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IS 475-1001

12/01/21

Project Report

I. Business Problems

After careful consideration, the firm decided that one of the most significant business difficulties the company is experiencing is organizational uncertainty and a lack of adequate inventory management. Furthermore, clients are not obtaining rapid and effective service in the current business operations, which has reduced customer satisfaction and business revenues as well due to declining customer supply.

Following the examination of last year's business income statement, balance sheet, and cash flow, we feel the source of our business problems is confusion inside the routine business activities. First, we discovered that most of our customers' appointments are either delayed or clash with another customer's appointment due to miscommunications or other underlying issues. Following that, the mechanics inside the organization are unable to perform in the most efficient and effective manner. This might be because the parts needed for their service are out of stock due to inadequate inventory management. The parts that were utilized were not documented; therefore, the company does not know what components need to be bought due to the increased demand. These issues have an impact on both customers and the business since the services requested by the client are not being provided on time. This causes client discontent, which together leads to fewer customers and lower total business income. Due to the lack of a comprehensive database within the organization, the firm cannot efficiently and effectively input needed information such as customer and business data. Overall, this can impede the firm from studying patterns that it is currently experiencing or may encounter in the future, which is critical in assisting the organization in adapting and evolving for future endeavors.

II. Business Rules

a. A customer can have as many as zero vehicles or many vehicles; however, only one vehicle will be assigned to the customer with the service.

b. A customer can schedule as many as zero appointments or many appointments, but again, that specific date and time will only be assigned to that customer.

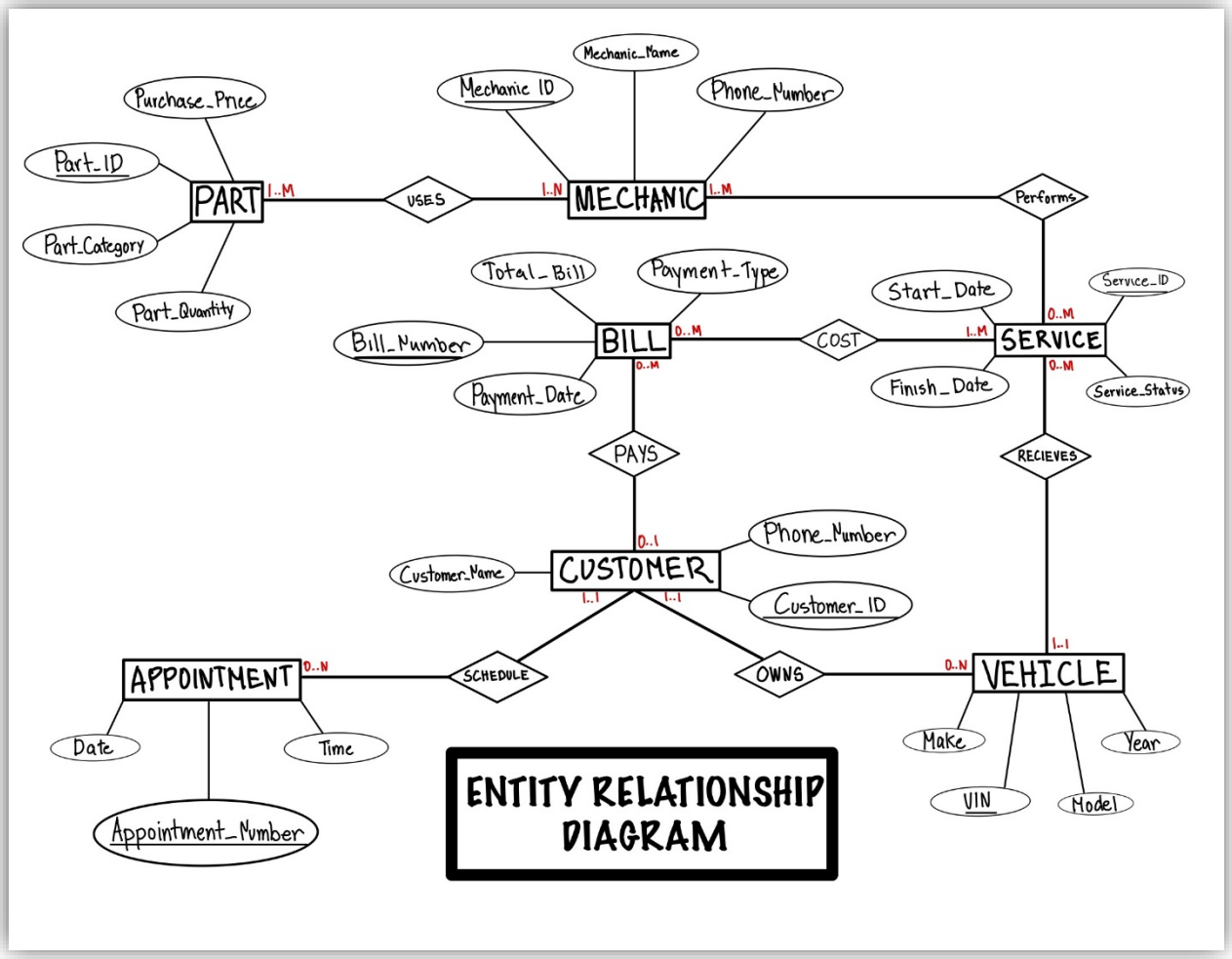
c. A vehicle brought in for service can receive zero repairs if no repairs or services are necessary, or the vehicle may be serviced many times.

d. A customer may pay no bills if no service or repair was done on their vehicle, or the customer may pay multiple bills if many repairs and services were made on the vehicle.

e. A mechanic may service as many as zero vehicles if no service is needed, or a mechanic can perform many different repairs. The service or repair is specifically assigned to one mechanic; however, this does not mean other mechanics cannot help with the repair. The responsibility is solely on the mechanic assigned to the service.

f. A mechanic may use as many as zero parts for the service if no parts are needed, but they can use as many parts required to complete the service.

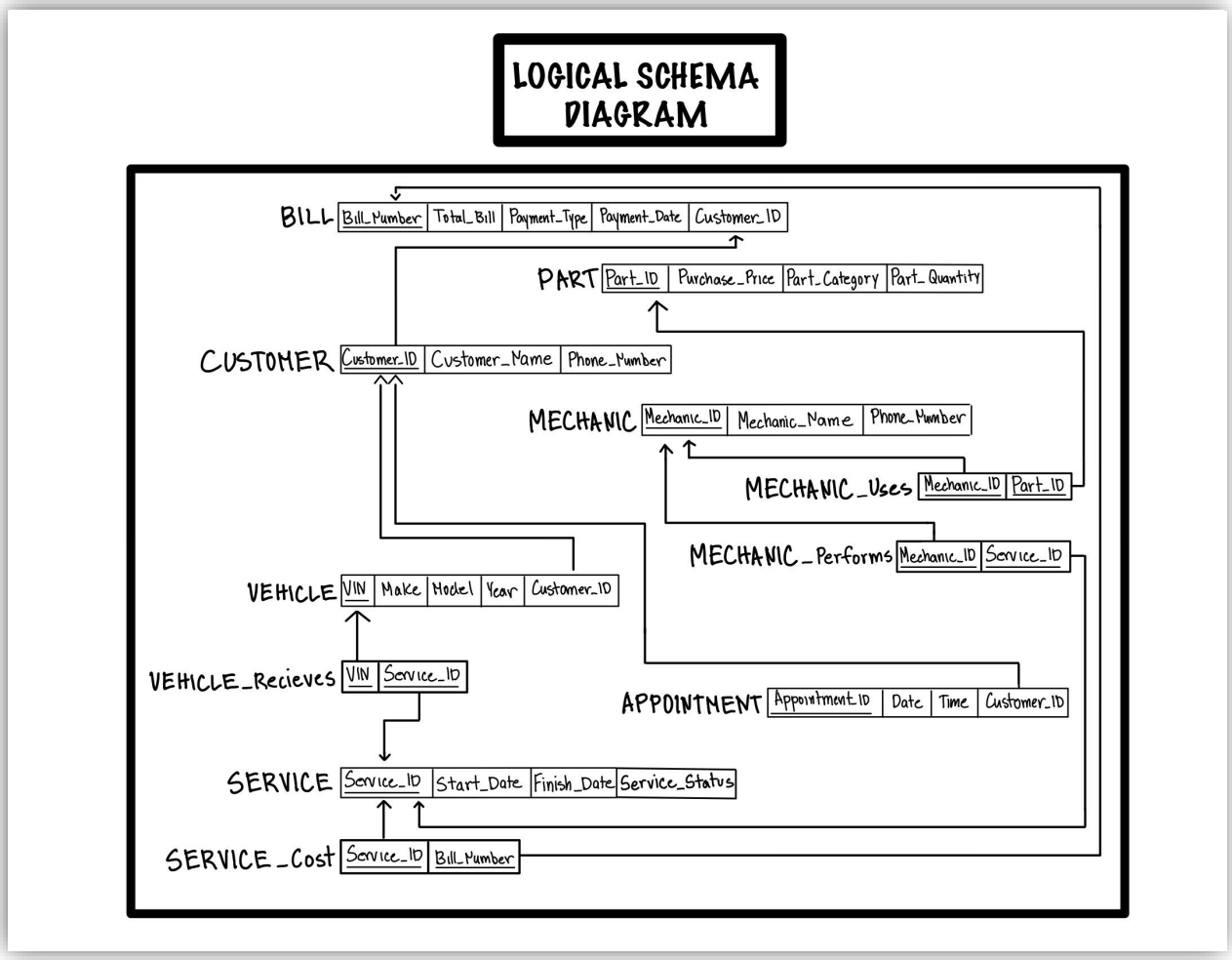
III. Conceptual Design



- **Customer**: A customer will be required to provide their full name, phone number, and they will be assigned a unique customer identification number.
- **Appointment**: A customer is given a unique appointment number, date, and time when they book an appointment for vehicle service.

- **Vehicle**: Required to record the make, model, year, and unique VIN of a customer's vehicle(s).
- **Service**: The service for a specific vehicle will have a service id, the start of the service, date the service is finished, and the service status.
- **Mechanic**: Required to provide their full name, phone number, and they will be assigned a unique mechanic identification number.
- **Part**: Required to record the type of part used, the unique part identification number, what category of the part was used, and the purchase price for the part used in the service.
- **Bill**: Will record the payment type, the payment date, unique bill number, and total bill.

IV. Logical Design



v. *Table Structure*

Table: Customer						
Column	*Description*	*Data Type*	*Length*	*Null*	*PK*	*FK*
Customer_ID	Customer ID	Char	15		Y	
Customer_Name	First Name/Last Name	Varchar	20	NN		
Telephone_Number	Customer Phone Number	Char	13			

```
CREATE TABLE Customer (
        Customer_ID char(15) PRIMARY KEY,
        Customer_Name varchar (20) NOT NULL,
        Telephone_Number char(13)
);
```

The customer table allows the business to store the customer's name which cannot be empty, their phone number, and customers will be assigned their own customer ID.

Table: Appointment						
Column	*Description*	*Data Type*	*Length*	*Null*	*PK*	*FK*
Appt_Number	Appointment Number	Char	10		Y	
Customer_ID	Customer ID	Char	15			Customer(Customer_ID)
App_Time	Appointment Time	Varchar	20	NN		
App_Date	Appointment Date	Date		NN		

The appointment table allows the business to store the customers appointment date and time. Each appointment will also have a designated appointment number.

```
CREATE TABLE appointment(
        Appt_Number char(10) PRIMARY KEY,
        Customer_ID char(15),
        Appt_Date date NOT NULL,
        Appt_Time varchar(20) NOT NULL,
        FOREIGN KEY (customer_id) REFERENCES customer(customer_id)
);
```

Table: Vehicle						
Column	*Description*	*Data Type*	*Length*	*Null*	*PK*	*FK*
VIN	Vehicle Vin Number	Char	17		Y	
Customer_ID	Customer ID	Char	15			Customer(Customer_ID)
Model	Vehicle Model	Varchar	20	NN		
Year	Vehicle Year	Char	5	NN		
Make	Vehicle Make	Varchar	20	NN		

```
CREATE TABLE Vehicle(
        VIN char(17) PRIMARY KEY,
        Customer_ID char(15),
        Make varchar(20) NOT NULL,
        Model varchar(20) NOT NULL,
        Year char(5),
        FOREIGN KEY (customer_id) REFERENCES customer(Customer_ID)
);
```

The vehicle table allows the business to store a customer's vehicle information such as the make, model, year, as well as the VIN numbers each vehicle has.

Table: Vehicle_Receives						
Column	*Description*	*Data Type*	*Length*	*Null*	*PK*	*FK*
VIN	Vehicle Vin Number	Char	17			Vehicle(Vin)
Service_ID	Service ID	Varchar	15			Service(Service_ID)

```
CREATE TABLE vehicle_receives(
        VIN char(17),
        Service_ID varchar(15),
         FOREIGN KEY (vin) REFERENCES vehicle(vin),
         FOREIGN KEY (service_ID) REFERENCES service(service_ID)
);
```

.

Table: Bill						
Column	*Description*	*Data Type*	*Length*	*Null*	*PK*	*FK*
Bill_Number	Bill Number	Varchar	20		Y	
Customer_ID	Customer ID	Char	15			Customer(Customer_ID)
Payment_Type	Payment Type Used	Varchar	15	NN		
Total_Bill	Total Bill	Decimal	7,2	NN		
Payment_Date	Payment Bill Paid	Date		NN		

The bill table allows the business to store billing information such as the payment date, the type of payment, the total bill, and the bill number for the customer.

```
CREATE TABLE bill(
        Bill_Number varchar(20) PRIMARY KEY,
        Customer_ID char(15),
        Payment_Date date NOT NULL,
        Payment_Type varchar(15) NOT NULL,
        Total_Bill decimal(7,2) NOT NULL,
        FOREIGN KEY (customer_id) REFERENCES customer(Customer_ID)
);
```

Table: Service						
Column	*Description*	*Data Type*	*Length*	*Null*	*PK*	*FK*
Service_ID	Service ID	Varchar	15		Y	
Start_Date	Service Start Date	Date		NN		
Finish_Date	Service Finish Date	Date				
Service_Status	Status of Service	Varchar	15	NN		

```
CREATE TABLE IF NOT EXISTS service(
        Service_ID varchar(15) PRIMARY KEY,
        Start_Date date NOT NULL,
        Finish_Date date,
        Service_Status varchar (15) NOT NULL DEFAULT 'incomeplete',
        FOREIGN KEY (mechanic_id) references mechanic(mechanic_id),
        FOREIGN KEY (vin) references vehicle(vin)


);
```

The service table allows the business to store the start and finish date of the service on a certain vehicle, the service status, and the service id. A particular mechanic is assigned to each vehicle for service.

Table: Service_Cost						
Column	*Description*	*Data Type*	*Length*	*Null*	*PK*	*FK*
Service_ID	Service ID	Varchar	17			Service(Service_ID)
Bill_Number	Customer Bill Number	Varchar	20			Bill(Bill_Number)

```
CREATE TABLE service_cost(
        Service_ID varchar(15),
        Bill_Number varchar(20),
        FOREIGN KEY (service_id) REFERENCES service(service_id),
        FOREIGN KEY (bill_number) REFERENCES bill(bill_number)
);
```

Table: Mechanic						
Column	*Description*	*Data Type*	*Length*	*Null*	*PK*	*FK*
Customer_ID	Customer ID	Char	15			Customer(Customer_ID)
Mechanic_ID	Mechanic ID	Varchar	15		Y	
Mechanic_Name	Mechanics Name	Varchar	20	NN		
Phone_Number	Mechanics Phone Number	Char	13	NN		

The mechanic table allows the business to store the mechanics full name, their phone number, and the mechanics id. Each mechanic is assigned to a customer's vehicle.

```
CREATE TABLE mechanic (
        Customer_ID char(15),
        Mechanic_ID varchar(15) PRIMARY KEY,
        Mechanic_Name varchar(20) NOT NULL,
        Phone_Number char(13) NOT NULL,
        FOREIGN KEY (customer_id) REFERENCES customer(Customer_ID)
);
```

Table: Mechanic_Uses						
Column	*Description*	*Data Type*	*Length*	*Null*	*PK*	*FK*
Mechanic_ID	Mechanic ID	Varchar	15			Mechanic(Mechanic_ID)
Part_ID	Parts ID	Varchar	15			Part(Part_ID)

```
CREATE TABLE mechanic_uses (
        Mechanic_ID varchar(15),
         Part_ID varchar(15),
        FOREIGN KEY (mechanic_id) references mechanic(mechanic_id),
        FOREIGN KEY (part_id) references part(part_id)
);
```

Table: Mechanic_Performs						
Column	*Description*	*Data Type*	*Length*	*Null*	*PK*	*FK*
Mechanic_ID	Mechanic ID	Varchar	15			Mechanic(Mechanic_ID)
Service_ID	Service ID	Varchar	15			Service(Service_ID)

```
CREATE TABLE mechanic_performs(
        Mechanic_ID varchar(15),
        Service_ID varchar(15),
        FOREIGN KEY (mechanic_id) references mechanic(mechanic_id),
        FOREIGN KEY (service_id) references service(service_id)
);
```

Table: Part						
Column	*Description*	*Data Type*	*Length*	*Null*	*PK*	*FK*
Part_ID	Part ID	Varchar	15		Y	
Part_Category	The Parts Category	Varchar	25	NN		
Part_Quantity	Quantity of Parts Bought	Varchar	10	NN		
Purchase_Price	Price Parts Were Bought	Decimal	7,2			

```
CREATE TABLE part(
        Part_ID varchar(15) PRIMARY KEY,
        Part_Category varchar(25) NOT NULL,
        Part_Quantity varchar(10) NOT
        NULL, Purchase_Price decimal(7,2),
        FOREIGN KEY (mechanic_id) references mechanic(mechanic_id)
);
```

The part table allows the business to store the type of general part used/needed for the service, the quantity, the purchase price for the parts, and the part id. The mechanics are the ones to determine what parts are needed to complete their service.

