PROapp System

BUSA8090 - Assignment 1

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Contents

1. Introduction

The PROapp is an integrated platform that brings customers, tradespeople, and suppliers together to one seamless workflow of task management, skill certification, and material procurement. It makes it easy to post tasks, bid for tasks, execute tasks, or perform supply chain management.

2. The Main Workflows in Brief

2.1 Task Workflow

1. Customer creates a TASK.
2. Tradespeople submit BIDS for the TASK.
3. Customer selects a BID, changing the TASK status to "Assigned".
4. Assigned TRADESPERSON updates TASK status to "In Progress".
5. TRADESPERSON completes the TASK, updating status to "Completed".
6. Customer reviews and confirms completion, triggering TASK_TRANSACTION creation.

2.2 Material Procurement

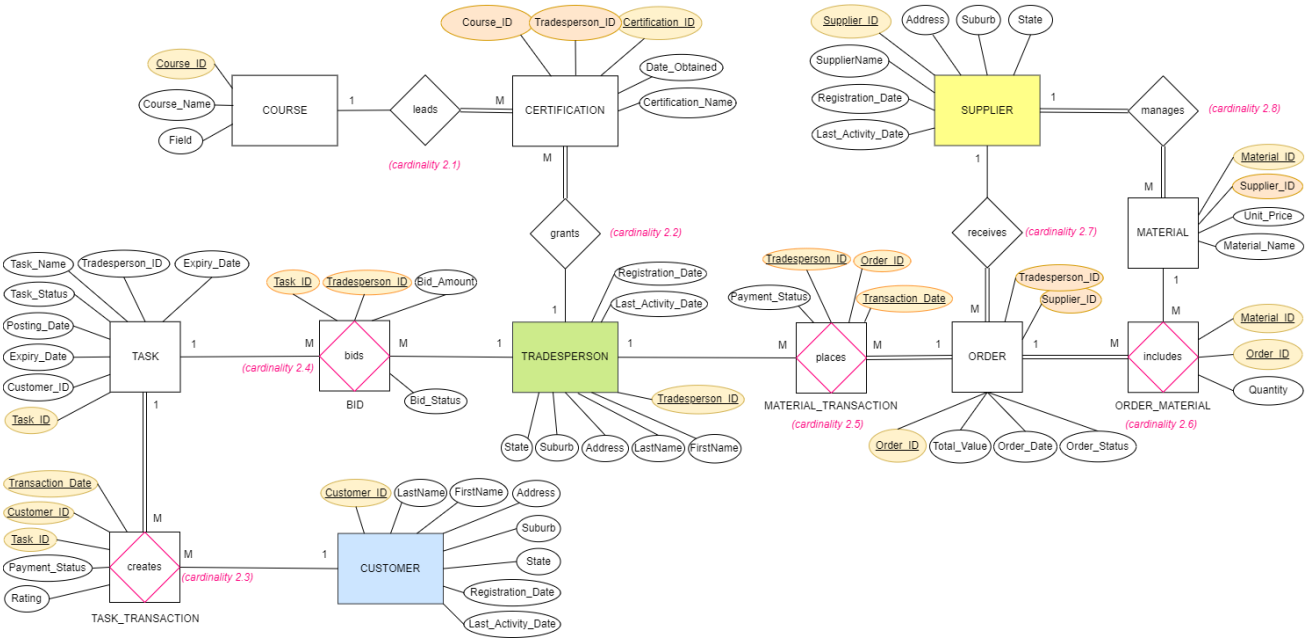
1. TRADESPERSON places ORDER for needed MATERIAL.
2. System assigns ORDER to appropriate SUPPLIER.
3. SUPPLIER fulfills ORDER, updating ORDER_STATUS.
4. TRADESPERSON receives MATERIALS, confirming delivery in the system.
5. System creates SUPPLY_TRANSACTION to record the procurement.

2.3 Transaction

1. Payment by customer held in escrow on accepted BID.
2. Upon task completion and customer confirmation, payment is released to TRADESPERSON.
3. System deducts a service fee before releasing payment.
4. Payment in SUPPLY_TRANSACTIONS will be executed by the system from TRADESPERSON to SUPPLIER.

PART A: THE DATABASE OF THE PROAPP

1. ER Diagram of the Platform

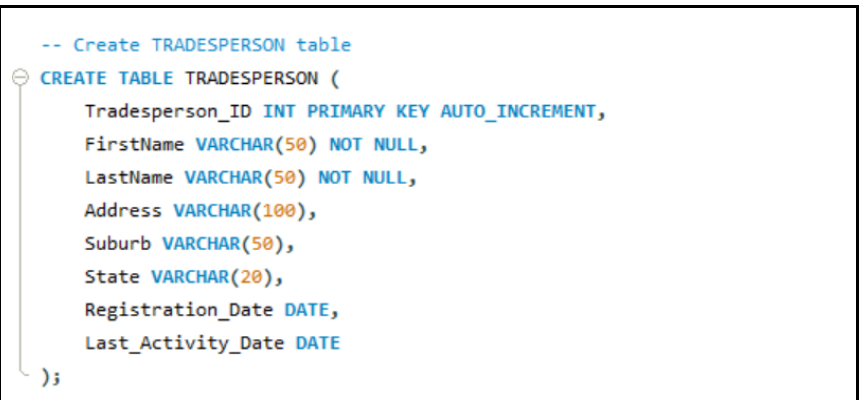
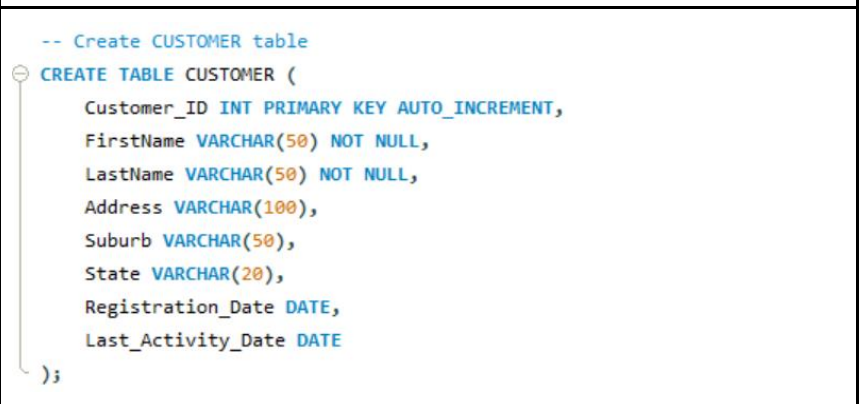
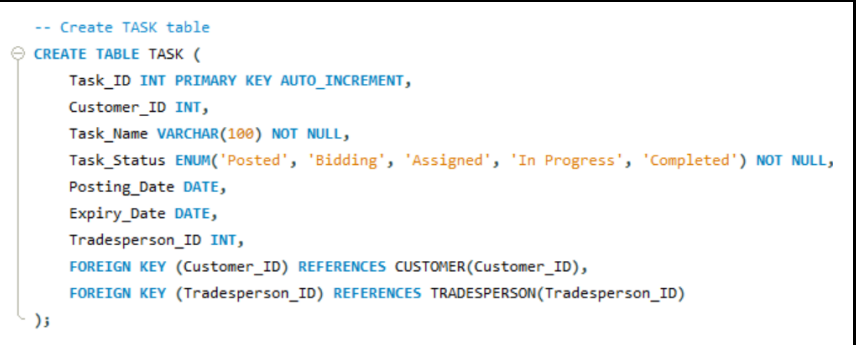


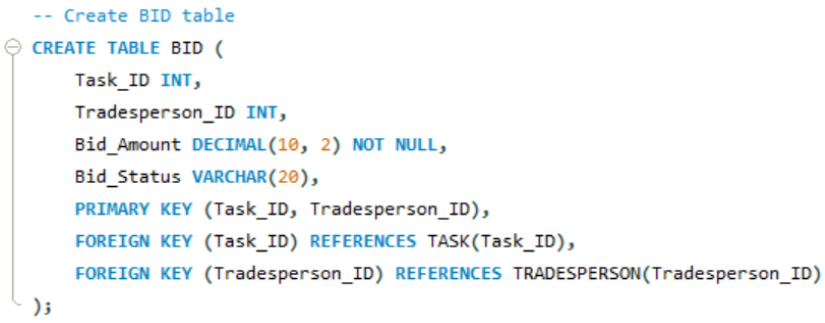
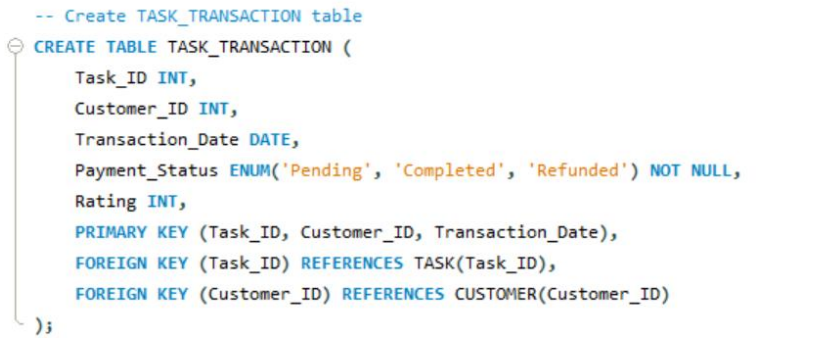
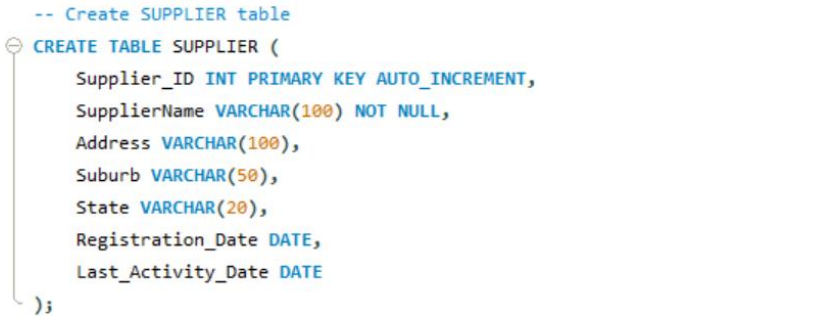
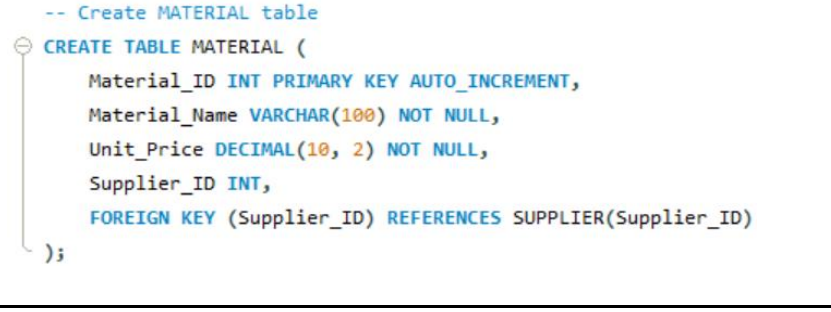
2. Entity Attributes, Cardinality and Participation

Table 1: Entities and Attributes

1. COURSE
• Course_ID (PK)
• Course_Name
• Field
	`-- Create COURSE table`
	`CREATE TABLE COURSE (`
	`Course_ID INT PRIMARY KEY AUTO_INCREMENT,`
	`Course_Name VARCHAR(100) NOT NULL,`
	`Field VARCHAR(50)`
	`);`

2. CERTIFICATION
• Certification_ID (PK)
• Certification_Name
• Course_ID (FK to COURSE)
• Tradesperson_ID (FK to TRADESPERSON)
• Date_Obtained
	`-- Create CERTIFICATION table`
	`CREATE TABLE CERTIFICATION (`
	`Certification_ID INT PRIMARY KEY AUTO_INCREMENT,`
	`Certification_Name VARCHAR(100) NOT NULL,`
	`Course_ID INT,`
	`Tradesperson_ID INT,`
	`Date_Obtained DATE,`
	`FOREIGN KEY (Course_ID) REFERENCES COURSE(Course_ID),`
	`FOREIGN KEY (Tradesperson_ID) REFERENCES TRADESPERSON(Tradesperson_ID)`
	`);`

3. TRADESPERSON • Tradesperson_ID (PK) • FirstName • LastName • Address • Suburb • State • Registration_Date • Last_Activity_Date	
4. CUSTOMER • Customer_ID (PK) • FirstName • LastName • Address • Suburb • State • Registration_Date • Last_Activity_Date	
5. TASK • Task_ID (PK) • Customer_ID (FK to CUSTOMER) • Task_Name • Task_Status (Posted, Bidding, Assigned, In Progress, Completed) • Posting_Date • Expiry_Date • Tradesperson_ID (FK to TRADESPERSON)	

6. BID • Task_ID (PK, FK to TASK) • Tradesperson_ID (PK, FK to TRADESPERSON) • Bid_Amount • Bid_Status	
7. TASK_TRANSACTION • Task_ID (PK, FK to TASK) • Customer_ID (PK, FK to CUSTOMER) • Transaction_Date (PK, FK to TRADESPERSON) • Payment_Status (Pending, Completed, Refunded) • Rating	
8. SUPPLIER • Supplier_ID (PK) • SupplierName • Address • Suburb • State • Registration_Date • Last_Activity_Date	
9. MATERIAL • Material_ID (PK) • Material_Name • Unit_Price • Supplier_ID (FK to SUPPLIER)	

10. ORDER

- Order_ID (PK)
- Tradesperson_ID (FK to TRADESPERSON)
- Supplier_ID (FK to SUPPLIER)
- Order_Date
- Total_Value
- Order_Status (Placed, Processing, Shipped, Delivered)

```sql
-- Create ORDER table
CREATE TABLE `ORDER` (
    Order_ID INT PRIMARY KEY AUTO_INCREMENT,
    Tradesperson_ID INT,
    Supplier_ID INT,
    Order_Date DATE,
    Total_Value DECIMAL(10, 2) NOT NULL,
    Order_Status ENUM('Placed', 'Processing', 'Shipped', 'Delivered') NOT NULL,
    FOREIGN KEY (Tradesperson_ID) REFERENCES TRADESPERSON(Tradesperson_ID),
    FOREIGN KEY (Supplier_ID) REFERENCES SUPPLIER(Supplier_ID)
);
```

11. ORDER_MATERIAL (Junction table for ORDER and MATERIAL)

- Order_ID (PK, FK to ORDER)
- Material_ID (PK, FK to MATERIAL)
- Quantity

```sql
-- Create ORDER_MATERIAL table
CREATE TABLE ORDER_MATERIAL (
    Order_ID INT,
    Material_ID INT,
    Quantity INT NOT NULL,
    PRIMARY KEY (Order_ID, Material_ID),
    FOREIGN KEY (Order_ID) REFERENCES `ORDER`(Order_ID),
    FOREIGN KEY (Material_ID) REFERENCES MATERIAL(Material_ID)
);
```

12. MATERIAL_TRANSACTION

- Order_ID (PK, FK to ORDER)
- Tradesperson_ID (PK, FK to TRADESPERSON)
- Transaction_Date
- Payment_Status

```sql
-- Create MATERIAL_TRANSACTION table
CREATE TABLE MATERIAL_TRANSACTION (
    Order_ID INT,
    Tradesperson_ID INT,
    Transaction_Date DATE,
    Payment_Status VARCHAR(20),
    PRIMARY KEY (Order_ID, Tradesperson_ID),
    FOREIGN KEY (Order_ID) REFERENCES `ORDER`(Order_ID),
    FOREIGN KEY (Tradesperson_ID) REFERENCES TRADESPERSON(Tradesperson_ID)
);
```

Table 2: Cardinality and Participation	
2.1 COURSE and CERTIFICATION: One-to-Many (1:M) ● A COURSE leads to one or more CERTIFICATIONS. ● A CERTIFICATION is associated with exactly one COURSE. Participation: Total on CERTIFICATION side, Partial on COURSE side	**2.2 TRADESPERSON and CERTIFICATION: One-to-Many (1:M)** ● A TRADESPERSON can earn none or multiple CERTIFICATIONS. ● A CERTIFICATION is associated with exactly one TRADESPERSON. Participation: Total on CERTIFICATION side, Partial on TRADESPERSON side
2.3 CUSTOMER and TASK: One-to-Many (1:M) ● A CUSTOMER can create none or multiple TASKS. ● A TASK is created by exactly one CUSTOMER. Participation: Partial on CUSTOMER side, Total on TASK side	**2.4 TRADESPERSON and TASK: Many-to-Many (M:M) through BID** ● A TRADESPERSON can bid on multiple TASKS. ● A TASK is bided by none or multiple TRADESPERSON. . Participation: Partial on both sides (not all tasks will be bided, and not all tradespeople will bid tasks)
2.5 TRADESPERSON to ORDER: One-to-Many (1:M) ● A TRADESPERSON can place no or multiple ORDERS. ● An ORDER is placed by exactly one TRADESPERSON. Participation: Partial on TRADESPERSON side, Total on ORDER side	**2.6 ORDER and MATERIAL: Many-to-Many (M:M) through ORDER_MATERIAL** ● An ORDER can include one or multiple MATERIALS. ● A MATERIAL can be part of no or multiple ORDERS. Participation: Total on ORDER side and Partial on MATERIAL sides
2.7 SUPPLIER and ORDER: One-to-Many (1:M) ● A SUPPLIER can fulfill no or multiple ORDERS. ● An ORDER is fulfilled by exactly one SUPPLIER. Participation: Partial on SUPPLIER side, Total on ORDER side	**2.8 SUPPLIER and MATERIAL: One-to-Many (1:M)** ● A SUPPLIER can have one or multiple MATERIAL. ● A MATERIAL is managed by exactly one SUPPLIER. Participation: Total on both SUPPLIER side and MATERIAL side

3. Dummy Data

- COURSE table

```
-- COURSE table
INSERT INTO COURSE (Course_ID, Course_Name, Field) VALUES
(1, 'Basic Plumbing', 'Plumbing'),
(2, 'Advanced Electrical', 'Electrical'),
(3, 'Carpentry Fundamentals', 'Carpentry'),
(4, 'HVAC Essentials', 'HVAC'),
(5, 'Construction Techniques', 'Construction');
```

Course_ID	Course_Name	Field
1	Basic Plumbing	Plumbing
2	Advanced Electrical	Electrical
3	Carpentry Fundamentals	Carpentry
4	HVAC Essentials	HVAC
5	Construction Techniques	Construction

- TRADESPERSON table

```
-- TRADESPERSON table
INSERT INTO TRADESPERSON (Tradesperson_ID, FirstName, LastName, Address, Suburb, State, Registration_Date, Last_Activity_Date) VALUES
(1, 'Budi', 'Santoso', 'Jl. Sudirman No. 123', 'Menteng', 'DKI Jakarta', '2022-01-23', '2022-03-15'),
(2, 'Siti', 'Rahayu', 'Jl. Thamrin No. 456', 'Kebayoran Baru', 'DKI Jakarta', '2022-10-01', '2023-07-20'),
(3, 'Agus', 'Wijaya', 'Jl. Gajah Mada No. 789', 'Sawahan', 'Jawa Timur', '2023-06-01', '2024-07-18'),
(4, 'Dewi', 'Lestari', 'Jl. Diponegoro No. 321', 'Tegalsari', 'Jawa Timur', '2022-04-01', '2024-08-22'),
(5, 'Eko', 'Prasetyo', 'Jl. Pemuda No. 654', 'Semarang Tengah', 'Jawa Tengah', '2023-05-01', '2024-03-17'),
(6, 'Sri', 'Wahyuni', 'Jl. Asia Afrika No. 987', 'Sumur Bandung', 'Jawa Barat', '2022-12-01', '2024-09-21'),
(7, 'Hendra', 'Gunawan', 'Jl. Veteran No. 147', 'Mamajang', 'Sulawesi Selatan', '2023-07-01', '2024-09-19'),
(8, 'Rina', 'Sari', 'Jl. Gatot Subroto No. 258', 'Denpasar Barat', 'Bali', '2023-08-01', '2024-06-16'),
(9, 'Andi', 'Kusuma', 'Jl. Ahmad Yani No. 369', 'Ilir Timur I', 'Sumatera Selatan', '2022-09-01', '2024-05-23'),
(10, 'Yuni', 'Hartono', 'Jl. Malioboro No. 753', 'Gedongtengen', 'DI Yogyakarta', '2024-03-01', '2024-03-14');
```

Tradesperson_ID	FirstName	LastName	Address	Suburb	State	Registration_Date	Last_Activity_Date
1	Budi	Santoso	Jl. Sudirman No. 123	Menteng	DKI Jakarta	2022-01-23	2022-03-15
2	Siti	Rahayu	Jl. Thamrin No. 456	Kebayoran Baru	DKI Jakarta	2022-10-01	2023-07-20
3	Agus	Wijaya	Jl. Gajah Mada No. 789	Sawahan	Jawa Timur	2023-06-01	2024-07-18
4	Dewi	Lestari	Jl. Diponegoro No. 321	Tegalsari	Jawa Timur	2022-04-01	2024-08-22
5	Eko	Prasetyo	Jl. Pemuda No. 654	Semarang Tengah	Jawa Tengah	2023-05-01	2024-03-17
6	Sri	Wahyuni	Jl. Asia Afrika No. 987	Sumur Bandung	Jawa Barat	2022-12-01	2024-09-21
7	Hendra	Gunawan	Jl. Veteran No. 147	Mamajang	Sulawesi Selatan	2023-07-01	2024-09-19
8	Rina	Sari	Jl. Gatot Subroto No. 258	Denpasar Barat	Bali	2023-08-01	2024-06-16
9	Andi	Kusuma	Jl. Ahmad Yani No. 369	Ilir Timur I	Sumatera Selatan	2022-09-01	2024-05-23
10	Yuni	Hartono	Jl. Malioboro No. 753	Gedongtengen	DI Yogyakarta	2024-03-01	2024-03-14

- CERTIFICATION table

```
-- CERTIFICATION table
INSERT INTO CERTIFICATION (Certification_ID, Certification_Name, Course_ID, Tradesperson_ID, Date_Obtained) VALUES
(1, 'Certified Plumber', 1, 1, '2022-02-15'),
(2, 'Master Electrician', 2, 2, '2022-11-20'),
(3, 'Expert Carpenter', 3, 3, '2023-07-10'),
(4, 'HVAC Specialist', 4, 4, '2022-05-05'),
(5, 'Professional Builder', 5, 5, '2023-06-12'),
(6, 'