution	5
6	TelematicsSolution	5

```
--Average manager salary  
select avg(salary)  
from Manager
```

	(No column name)
1	4380

```
--Most and least expensive service  
select max(ServiceCost), min(serviceCost)  
from service
```

	(No column name)	(No column name)
1	400	20

---Retieve names and phone numbers of customers that live in Beirut  
(for marketing purposes)

```
select CustomerFirstName, CustomerAddress, CustomerPhoneNum  
from customer  
where CustomerAddress = 'Beirut'
```

	CustomerFirstName	CustomerAddress	CustomerPhoneNum
1	Rashid	Beirut	03775631
2	Lara	Beirut	76701752

---Retieve customers names and service they purchased

```
select CustomerFirstName, CustomerLastName, ServiceName  
from customer, orders, service  
where Customer_ID = CustomerID and ServiceNum = Service_Num
```

	CustomerFirstName	CustomerLastName	ServiceName
1	Rashid	Nabha	APS
2	Lara	Nassif	ProcessControl
3	Romanos	Rizk	FireFox
4	Karl	Haddad	Windows
5	Elie	helou	EngineGednerator

## **16. Progress Report:**

Meetings: Total of 9

October 10 3 pm → First meeting was related to what questions will be asked with the manager

October 12 3:30 pm → This meeting was the interview with the manager where we asked the questions that we agreed on in the previous meeting

October 17 1 pm → Made our scenario and business rules

October 12 at 1 pm → created our relational schema and the ER Diagram

November 19 2:30 → Mapping

November 24 3:30 → Reviewing and checking up on all we did up to this point and then proceeding to normalize the schema

December 1 at 10 → Beginning of the SQL (10 to 15 on table of contents)

December 10 at 4:20 pm → finalizing our SQL and fixing the errors on my SQL server

December 11 at 5 pm → Going over the project as a whole and practicing our presentation

The group worked in perfect harmony as everyone met the deadlines that were provided, communication was on point and whenever there was a problem, we all solved it together.

Everyone contributed to the group fairly and no conflicts occurred 😊