VII. Queries

Data Tables with 50 Records

Customer_ID	Customer_Name	Telephone_Number
C-01	Nanine Coenraets	(699) 3284252
C-02	Shantee Glynne	(763) 3162634
C-03	Nevin Cudbird	(664) 5402420
C-04	Ceciley Lanceley	(160) 2435327
C-05	Rollie Roskams	(506) 1493502
C-06	Currie Bugbee	NULL
C-07	Colly Devitt	(125) 6761053
C-08	Zachariah Vankeev	(944) 7952010
C-09	Gustie Imbrey	(739) 1650288
C-10	Annemarie Hearons	(916) 7929168
C-11	Hedvig Mathison	(389) 6684803
C-12	Eduardo Spaducci	(400) 6040298
C-13	Crawford Thorold	(952) 4442341
C-14	Gertrudis Buckner	(892) 4766599
C-15	Humfrey O'Hickey	(794) 7628848
C-16	Jourdan Wescott	(697) 4159094
C-17	Ruth Domanek	(993) 7283035
C-18	Julissa Klimentov	(115) 2144328
C-19	Solly Rousell	(902) 4708587
C-20	Bendicty Neesham	(603) 6039443
C-21	Broddie Westman	(678) 3713279
C-22	Rodolphe Lashbrook	(270) 1243189
C-23	Reggis Glanvill	(918) 7516640
C-24	Zarla Phebey	(172) 9696078
C-25	Kizzie Wooddisse	(578) 8599274
C-26	Cahra Avrahamov	(840) 4519950
C-27	Bogart Northeast	(844) 7118974
C-28	Derry Pinnijar	(367) 3793505
C-29	Ashleigh Wortt	(388) 5051959
C-30	Roby Pavlenkov	(517) 6680585
C-31	Gaby Aim	(512) 1158937
C-32	Britte Grout	(327) 6112310
C-33	Patricio Dispencer	(548) 1354186
C-34	Lulu McPhilemy	(945) 3625899
C-35	June Roxbrough	(988) 3724252
C-36	Robena Gerlts	(263) 4537200
C-37	Randy Wykes	(832) 2475524
C-38	Cariotta Fleeming	(911) 4105619
C-39	Berke Skurm	(770) 6615595
C-40	Arney Grzesiewicz	(299) 6350412
C-41	Leicester Alvin	(479) 5852377
C-42	Vidovik Casone	(300) 8812537
C-43	Devinne Gowler	NULL
C-44	Katrinka Kenway	(856) 3769725
C-45	Conny Giacomuzzo	(763) 8342338
C-46	Early Tidbold	(661) 3181209
C-47	Rogerio Batha	(594) 6499436
C-48	Orly Creeber	(279) 2273969
C-49	Lawry Goodbody	(587) 8400596
C-50	Tobias Marryatt	(913) 4533087

Customer Table

Appt_Number	Customer_ID	Appt_Date	Appt_Time
A-01	C-01	2021-06-15	12:21 PM
A-02	C-02	2021-04-28	10:57 AM
A-03	C-03	2021-06-30	3:28 PM
A-04	C-04	2021-02-13	2:03 PM
A-05	C-05	2021-02-22	11:03 AM
A-06	C-06	2021-09-15	3:21 PM
A-07	C-07	2021-02-26	10:44 AM
A-08	C-08	2021-06-11	12:30 PM
A-09	C-09	2021-11-07	2:14 PM
A-10	C-10	2021-10-12	12:57 PM
A-11	C-11	2021-10-16	4:42 PM
A-12	C-12	2021-10-06	1:30 PM
A-13	C-13	2021-11-28	1:28 PM
A-14	C-14	2021-10-03	1:32 PM
A-15	C-15	2021-04-13	3:13 PM
A-16	C-16	2021-01-25	10:12 AM
A-17	C-17	2021-02-24	4:33 PM
A-18	C-18	2021-04-24	2:27 PM
A-19	C-19	2021-05-12	2:22 PM
A-20	C-20	2021-08-18	4:21 PM
A-21	C-21	2021-04-24	1:59 PM
A-22	C-22	2021-01-25	4:42 PM
A-23	C-23	2021-09-02	12:05 PM
A-24	C-24	2021-07-17	11:11 AM
A-25	C-25	2021-10-18	11:30 AM
A-26	C-26	2021-10-04	10:12 AM
A-27	C-27	2021-11-20	12:56 PM
A-28	C-28	2021-07-23	12:38 PM
A-29	C-29	2021-11-25	12:09 PM
A-30	C-30	2021-09-18	1:14 PM
A-31	C-31	2021-10-23	5:06 PM
A-32	C-32	2021-06-06	2:29 PM
A-33	C-33	2021-10-06	4:22 PM
A-34	C-34	2021-03-17	5:29 PM
A-35	C-35	2021-08-23	2:42 PM
A-36	C-36	2021-11-12	4:28 PM
A-37	C-37	2021-01-16	9:30 AM
A-38	C-38	2021-10-24	10:39 AM
A-39	C-39	2021-05-06	5:24 PM
A-40	C-40	2021-03-12	4:35 PM
A-41	C-41	2021-08-01	10:23 AM
A-42	C-42	2021-03-26	11:06 AM
A-43	C-43	2021-04-24	3:21 PM
A-44	C-44	2021-04-09	9:55 AM
A-45	C-45	2021-01-10	1:29 PM
A-46	C-46	2021-11-05	1:49 PM
A-47	C-47	2021-03-02	12:36 PM
A-48	C-48	2021-11-09	2:15 PM
A-49	C-49	2021-03-16	3:14 PM
A-50	C-50	2021-08-22	11:59 AM

Appointment

VIN	Customer_ID	Make	Model	Year
WAUVC68E42A107501	C-01	Mercede...	SLR McLaren	2008
1GYS4CEF6BR511619	C-02	Mercede...	C-Class	1997
1G6DC5EY0B0788692	C-03	BMW	750	2006
3D7LP2ET1AG409537	C-04	Buick	Roadmaster	1995
1FTSW2B51AE060852	C-05	Infiniti	QX56	2007
WAUGL68E95A637492	C-06	BMW	M5	2000
3D73M4EL7AG269742	C-07	Pontiac	Bonneville	1995
1N6AD0CU0CN046195	C-08	Lincoln	Blackwood	2003
JN1CV6EK5BM624676	C-09	Oldsmobile	98	1992
WBAGL63584D028463	C-10	Dodge	Ram 3500 Club	1996
5GADV23L36D759491	C-11	Ford	Escort	1990
JM1BL1H43A1257081	C-12	Hyundai	Elantra	2013
SCFFDCCD1AG171400	C-13	Jeep	Wrangler	2006
WP0AA2A96ES584006	C-14	Chevrolet	Camaro	1975
KMHHT6KD3EU102529	C-15	Subaru	Tribeca	2010
WBABS53471E812234	C-16	Mercury	Lynx	1987
5NPDH4AE7CH330687	C-17	Toyota	Corolla	1995
3VWKX7AJ1AM661259	C-18	Suzuki	X-90	1998
1FAHP2DW0AG257716	C-19	Mazda	Navajo	1991
2C3CDXBG2EH966569	C-20	Toyota	Camry	2001
1G6AB5SAXE0703763	C-21	Acura	CL	2001
3FA6P0SU3FR598685	C-22	Audi	A8	2011
2T1BURHE9EC507932	C-23	Chevrolet	Silverado 3500	2007
1GYS3PKJ2FR233584	C-24	Toyota	T100	1998
1G6AK5S31D0247846	C-25	Nissan	Maxima	1993
1N6AF0KY5EN169914	C-26	Mitsubishi	GTO	1993
5J6TF2H59EL253132	C-27	Saab	9-3	2007
WDDGF5EB1AA785926	C-28	Hyundai	Elantra	1998
VNKKTUD39FA642450	C-29	Audi	TT	2001
1GYS3BEF4CR652106	C-30	Chevrolet	Suburban 2500	1995
4T1BD1FK3DU703999	C-31	Ford	Explorer	2003
2G61L5S31F9133450	C-32	Oldsmobile	88	1999
SALFP2BN3BH556844	C-33	Chrysler	300M	2000
1GYUCHEF2AR127960	C-34	Chevrolet	1500	1996
WBSPM9C54AE332793	C-35	Toyota	Solara	2004
WBAVB73568V221887	C-36	Oldsmobile	Silhouette	1999
WDDGF5EB0AF166768	C-37	Audi	TT	2001
WVGFF9BP8BD152008	C-38	Kia	Rio	2003
WBA3V7C58FP073712	C-39	Chevrolet	Monte Carlo	1998
WAUEFAFL0FN178933	C-40	Pontiac	Grand Prix	1994
WAUVC58E63A098666	C-41	Ford	Bronco II	1986
JTHFF2C24D2799002	C-42	Mazda	626	1994
1GYS3DEF1ER988116	C-43	Mercury	Mystique	1999
WAUCFAFR3EA282799	C-44	Mitsubishi	Galant	1984
5FRYD4H60FB092372	C-45	Honda	Accord Crosst...	2010
JH4CU4F41BC696693	C-46	Isuzu	Trooper	2000
1C4RDJAG1EC717428	C-47	Acura	Integra	2000
2D4RN4DG0BR493424	C-48	BMW	X5	2008
1C4RDJEG7DC388632	C-49	Mazda	Mazda3	2009
1G6KE57Y93U706080	C-50	Ford	Crown Victoria	1997

Vehicle Table

-The eleven tables displayed above have each been loaded with 50 records.

-These tables enable the firm to keep track of each client, their matching vehicle(s), their appointment with the company, the service, the mechanic assigned to a customer's vehicle, the parts used by the technician, and the bill the customer will pay for the service.

-The null values in the service table simply shows that the vehicle service has not yet been completed and therefore there are no values assigned to the finish date.

-The null values in the part table are an example of not properly recording how much the business has spent on those parts that was purchased. This can make it difficult for the company to know whether they are undercharging or overcharging on their vehicle services.

Bill_Number	Customer_ID	Payment_Date	Payment_Type	Total_Bill
B-0001	C-01	2021-06-15	visa	313.72
B-0002	C-02	2021-04-28	mastercard	3997.54
B-0003	C-03	2021-06-30	visa	1066.69
B-0004	C-04	2021-02-13	bankcard	3639.37
B-0005	C-05	2021-02-22	visa	927.42
B-0006	C-06	2021-09-15	mastercard	336.69
B-0007	C-07	2021-02-26	americanexpress	193.06
B-0008	C-08	2021-06-11	bankcard	3179.74
B-0009	C-09	2021-11-07	americanexpress	594.82
B-0010	C-10	2021-10-12	bankcard	3003.75
B-0011	C-11	2021-10-16	mastercard	1444.12
B-0012	C-12	2021-10-06	jcb	735.85
B-0013	C-13	2021-11-28	visa	335.52
B-0014	C-14	2021-10-03	bankcard	39.19
B-0015	C-15	2021-04-13	mastercard	359.54
B-0016	C-16	2021-01-25	jcb	1008.27
B-0017	C-17	2021-02-24	jcb	522.00
B-0018	C-18	2021-04-24	visa	728.32
B-0019	C-19	2021-05-12	americanexpress	3815.31
B-0020	C-20	2021-08-18	americanexpress	132.33
B-0021	C-21	2021-04-24	bankcard	1142.34
B-0022	C-22	2021-01-25	jcb	1389.89
B-0023	C-23	2021-09-02	bankcard	599.68
B-0024	C-24	2021-07-17	jcb	222.92
B-0025	C-25	2021-10-18	mastercard	2589.28
B-0026	C-26	2021-10-04	mastercard	2371.48
B-0027	C-27	2021-11-20	jcb	40.41
B-0028	C-28	2021-07-23	jcb	382.81
B-0029	C-29	2021-11-25	americanexpress	350.85
B-0030	C-30	2021-09-18	americanexpress	838.94
B-0031	C-31	2021-10-23	americanexpress	2853.30
B-0032	C-32	2021-06-06	bankcard	3772.38
B-0033	C-33	2021-10-06	mastercard	64.27
B-0034	C-34	2021-03-17	bankcard	3756.34
B-0035	C-35	2021-08-23	mastercard	738.97
B-0036	C-36	2021-11-12	bankcard	130.31
B-0037	C-37	2021-01-16	americanexpress	3091.99
B-0038	C-38	2021-10-24	visa	954.88
B-0039	C-39	2021-05-06	americanexpress	2192.68
B-0040	C-40	2021-03-12	americanexpress	368.53
B-0041	C-41	2021-08-01	visa	99.67
B-0042	C-42	2021-03-26	visa	3210.61
B-0043	C-43	2021-04-24	bankcard	921.60
B-0044	C-44	2021-04-09	americanexpress	961.11
B-0045	C-45	2021-01-10	jcb	1996.38
B-0046	C-46	2021-11-05	americanexpress	659.93
B-0047	C-47	2021-03-02	mastercard	78.74
B-0048	C-48	2021-11-09	jcb	352.64
B-0049	C-49	2021-03-16	visa	1056.83
B-0050	C-50	2021-08-22	bankcard	210.22

Bill Table

Customer_ID	Mechanic_ID	Mechanic_Name	Phone_Number
C-01	M-001	Iosep Titchmarsh	(191) 6330240
C-02	M-002	Ivie Goodrich	(501) 8640713
C-03	M-003	Marley Gabey	(184) 8469584
C-04	M-004	Sarge Blowin	(108) 5019874
C-05	M-005	Ginnie Paradin	(605) 2159905
C-06	M-006	Krystalle Shale	(314) 4622514
C-07	M-007	Neil Redsell	(103) 6067554
C-08	M-008	Cybil Ferrier	(678) 1152259
C-09	M-009	Jo-ann Swinyard	(390) 8086496
C-10	M-010	Tibold Knotton	(687) 6704021
C-11	M-011	Josy Haslam	(215) 1145018
C-12	M-012	Edwin Gerrad	(354) 3049683
C-13	M-013	Alameda Benoix	(707) 7842215
C-14	M-014	Beckie Rains	(132) 9314106
C-15	M-015	Lizabeth Pickton	(862) 8780383
C-16	M-016	Wood Haliday	(868) 5315837
C-17	M-017	Rosaline Simka	(533) 4717422
C-18	M-018	Staci McGrae	(530) 8142947
C-19	M-019	Meghann Gaize	(696) 6098340
C-20	M-020	Larry Gridley	(437) 7837064
C-21	M-021	Wendy Lively	(227) 8600153
C-22	M-022	Cody Kmicicki	(729) 9005474
C-23	M-023	Willi Hadkins	(824) 7439455
C-24	M-024	Ottilie Aldrich	(366) 5382836
C-25	M-025	Belinda Virr	(705) 6835795
C-26	M-026	Shannon Craker	(961) 6565237
C-27	M-027	Kandace Ord	(986) 9196335
C-28	M-028	Gibb Couchman	(311) 7002018
C-29	M-029	Hastings Bolzmann	(895) 5408182
C-30	M-030	Madelene Hesey	(973) 8755695
C-31	M-031	Ezra Herion	(467) 2962517
C-32	M-032	Cammy Andreas...	(811) 3420851
C-33	M-033	Angelia Samsin	(597) 4546805
C-34	M-034	Lena Gianasi	(429) 3564136
C-35	M-035	Lydia Vegas	(233) 8163357
C-36	M-036	Cammy Leyninye	(803) 1189454
C-37	M-037	Trent Crinage	(832) 9749056
C-38	M-038	Prent Brannan	(588) 9626937
C-39	M-039	Bronson Yakush...	(707) 1910607
C-40	M-040	Agata Brunotti	(377) 6712267
C-41	M-041	Arlen Gasparro	(796) 8662693
C-42	M-042	Vaclav Bodleigh	(198) 7713426
C-43	M-043	Colet Rohlfs	(243) 7265226
C-44	M-044	Gaylene Brosius	(554) 1022016
C-45	M-045	Cos Pykerman	(196) 7634288
C-46	M-046	Salli Lytle	(381) 5713819
C-47	M-047	Adelice Jeppe	(607) 4365206
C-48	M-048	Desirae Bunston	(394) 5263664
C-49	M-049	Bing Landal	(617) 7102652
C-50	M-050	Dasya Sharrocks	(659) 4382849

Mechanic Table

Service_ID	Start_Date	Finish_Date	Service_Status
S-01	2021-06-15	NULL	Incomeplete
S-02	2021-04-28	2021-04-28	Complete
S-03	2021-06-30	2021-06-30	Complete
S-04	2021-02-13	2021-02-15	Complete
S-05	2021-02-22	NULL	Incomeplete
S-06	2021-09-15	NULL	Incomeplete
S-07	2021-02-26	2021-02-28	Complete
S-08	2021-06-11	NULL	Incomeplete
S-09	2021-11-07	2021-11-18	Complete
S-10	2021-10-12	NULL	Incomeplete
S-11	2021-10-16	2021-10-18	Complete
S-12	2021-10-06	NULL	Incomeplete
S-13	2021-11-28	NULL	Incomeplete
S-14	2021-10-03	2021-10-10	Complete
S-15	2021-04-13	2021-04-30	Complete
S-16	2021-01-25	NULL	Incomeplete
S-17	2021-02-24	2021-02-25	Complete
S-18	2021-04-24	2021-04-29	Complete
S-19	2021-05-12	2021-05-13	Complete
S-20	2021-08-18	NULL	Incomeplete
S-21	2021-04-24	2021-04-30	Complete
S-22	2021-01-25	2021-01-28	Complete
S-23	2021-09-02	2021-09-03	Complete
S-24	2021-07-17	NULL	Incomeplete
S-25	2021-10-18	2021-10-22	Complete
S-26	2021-10-04	2021-10-09	Complete
S-27	2021-11-20	NULL	Incomeplete
S-28	2021-07-23	NULL	Incomeplete
S-29	2021-11-25	2021-11-29	Complete
S-30	2021-09-18	NULL	Incomeplete
S-31	2021-10-23	2021-10-24	Complete
S-32	2021-06-06	2021-06-23	Complete
S-33	2021-08-06	2021-08-12	Complete
S-34	2021-03-17	NULL	Incomeplete
S-35	2021-11-23	2021-11-24	Complete
S-36	2021-11-12	2021-11-16	Complete
S-37	2021-03-16	2021-03-18	Complete
S-38	2021-10-24	2021-10-29	Complete
S-39	2021-05-06	2021-05-07	Complete
S-40	2021-03-12	NULL	Incomeplete
S-41	2021-08-01	NULL	Incomeplete
S-42	2021-03-26	2021-03-29	Complete
S-43	2021-04-24	NULL	Incomeplete
S-44	2021-04-09	2021-04-17	Complete
S-45	2021-01-10	2021-01-12	Complete
S-46	2021-11-05	2021-11-28	Complete
S-47	2021-03-02	NULL	Incomeplete
S-48	2021-11-09	2021-11-15	Complete
S-49	2021-03-16	2021-03-25	Complete
S-50	2021-08-22	NULL	Incomeplete

Service Table

Part_ID	Mechanic_ID	Part_Category	Part_Quantity	Purchase_Price
P-0001	M-001	engine	1	179.87
P-0002	M-002	fuel system	3	454.02
P-0003	M-003	exhaust system	1	262.84
P-0004	M-004	fuel system	3	527.93
P-0005	M-005	exhaust system	2	315.57
P-0006	M-006	engine	1	103.96
P-0007	M-007	engine	2	434.43
P-0008	M-008	fuel system	3	662.72
P-0009	M-009	exhaust system	4	413.63
P-0010	M-010	cooling system	1	380.26
P-0011	M-011	fuel system	1	398.71
P-0012	M-012	cooling system	2	546.16
P-0013	M-013	cooling system	1	90.44
P-0014	M-014	cooling system	4	762.56
P-0015	M-015	engine	4	284.13
P-0016	M-016	fuel system	3	452.86
P-0017	M-017	engine	1	582.16
P-0018	M-018	electrical system	8	758.16
P-0019	M-019	transmission	4	325.24
P-0020	M-020	fluids	4	54.77
P-0021	M-021	chassis	1	NULL
P-0022	M-022	transmission	2	429.34
P-0023	M-023	engine	3	495.54
P-0024	M-024	fuel system	1	111.54
P-0025	M-025	transmission	1	383.73
P-0026	M-026	chassis	2	519.85
P-0027	M-027	chassis	3	NULL
P-0028	M-028	chassis	2	514.27
P-0029	M-029	exhaust system	2	320.24
P-0030	M-030	chassis	3	366.40
P-0031	M-031	fluids	4	95.95
P-0032	M-032	exhaust system	2	680.50
P-0033	M-033	exhaust system	1	107.32
P-0034	M-034	fluids	1	47.96
P-0035	M-035	engine	2	510.97
P-0036	M-036	electrical system	6	636.32
P-0037	M-037	chassis	1	163.84
P-0038	M-038	engine	4	772.25
P-0039	M-039	chassis	2	506.63
P-0040	M-040	fuel system	1	256.46
P-0041	M-041	chassis	2	517.62
P-0042	M-042	chassis	1	NULL
P-0043	M-043	fuel system	3	353.76
P-0044	M-044	chassis	1	310.38
P-0045	M-045	cooling system	2	442.48
P-0046	M-046	fuel system	3	528.52
P-0047	M-047	electrical system	7	659.34
P-0048	M-048	transmission	2	362.80
P-0049	M-049	engine	6	657.22
P-0050	M-050	fluids	1	36.17

Part Table

VIN	Service_ID
WAUVC68E42A107501	S-01
1GYS4CEF6BR511619	S-02
1G6DC5EY0B0788692	S-03
3D7LP2ET1AG409537	S-04
1FTSW2B51AE060852	S-05
WAUGL68E95A637492	S-06
3D73M4EL7AG269742	S-07
1N6AD0CU0CN046195	S-08
JN1CV6EK5BM624676	S-09
WBAGL63584D028463	S-10
5GADV23L36D759491	S-11
JM1BL1H43A1257081	S-12
SCFFDCCD1AG171400	S-13
WP0AA2A96ES584006	S-14
KMHHT6KD3EU102529	S-15
WBABS53471E812234	S-16
5NPDH4AE7CH330687	S-17
3VWKX7AJ1AM661259	S-18
1FAHP2DW0AG257716	S-19
2C3CDXBG2EH966569	S-20
1G6AB5SAXE0703763	S-21
3FA6P0SU3FR598685	S-22
2T1BURHE9EC507932	S-23
1GYS3PKJ2FR233584	S-24
1G6AK5S31D0247846	S-25
1N6AF0KY5EN169914	S-26
5J6TF2H59EL253132	S-27
WDDGF5EB1AA785926	S-28
VNKKTUD39FA642450	S-29
1GYS3BEF4CR652106	S-30
4T1BD1FK3DU703999	S-31
2G61L5S31F9133450	S-32
SALFP2BN3BH556844	S-33
1GYUCHEF2AR127960	S-34
WBSPM9C54AE332793	S-35
WBAVB73568V221887	S-36
WDDGF5EB0AF166768	S-37
WVGFF9BP8BD152008	S-38
WBA3V7C58FP073712	S-39
WAUEFAFL0FN178933	S-40
WAUVC58E63A098666	S-41
JTHFF2C24D2799002	S-42
1GYS3DEF1ER988116	S-43
WAUCFAFR3EA282799	S-44
5FRYD4H60FB092372	S-45
JH4CU4F41BC696693	S-46
1C4RDJAG1EC717428	S-47
2D4RN4DG0BR493424	S-48
1C4RDJEG7DC388632	S-49
1G6KE57Y93U706080	S-50

Vehicle Receives Table

Service_ID	Bill_Number
S-01	B-0001
S-02	B-0002
S-03	B-0003
S-04	B-0004
S-05	B-0005
S-06	B-0006
S-07	B-0007
S-08	B-0008
S-09	B-0009
S-10	B-0010
S-11	B-0011
S-12	B-0012
S-13	B-0013
S-14	B-0014
S-15	B-0015
S-16	B-0016
S-17	B-0017
S-18	B-0018
S-19	B-0019
S-20	B-0020
S-21	B-0021
S-22	B-0022
S-23	B-0023
S-24	B-0024
S-25	B-0025
S-26	B-0026
S-27	B-0027
S-28	B-0028
S-29	B-0029
S-30	B-0030
S-31	B-0031
S-32	B-0032
S-33	B-0033
S-34	B-0034
S-35	B-0035
S-36	B-0036
S-37	B-0037
S-38	B-0038
S-39	B-0039
S-40	B-0040
S-41	B-0041
S-42	B-0042
S-43	B-0043
S-44	B-0044
S-45	B-0045
S-46	B-0046
S-47	B-0047
S-48	B-0048
S-49	B-0049
S-50	B-0050

Service Cost Table

Mechanic_ID	Part_ID
M-001	P-0001
M-002	P-0002
M-003	P-0003
M-004	P-0004
M-005	P-0005
M-006	P-0006
M-007	P-0007
M-008	P-0008
M-009	P-0009
M-010	P-0010
M-011	P-0011
M-012	P-0012
M-013	P-0013
M-014	P-0014
M-015	P-0015
M-016	P-0016
M-017	P-0017
M-018	P-0018
M-019	P-0019
M-020	P-0020
M-021	P-0021
M-022	P-0022
M-023	P-0023
M-024	P-0024
M-025	P-0025
M-026	P-0026
M-027	P-0027
M-028	P-0028
M-029	P-0029
M-030	P-0030
M-031	P-0031
M-032	P-0032
M-033	P-0033
M-034	P-0034
M-035	P-0035
M-036	P-0036
M-037	P-0037
M-038	P-0038
M-039	P-0039
M-040	P-0040
M-041	P-0041
M-042	P-0042
M-043	P-0043
M-044	P-0044
M-045	P-0045
M-046	P-0046
M-047	P-0047
M-048	P-0048
M-049	P-0049
M-050	P-0050

Mechanic Uses Table

Mechanic_ID	Service_ID
M-001	S-01
M-002	S-02
M-003	S-03
M-004	S-04
M-005	S-05
M-006	S-06
M-007	S-07
M-008	S-08
M-009	S-09
M-010	S-10
M-011	S-11
M-012	S-12
M-013	S-13
M-014	S-14
M-015	S-15
M-016	S-16
M-017	S-17
M-018	S-18
M-019	S-19
M-020	S-20
M-021	S-21
M-022	S-22
M-023	S-23
M-024	S-24
M-025	S-25
M-026	S-26
M-027	S-27
M-028	S-28
M-029	S-29
M-030	S-30
M-031	S-31
M-032	S-32
M-033	S-33
M-034	S-34
M-035	S-35
M-036	S-36
M-037	S-37
M-038	S-38
M-039	S-39
M-040	S-40
M-041	S-41
M-042	S-42
M-043	S-43
M-044	S-44
M-045	S-45
M-046	S-46
M-047	S-47
M-048	S-48
M-049	S-49
M-050	S-50

Mechanic Performs Table

SQL Commands

Within the provided screenshots are the queries designed to help address the business questions and problems. In the queries are SQL commands that could help try and prevent business confusion currently happening within the regular business operations. I will go into more detail regarding how each query and its result can address the current business problems.

```
SELECT mechanic_name "Mechanic" , Part_Category as "Type of Part Ordered" , sum(part_quantity) as " Total Number of Parts Ordered",
                                                                            sum(purchase_price) as "Cost of Parts Ordered"
    FROM mechanic
    INNER JOIN mechanic_uses
        ON mechanic.mechanic_id = mechanic_uses.mechanic_id
    INNER JOIN part
        ON mechanic_uses.part_id = part.part_id
    GROUP BY mechanic_name
    ORDER BY sum(Part_Quantity)desc, Part_Category asc;
```

Mechanic	Type of Part Ordered	Total Number of Parts Ordered	Cost of Parts Ordered
Staci McGrae	electrical system	8	458.16
Adelice Jeppe	electrical system	7	50.34
Cammy Leyninye	electrical system	6	85.32
Bing Landal	engine	6	657.22
Beckie Rains	cooling system	4	35.56
Lizabeth Pickton	engine	4	284.13
Prent Brannan	engine	4	772.25
Jo-ann Swinyard	exhaust system	4	413.63
Ezra Herion	fluids	4	285.95
Larry Gridley	fluids	4	54.77
Meghann Gaize	transmission	4	725.24
Madelene Hesey	chassis	3	366.40
Kandace Ord	chassis	3	NULL
Willi Hadkins	engine	3	495.54
Ivie Goodrich	fuel system	3	454.02
Sarge Blowin	fuel system	3	927.93
Wood Haliday	fuel system	3	452.86
Cybil Ferrier	fuel system	3	962.72
Colet Rohlfs	fuel system	3	353.76
Salli Lytle	fuel system	3	528.52
Shannon Craker	chassis	2	919.85

1

```
SELECT part_category as "Part Category", avg(purchase_price) as "Average Price Paid for Part(s)"
    FROM part
    GROUP BY part_category
    ORDER BY avg(purchase_price) desc;
```

Part Category	Average Price Paid for Part(s)
transmission	572.277500
chassis	501.284286
cooling system	498.980000
fuel system	494.057778
exhaust system	468.850000
engine	368.947778
electrical system	197.940000
fluids	120.962500

2

```
SELECT part_category, avg(purchase_price), avg(part_quantity)
    FROM part
    GROUP BY part_category
    ORDER BY avg(Purchase_Price) desc;
```

part_category	avg(purchase_price)	avg(part_quantity)
transmission	572.277500	2.25
chassis	501.284286	1.8
cooling system	498.980000	2
fuel system	494.057778	2.3333333333333335
exhaust system	468.850000	2
engine	368.947778	2.6666666666666665
electrical system	197.940000	7
fluids	120.962500	2.5

3

```
SELECT Part_Category, COUNT(part_category) as "Most Used and Purchased Part Category"
    FROM part
    GROUP BY part_category
    ORDER BY COUNT(part_category) desc;
```

Part_Category	Most Used and Purchased Part Category
chassis	10
engine	9
fuel system	9
exhaust system	6
cooling system	5
transmission	4
fluids	4
electrical system	3

4

-The queries provided above are examples of what type of database the business can utilize to eliminate any confusion regarding proper inventory management.

1) In query 1, it displays the mechanic who used the needed parts to complete their required task. Not only that but it also displays what part category was used, as well as the total parts that were ordered and how much the utilized parts cost the business.
2) In query 2, it simply shows the average price parts are paid by the business. This can allow the business to analyze a trend and determine what part category costs the business the most.
3) In query 3, it again shows the average price parts are paid by the business. Now this shows the average quantity of parts that are purchased as well.
4) In query 4, it shows what type of parts are being utilized and purchased the most. This again can analyze and determine whether there is a trend in the following years.

```
SELECT Mechanic_Name, customer_name, start_date, service_status
    FROM mechanic
    INNER JOIN mechanic_performs
        ON mechanic.Mechanic_ID = mechanic_performs.Mechanic_ID
    INNER JOIN customer
        ON customer.Customer_ID = mechanic.Customer_ID
    INNER JOIN service
        ON mechanic_performs.service_ID = service.service_id
    WHERE Service_Status = 'incomeplete'
    ORDER BY start_date asc;
```

Mechanic_Name	customer_name	start_date	service_status
Wood Haliday	Jourdan Wescott	2021-01-25	Incomeplete
Ginnie Paradin	Rollie Roskams	2021-02-22	Incomeplete
Adelice Jeppe	Rogerio Batha	2021-03-02	Incomeplete
Agata Brunotti	Arney Grzesiewicz	2021-03-12	Incomeplete
Lena Gianasi	Lulu McPhilemy	2021-03-17	Incomeplete
Colet Rohlfs	Devinne Gowler	2021-04-24	Incomeplete
Cybil Ferrier	Zachariah Vankeev	2021-06-11	Incomeplete
Iosep Titchmarsh	Nanine Coenraets	2021-06-15	Incomeplete
Ottilie Aldrich	Zarla Phebey	2021-07-17	Incomeplete
Gibb Couchman	Derry Pinnijar	2021-07-23	Incomeplete
Arlen Gasparro	Leicester Alvin	2021-08-01	Incomeplete
Larry Gridley	Bendicty Neesham	2021-08-18	Incomeplete
Dasya Sharrocks	Tobias Marryatt	2021-08-22	Incomeplete
Krystalle Shale	Currie Bugbee	2021-09-15	Incomeplete
Madelene Hesey	Roby Pavlenkov	2021-09-18	Incomeplete
Edwin Gerrad	Eduardo Spaducci	2021-10-06	Incomeplete
Tibold Knotton	Annemarie Hearons	2021-10-12	Incomeplete
Kandace Ord	Bogart Northeast	2021-11-20	Incomeplete
Alameda Benoix	Crawford Thorold	2021-11-28	Incomeplete

5

```
SELECT avg(datediff(finish_Date, start_date)) as "Average Day(s) To Complete a Vehicle Service"
    FROM vehicle
    INNER JOIN vehicle_receives
        ON vehicle.vin = vehicle_receives.vin
    INNER JOIN service
        ON vehicle_receives.service_id = service.service_id
    WHERE service_status = 'complete'
    ORDER BY avg(datediff(finish_Date, start_date)) desc;
```

Average Day(s) To Complete a Vehicle Service
5.1290

6

```
SELECT mechanic_name as "Mechanic", part_category as "Part Category Used", part_quantity as "Parts Used", make as "Vehicle Make" , customer_name as "Customer Name",  total_bill as "Total Customer Bill"
    FROM mechanic
    INNER JOIN mechanic_uses
        ON mechanic.mechanic_id = mechanic_uses.mechanic_id
    INNER JOIN part
        ON mechanic_uses.part_id = part.part_id
    INNER JOIN customer
        ON customer.customer_id = mechanic.customer_id
    INNER JOIN vehicle
        ON customer.customer_id = vehicle.customer_id
    INNER JOIN bill
        ON customer.customer_id = bill.customer_id
    ORDER BY total_bill desc;
```

Mechanic	Part Category Used	Parts Used	Vehicle Make	Customer Name	Total Customer Bill
Ivie Goodrich	fuel system	3	Mercedes-Benz	Shantee Glynne	3997.54
Meghann Gaize	transmission	4	Mazda	Solly Rousell	3815.31
Cammy Andreasson	exhaust system	2	Oldsmobile	Britte Grout	3772.38
Lena Gianasi	fluids	1	Chevrolet	Lulu McPhilemy	3756.34
Sarge Blowin	fuel system	3	Buick	Ceciley Lanceley	3639.37
Vaclav Bodleigh	chassis	1	Mazda	Vidovik Casone	3210.61
Cybil Ferrier	fuel system	3	Lincoln	Zachariah Vankeev	3179.74
Trent Crinage	chassis	1	Audi	Randy Wykes	3091.99
Tibold Knotton	cooling system	1	Dodge	Annemarie Hearons	3003.75
Ezra Herion	fluids	4	Ford	Gaby Aim	2853.30
Belinda Virr	transmission	1	Nissan	Kizzie Wooddisse	2589.28
Shannon Craker	chassis	2	Mitsubishi	Cahra Avrahamov	2371.48
Bronson Yakushkev	chassis	2	Chevrolet	Berke Skurm	2192.68
Cos Pykerman	cooling system	2	Honda	Conny Giacomuzzo	1996.38
Josy Haslam	fuel system	1	Ford	Hedvig Mathison	1444.12
Cody Kmicicki	transmission	2	Audi	Rodolphe Lashbrook	1389.89
Wendy Lively	chassis	1	Acura	Broddie Westman	1142.34
Marley Gabey	exhaust system	1	BMW	Nevin Cudbird	1066.69
Bing Landal	engine	6	Mazda	Lawry Goodbody	1056.83
Wood Haliday	fuel system	3	Mercury	Jourdan Wescott	1008.27
Gaylene Brosius	chassis	1	Mitsubishi	Katrinka Kenway	961.11
Prent Brannan	engine	4	Kia	Cariotta Fleeming	954.88
Ginnie Paradin	exhaust system	2	Infiniti	Rollie Roskams	927.42
Colet Rohlfs	fuel system	3	Mercury	Devinne Gowler	921.60
Madelene Hesey	chassis	3	Chevrolet	Roby Pavlenkov	838.94
Lydia Vegas	engine	2	Toyota	June Roxbrough	738.97
Edwin Gerrad	cooling system	2	Hyundai	Eduardo Spaducci	735.85
Staci McGrae	electrical system	8	Suzuki	Julissa Klimentov	728.32
Salli Lytle	fuel system	3	Isuzu	Early Tidbold	659.93
Willi Hadkins	engine	3	Chevrolet	Reggis Glanvill	599.68
Jo-ann Swinyard	exhaust system	4	Oldsmobile	Gustie Imbrey	594.82
Rosaline Simka	engine	1	Toyota	Ruth Domanek	522.00
Gibb Couchman	chassis	2	Hyundai	Derry Pinnijar	382.81
Agata Brunotti	fuel system	1	Pontiac	Arney Grzesiewicz	368.53
Lizabeth Pickton	engine	4	Subaru	Humfrey O'Hickey	359.54
Desirae Bunston	transmission	2	BMW	Orly Creeber	352.64
Hastings Bolzmann	exhaust system	2	Audi	Ashleigh Wortt	350.85
Krystalle Shale	engine	1	BMW	Currie Bugbee	336.69
Alameda Benoix	cooling system	1	Jeep	Crawford Thorold	335.52
Iosep Titchmarsh	engine	1	Mercedes-Benz	Nanine Coenraets	313.72
Ottilie Aldrich	fuel system	1	Toyota	Zarla Phebey	222.92
Dasya Sharrocks	fluids	1	Ford	Tobias Marryatt	210.22
Neil Redsell	engine	2	Pontiac	Colly Devitt	193.06
Larry Gridley	fluids	4	Toyota	Bendicty Neesham	132.33
Cammy Leyninye	electrical system	6	Oldsmobile	Robena Gerlts	130.31
Arlen Gasparro	chassis	2	Ford	Leicester Alvin	99.67
Adelice Jeppe	electrical system	7	Acura	Rogerio Batha	78.74
Angelia Samsin	exhaust system	1	Chrysler	Patricio Dispencer	64.27
Kandace Ord	chassis	3	Saab	Bogart Northeast	40.41
Beckie Rains	cooling system	4	Chevrolet	Gertrudis Buckner	39.19

```
SELECT purchase_price as "Price Paid for Part(s)", total_bill as "Price Customer Paid for Service",(total_bill-purchase_price) as "Revenue - Expenses (*Wages Not Accounted For*)"
    FROM mechanic
    INNER JOIN mechanic_uses
        ON mechanic.mechanic_id = mechanic_uses.mechanic_id
    INNER JOIN part
        ON mechanic_uses.part_id = part.part_id
    INNER JOIN customer
        ON customer.customer_id = mechanic.customer_id
    INNER JOIN vehicle
        ON customer.customer_id = vehicle.customer_id
    INNER JOIN bill
        ON customer.customer_id = bill.customer_id
    ORDER BY (Total_Bill-Purchase_Price)desc;
```

Price Paid for Part(s)	Price Customer Paid for Service	Revenue - Expenses (*Wages Not Accounted For*)
47.96	3756.34	3708.38
454.02	3997.54	3543.52
680.50	3772.38	3091.88
725.24	3815.31	3090.07
927.93	3639.37	2711.44
285.95	2853.30	2567.35
962.72	3179.74	2217.02
950.84	3091.99	2141.15
883.73	2589.28	1705.55
506.63	2192.68	1686.05
1380.26	3003.75	1623.49
442.48	1996.38	1553.90
919.85	2371.48	1451.63
398.71	1444.12	1045.41
429.34	1389.89	960.55
353.76	921.60	567.84
452.86	1008.27	555.41
366.40	838.94	472.54
662.84	1066.69	403.85
657.22	1056.83	399.61
601.38	961.11	359.73
458.16	728.32	270.16
114.27	382.81	268.54
90.44	335.52	245.08
282.16	522.00	239.84
103.96	336.69	232.73
510.97	738.97	228.00
715.57	927.42	211.85
546.16	735.85	189.69
772.25	954.88	182.63
413.63	594.82	181.19
34.43	193.06	158.63
179.87	313.72	133.85
528.52	659.93	131.41
95.17	210.22	115.05
256.46	368.53	112.07
111.54	222.92	111.38
495.54	599.68	104.14
250.80	352.64	101.84
54.77	132.33	77.56
284.13	359.54	75.41
49.62	99.67	50.05
85.32	130.31	44.99
20.32	64.27	43.95
320.24	350.85	30.61
50.34	78.74	28.40
35.56	39.19	3.63
NULL	1142.34	NULL
NULL	40.41	NULL
NULL	3210.61	NULL

```
SELECT make, avg(datediff(finish_Date, start_date)) as "Average Day(s) To Complete a Vehicle Service"
    FROM service
    INNER JOIN vehicle_receives
        ON service.service_id = vehicle_receives.service_id
    INNER JOIN vehicle
        ON vehicle_receives.vin = vehicle.vin
    WHERE service_status = 'complete'
    GROUP BY make
    ORDER BY avg(datediff(finish_Date, start_date)) desc;
```

make	Average Day(s) To Complete a Vehicle Service
Isuzu	23.0000
Subaru	17.0000
Oldsmobile	10.6667
Mitsubishi	6.5000
Acura	6.0000
Chrysler	6.0000
Suzuki	5.0000
Kia	5.0000
Mazda	4.3333
Nissan	4.0000
BMW	3.0000
Chevrolet	3.0000
Audi	3.0000
Buick	2.0000
Pontiac	2.0000
Honda	2.0000
Ford	1.5000
Toyota	1.0000
Mercedes...	0.0000

9

```
SELECT make, count(*) as "Most Frequent Vehicle Make"
    FROM vehicle
    GROUP BY make
    ORDER BY count(*) desc;
```

make	Most Frequent Vehicle Make
Chevrolet	5
Ford	4
Toyota	4
Mazda	3
BMW	3
Oldsmobile	3
Audi	3
Acura	2
Mercury	2
Mercedes-Benz	2
Mitsubishi	2
Pontiac	2
Hyundai	2
Infiniti	1
Nissan	1
Lincoln	1
Buick	1
Suzuki	1
Honda	1
Saab	1
Isuzu	1
Subaru	1
Chrysler	1
Jeep	1
Dodge	1
Kia	1

10

```
SELECT make as "Manufacturer" , sum(total_bill) as "Total Bill Per Car Manufacturer Serviced"
    FROM customer
    INNER JOIN vehicle
        ON customer.customer_id = vehicle.customer_id
    LEFT OUTER JOIN bill
        ON customer.customer_id = bill.customer_id
    GROUP BY make
    ORDER BY sum(total_bill) desc;
```

Manufacturer	Total Bill Per Car Manufacturer Serviced
Mazda	8082.75
Chevrolet	7426.83
Audi	4832.73
Ford	4607.31
Oldsmobile	4497.51
Mercedes-Benz	4311.26
Buick	3639.37
Mitsubishi	3332.59
Lincoln	3179.74
Dodge	3003.75
Nissan	2589.28
Honda	1996.38
Mercury	1929.87
BMW	1756.02
Toyota	1616.22
Acura	1221.08
Hyundai	1118.66
Kia	954.88
Infiniti	927.42
Suzuki	728.32
Isuzu	659.93
Pontiac	561.59
Subaru	359.54
Jeep	335.52
Chrysler	64.27
Saab	40.41

11

```
SELECT part_category, sum(purchase_price)
    FROM part
    GROUP BY part_category
    ORDER BY sum(purchase_price) desc;
```

part_category	Total Price Paid Per Category
fuel system	4446.52
chassis	3508.99
engine	3320.53
exhaust system	2813.10
cooling system	2494.90
transmission	2289.11
electrical system	593.82
fluids	483.85

12

```
SELECT Mechanic_Name as "Mechanic", customer_name as "Customer" ,Service_Status, Start_date, Finish_Date, datediff(finish_Date, start_date) as "Days Needed To Complete Service"
    FROM mechanic
    INNER JOIN customer
        ON customer.customer_id = mechanic.customer_id
    INNER JOIN mechanic_performs
        ON mechanic.mechanic_id = mechanic_performs.mechanic_id
    INNER JOIN service
        ON mechanic_performs.service_id = service.service_id
    WHERE Service_Status = 'complete'
    ORDER BY start_date asc;
```

Mechanic	Customer	service_status	start_date	Finish_Date	Days Needed To Complete Service
Cos Pykerman	Conny Giacomuzzo	Complete	2021-01-10	2021-01-12	2
Cody Kmicicki	Rodolphe Lashbrook	Complete	2021-01-25	2021-01-28	3
Sarge Blowin	Ceciley Lanceley	Complete	2021-02-13	2021-02-15	2
Rosaline Simka	Ruth Domanek	Complete	2021-02-24	2021-02-25	1
Neil Redsell	Colly Devitt	Complete	2021-02-26	2021-02-28	2
Trent Crinage	Randy Wykes	Complete	2021-03-16	2021-03-18	2
Bing Landal	Lawry Goodbody	Complete	2021-03-16	2021-03-25	9
Vaclav Bodleigh	Vidovik Casone	Complete	2021-03-26	2021-03-29	3
Gaylene Brosius	Katrinka Kenway	Complete	2021-04-09	2021-04-17	8
Lizabeth Pickton	Humfrey O'Hickey	Complete	2021-04-13	2021-04-30	17
Staci McGrae	Julissa Klimentov	Complete	2021-04-24	2021-04-29	5
Wendy Lively	Broddie Westman	Complete	2021-04-24	2021-04-30	6
Ivie Goodrich	Shantee Glynne	Complete	2021-04-28	2021-04-28	0
Bronson Yakus...	Berke Skurm	Complete	2021-05-06	2021-05-07	1
Meghann Gaize	Solly Rousell	Complete	2021-05-12	2021-05-13	1
Cammy Andrea...	Britte Grout	Complete	2021-06-06	2021-06-23	17
Marley Gabey	Nevin Cudbird	Complete	2021-06-30	2021-06-30	0
Angelia Samsin	Patricio Dispencer	Complete	2021-08-06	2021-08-12	6
Willi Hadkins	Reggis Glanvill	Complete	2021-09-02	2021-09-03	1
Beckie Rains	Gertrudis Buckner	Complete	2021-10-03	2021-10-10	7
Shannon Craker	Cahra Avrahamov	Complete	2021-10-04	2021-10-09	5
Josy Haslam	Hedvig Mathison	Complete	2021-10-16	2021-10-18	2
Belinda Virr	Kizzie Wooddisse	Complete	2021-10-18	2021-10-22	4
Ezra Herion	Gaby Aim	Complete	2021-10-23	2021-10-24	1
Prent Brannan	Cariotta Fleeming	Complete	2021-10-24	2021-10-29	5
Salli Lytle	Early Tidbold	Complete	2021-11-05	2021-11-28	23
Jo-ann Swinyard	Gustie Imbrey	Complete	2021-11-07	2021-11-18	11
Desirae Bunston	Orly Creeber	Complete	2021-11-09	2021-11-15	6
Cammy Leyninye	Robena Gerlts	Complete	2021-11-12	2021-11-16	4
Lydia Vegas	June Roxbrough	Complete	2021-11-23	2021-11-24	1
Hastings Bolzm...	Ashleigh Wortt	Complete	2021-11-25	2021-11-29	4

```
SELECT payment_type, sum(total_bill) as "Total Amount From Payment Type", COUNT(Payment_Type) as "Number of Times Payment Type Used"
   FROM bill
   GROUP BY Payment_Type
   ORDER BY sum(total_bill) desc;
```

payment_type	Total Amount From Payment Type	Number of Times Payment Type Used
bankcard	20394.92	11
americanexpress	16052.85	12
mastercard	11980.63	9
visa	8693.66	9
jcb	6651.17	9

14

```
SELECT Appt_Date, Customer_Name, Telephone_Number, Make, Model, Year
    FROM customer
    INNER JOIN vehicle
        ON customer.Customer_ID = vehicle.customer_id
    LEFT OUTER JOIN appointment
        ON customer.customer_id = appointment.customer_id
    WHERE Appt_Date BETWEEN '2021-01-01' AND '2021-04-30'
    ORDER BY appt_date asc;
```

Appt_Date	Customer_Name	Telephone_Number	Make	Model	Year
2021-01-10	Conny Giacomuzzo	(763) 8342338	Honda	Accord Crosstour	2010
2021-01-16	Randy Wykes	(832) 2475524	Audi	TT	2001
2021-01-25	Jourdan Wescott	(697) 4159094	Mercury	Lynx	1987
2021-01-25	Rodolphe Lashbrook	(270) 1243189	Audi	A8	2011
2021-02-13	Ceciley Lanceley	(160) 2435327	Buick	Roadmaster	1995
2021-02-22	Rollie Roskams	(506) 1493502	Infiniti	QX56	2007
2021-02-24	Ruth Domanek	(993) 7283035	Toyota	Corolla	1995
2021-02-26	Colly Devitt	(125) 6761053	Pontiac	Bonneville	1995
2021-03-02	Rogerio Batha	(594) 6499436	Acura	Integra	2000
2021-03-12	Arney Grzesiewicz	(299) 6350412	Pontiac	Grand Prix	1994
2021-03-16	Lawry Goodbody	(587) 8400596	Mazda	Mazda3	2009
2021-03-17	Lulu McPhilemy	(945) 3625899	Chevrolet	1500	1996
2021-03-26	Vidovik Casone	(300) 8812537	Mazda	626	1994
2021-04-09	Katrinka Kenway	(856) 3769725	Mitsubishi	Galant	1984
2021-04-13	Humfrey O'Hickey	(794) 7628848	Subaru	Tribeca	2010
2021-04-24	Julissa Klimentov	(115) 2144328	Suzuki	X-90	1998
2021-04-24	Broddie Westman	(678) 3713279	Acura	CL	2001
2021-04-24	Devinne Gowler	NULL	Mercury	Mystique	1999
2021-04-28	Shantee Glynne	(763) 3162634	Merced...	C-Class	1997

15

-The queries provided above from pages 11 through 17 are examples of how the business can utilize the database to try and analyze the data to look for any trends currently happening within the business. Locating and properly analyzing these trends can help the company adapt in hopes that it can provide a more efficient and cost-effective business service to its customers.

5) In query 5, this example aims to show how mechanics are now provided information on what vehicles are still in need of service. This query's main goal is to eliminate any confusion or doubt. We do not want other mechanics that are assigned to another vehicle to work on a vehicle that is not assigned to them. The exception is if another mechanic currently does not have any appointments to service another vehicle. In this case, he will be allowed to help the mechanic assigned to the vehicle. The responsibility to complete the service will not fall on the mechanic trying to help, but rather the mechanic originally assigned to the vehicle.

6) In query 6, this simply shows the average day it takes for the mechanics within the business to complete a vehicle service. This data can help the management team decide whether the mechanics are performing at a proper and efficient pace.

7) In query 7, this data shows the mechanics that were assigned to a certain vehicle as well as the parts that they utilized to complete their service for a specific vehicle. This can help avoid confusion as it shows which mechanic has used part and where that part was used to complete a service for a customer.

8) In query 8, this data is simply aimed for the upper-level management team or business leaders. It shows the profit that the business made from a certain service. To do this, we simply subtract the price we paid for the parts from the bill that a customer paid. The result shows the difference from how much the company paid for the part and how much the company charged the customer. Note, this does not consider any wages that we owe the mechanics assigned to the job or other expenses the business may have incurred from the service.

9) In query 9, this data is aimed at analyzing the amount of time it takes to complete a service from a certain vehicle make. Some vehicles are more complexed than others so it can be important to know vehicle makes will need more attention and help servicing.

10) In query 10, This data can help the business determine the parts more frequently used and therefore need more stock of. This can help avoid stock shortages if the business always has parts that are always in need. If a certain vehicle make seems to appear more for a service, it might be wise to have more parts in stock for that certain vehicle make.

11) In query 11, this data can be used to analyze any potential trend. If a certain vehicle make always seems to have a higher bill compared to others, understanding why could help the business determine whether it is the parts that are expensive, or the labor that goes into the service.

12) In query 12, this data is used to determine what part category costs the business the most. If a trend is present, the business can try and work with other business who sell or manufacture those parts for a business deal that can potentially decrease the expense for the business while also increasing the revenue.

13) In query 13, this shows the mechanic that worked on a customer's vehicle and the number of days it took for them to complete the vehicle service. This can be used to determine if the days needed to complete the service is justifiable. If not, the management team can take further actions to find out why a mechanic needed more time to complete a service.

14) In query 14, this shows what payment type seems to be used most often. A business can try and make a business deal with the companies that are used the most within the business to offer customers an incentive to use a certain payment type for the business. This can be higher cash back percentages for the customers or the business can make their own card with the help of the credit card company to provide another type of incentive for the customers.

15) In query 15, this simply shows the appointment dates that a customer has with the business as well as their corresponding vehicle information. This can help the business prepare in advance to make sure that they at least have the very basic parts needed for the service.