Final Project: Case Study Project

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CIS535-T301: Week 12 Case Study Project

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Introduction Letter

Dear Bob,

I'm excited to share the final results of our project to computerize the key processes at Bob's Home Repairs. This document contains a comprehensive solution package designed to improve your operations. Inside, you'll find a detailed E-R diagram, normalized tables, SQL scripts, and key query results.

Our main goal was to create a strong and efficient database system that meets the specific needs of your business. By carefully analyzing and implementing this solution, we've aimed to streamline your operations, help your business grow, and reduce the time you spend on manual bookkeeping.

Included is the final software package, customized for Bob's Home Repairs. We believe this solution will not only meet your needs but also drive your business to new heights.

Best regards,

Surena Nokham

Project Overview

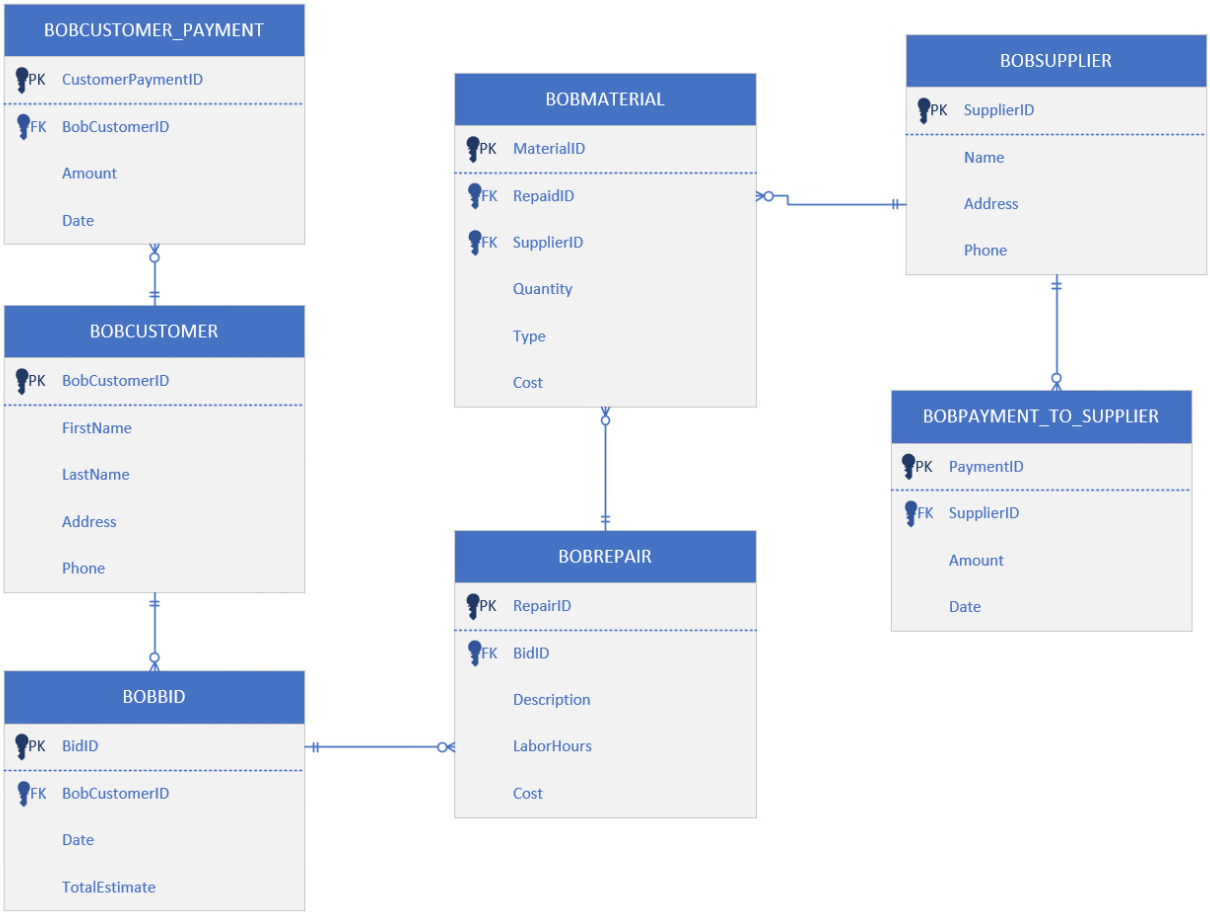
This document includes a comprehensive solution that captures the essential elements of your business, from customer bids to supplier payments. The following sections detail the entities, relationships, and data structures necessary for an efficient and scalable database system. The project components are:

1. **E-R Diagram**: This diagram identifies the key entities in your business, such as customers, bids, repairs, materials, and suppliers, along with their relationships and attributes.

2. **DDL and DML Scripts**: These scripts create the database tables and populate them with sample data, ensuring they are in third normal form for optimal performance and scalability.
3. **SQL Queries**: Five key SQL queries are included to help you manage your business operations, such as listing customers with bids, managing outstanding balances, and tracking material purchases from suppliers.

This package has been organized for easy viewing and editing, with diagrams and scripts copied directly into this document. Each section is accompanied by appropriate verbiage to help structure and explain the content.

E-R Diagram



Entities and Relationships:

- **BOBCUSTOMER**: Contains customer details.

- **BOBBID**: Stores bid information with a foreign key to BOBCUSTOMER.
- **BOBCUSTOMER_PAYMENT**: Records customer payments with a foreign key to BOBCUSTOMER.
- **BOBSUPPLIER**: Stores supplier details.
- **BOBMATERIAL**: Tracks materials with foreign keys to BOBREPAIR and BOBSUPPLIER.
- **BOBREPAIR**: Contains repair details with a foreign key to BOBBID.
- **BOBPAYMENT_TO_SUPPLIER**: Records payments to suppliers with a foreign key to BOBSUPPLIER.

DDL Scripts

```
-- Create BOBCUSTOMER Table
CREATE TABLE BOBCUSTOMER (
   BobCustomerID int PRIMARY KEY,
   FirstName varchar(30),
   LastName varchar(30),
   Address varchar(100),
   Phone varchar(50)
);

-- Create BOBBID Table
CREATE TABLE BOBBID (
   BidID int PRIMARY KEY,
   BobCustomerID int FOREIGN KEY REFERENCES BOBCUSTOMER(BobCustomerID),
   Date datetime2,
   TotalEstimate money
);

-- Create BOBCUSTOMER_PAYMENT Table
CREATE TABLE BOBCUSTOMER_PAYMENT (
   CustomerPaymentID int PRIMARY KEY,
   BobCustomerID int FOREIGN KEY REFERENCES BOBCUSTOMER(BobCustomerID),
   Amount money,
   Date datetime2
);

-- Create BOBSUPPLIER Table
CREATE TABLE BOBSUPPLIER (
   SupplierID int PRIMARY KEY,
   Name varchar(100),
   Address varchar(100),
   Phone varchar(50)
);
```

```
-- Create BOBMATERIAL Table
CREATE TABLE BOBMATERIAL (
   MaterialID int PRIMARY KEY,
   RepairID int FOREIGN KEY REFERENCES BOBREPAIR(RepairID),
   SupplierID int FOREIGN KEY REFERENCES BOBSUPPLIER(SupplierID),
   Type varchar(255),
   Quantity int,
   Cost money
);

-- Create BOBREPAIR Table
CREATE TABLE BOBREPAIR (
   RepairID int PRIMARY KEY,
   BidID int FOREIGN KEY REFERENCES BOBBID(BidID),
   Description text,
   LaborHours int,
   Cost money
);

-- Create BOBPAYMENT_TO_SUPPLIER Table
CREATE TABLE BOBPAYMENT_TO_SUPPLIER (
   PaymentID int PRIMARY KEY,
   SupplierID int FOREIGN KEY REFERENCES BOBSUPPLIER(SupplierID),
   Amount money,
   Date datetime2
);
```

DML Scripts

-- Insert Data into BOBCUSTOMER

```
INSERT INTO BOBCUSTOMER VALUES (1, 'Michael', 'Scott', '1725 Scranton Branch Blvd, Scranton, PA', '570-865-4321');

INSERT INTO BOBCUSTOMER VALUES (2, 'Dwight', 'Schrute', '78 Beet Farm Road, Dunmore, PA', '570-123-4567');

INSERT INTO BOBCUSTOMER VALUES (3, 'Jim', 'Halpert', '25 Prankster Lane, Pittston, PA', '570-765-4321');

INSERT INTO BOBCUSTOMER VALUES (4, 'Pam', 'Beesly', '155 Art School Loop, Carbondale, PA', '570-987-6543');

INSERT INTO BOBCUSTOMER VALUES (5, 'Angela', 'Martin', '320 Cat Lovers Way, Wilkes-Barre, PA', '570-555-6789');
```

-- Insert Data into BOBBID

INSERT INTO BOBBID VALUES (101, 1, '2024-04-01 08:30:00', 1500.00);

INSERT INTO BOBBID VALUES (102, 2, '2024-04-02 09:00:00', 2500.00);

INSERT INTO BOBBID VALUES (103, 3, '2024-04-03 10:00:00', 3200.00);

INSERT INTO BOBBID VALUES (104, 4, '2024-04-04 11:30:00', 2850.00);

INSERT INTO BOBBID VALUES (105, 5, '2024-04-05 14:45:00', 4300.00);

-- Insert Data into BOBCUSTOMER_PAYMENT

INSERT INTO BOBCUSTOMER_PAYMENT VALUES (201, 1, 200.00, '2024-04-10 10:00:00');

INSERT INTO BOBCUSTOMER_PAYMENT VALUES (202, 2, 150.00, '2024-04-11 11:00:00');

INSERT INTO BOBCUSTOMER_PAYMENT VALUES (203, 3, 250.00, '2024-04-12 12:00:00');

INSERT INTO BOBCUSTOMER_PAYMENT VALUES (204, 4, 300.00, '2024-04-13 13:00:00');

INSERT INTO BOBCUSTOMER_PAYMENT VALUES (205, 5, 350.00, '2024-04-14 14:00:00');

-- Insert Data into BOBSUPPLIER

INSERT INTO BOBSUPPLIER VALUES (301, 'Dunder Mifflin', '1725 Slough Ave, Scranton, PA', '570-555-0001');

INSERT INTO BOBSUPPLIER VALUES (302, 'Bluth Company', '1 Banana Stand Ave, Newport Beach, CA', '949-555-0004');

INSERT INTO BOBSUPPLIER VALUES (303, 'Buy n Large', '123 Space Station Orbit, Fayetteville, AR', '123-555-0101');

INSERT INTO BOBSUPPLIER VALUES (304, 'Binford Tool', '1007 Tool Time, Detroit, MI', '212-555-1234');

INSERT INTO BOBSUPPLIER VALUES (305, 'Stark Industries', '10880 Malibu Point, Malibu, CA', '310-555-5555');

-- Insert Data into BOBMATERIAL

INSERT INTO BOBMATERIAL VALUES (401, 501, 301, 'Paint - Interior Eggshell', 15, 250.00);

```
INSERT INTO BOBMATERIAL VALUES (402, 502, 302, 'Drywall Sheets', 30, 300.00);

INSERT INTO BOBMATERIAL VALUES (403, 503, 303, 'Electrical Wire (100 ft)', 5, 150.00);

INSERT INTO BOBMATERIAL VALUES (404, 504, 304, 'Plumbing PVC Pipes (10 ft)', 30, 200.00);

INSERT INTO BOBMATERIAL VALUES (405, 505, 305, 'Ceramic Tiles (1 sq ft each)', 50, 500.00);


-- Insert Data into BOBREPAIR

INSERT INTO BOBREPAIR VALUES (501, 101, 'Repainting living room walls', 8, 400.00);

INSERT INTO BOBREPAIR VALUES (502, 102, 'Installing new drywall in the basement', 10, 500.00);

INSERT INTO BOBREPAIR VALUES (503, 103, 'Full electrical rewiring of kitchen', 12, 600.00);

INSERT INTO BOBREPAIR VALUES (504, 104, 'Updating bathroom plumbing and fixtures', 15, 750.00);

INSERT INTO BOBREPAIR VALUES (505, 105, 'Laying new ceramic floor tiles in the hallway', 9, 450.00);


-- Insert Data into BOBPAYMENT_TO_SUPPLIER

INSERT INTO BOBPAYMENT_TO_SUPPLIER VALUES (601, 301, 1000.00, '2024-04-01 12:00:00');

INSERT INTO BOBPAYMENT_TO_SUPPLIER VALUES (602, 302, 1500.00, '2024-04-02 14:00:00');

INSERT INTO BOBPAYMENT_TO_SUPPLIER VALUES (603, 303, 750.00, '2024-04-03 10:30:00');

INSERT INTO BOBPAYMENT_TO_SUPPLIER VALUES (604, 304, 1200.00, '2024-04-04 15:45:00');

INSERT INTO BOBPAYMENT_TO_SUPPLIER VALUES (605, 305, 500.00, '2024-04-05 11:00:00');
```

SQL Queries

1. List the names of the customers who provided bids last month

Description:
This SQL query retrieves the first and last names of customers who have placed bids in the previous month.

SQL query:

```
SELECT DISTINCT c.FirstName, c.LastName
FROM BOBCUSTOMER c
JOIN BOBBID b ON c.BobCustomerID = b.BobCustomerID
WHERE MONTH(b.Date) = MONTH(DATEADD(MONTH, -1, GETDATE()))
AND YEAR(b.Date) = YEAR(DATEADD(MONTH, -1, GETDATE()));
```

Result:

FirstName	LastName
Angela	Martin
Dwight	Shrute
Jim	Halpert
Michael	Scott
Pam	Beesly

2. **List all the customers that have an outstanding balance (amount due to Bob) that is greater than $500**

Description:
This SQL query lists the first and last names of customers who have an outstanding balance greater than $500. It calculates the balance by subtracting the total payments made by the customer from the total estimated amount of their bids. The query groups the results by customer and uses the HAVING clause to filter those with a balance greater than $500.

SQL query:

```
SELECT c.FirstName, c.LastName
FROM BOBCUSTOMER c
JOIN BOBBID b ON c.BobCustomerID = b.BobCustomerID
LEFT JOIN BOBCUSTOMER_PAYMENT p ON c.BobCustomerID = p.BobCustomerID
GROUP BY c.FirstName, c.LastName, c.BobCustomerID
HAVING SUM(b.TotalEstimate) - ISNULL(SUM(p.Amount), 0) > 500;
```

Result:

FirstName	LastName
Michael	Scott
Dwight	Shrute
Jim	Halpert
Pam	Beesly
Angela	Martin

3. **List all the suppliers where Bob has an outstanding balance that is greater than $1,000**

   Description:
   This SQL query retrieves the names of suppliers where the total payments made by the company are less than $1,000.

   SQL query:

```
SELECT s.Name
FROM BOBSUPPLIER s
LEFT JOIN BOBPAYMENT_TO_SUPPLIER p ON s.SupplierID = p.SupplierID
GROUP BY s.Name, s.SupplierID
HAVING SUM(p.Amount) < 1000;
```

   Result:

Name
Buy n Large
Stark Industries

4. **List all the material that was used for bids where the estimated hours for the bid was greater than 40 hours**

   Description:
   This SQL query retrieves the types of materials used in repairs where the estimated labor hours for the bid exceeded 40 hours.

   SQL query:

```
SELECT DISTINCT m.Type
FROM BOBMATERIAL m
JOIN BOBREPAIR r ON m.RepairID = r.RepairID
WHERE r.LaborHours > 40;
```

   Result:

Type
Paint - Eggshell

5. **List all the material that Bob purchased from a specific supplier (Note: you can decide on the supplier but there should only be one supplier)**

   Description:

This SQL query lists all the types of materials that is purchased from a specific supplier, identified by the SupplierID. In this example, it retrieves the materials from the supplier with SupplierID = 301.

SQL query:

```
SELECT m.Type
FROM BOBMATERIAL m
WHERE m.SupplierID = 301;
```

Result:

Type
Paint - Eggshell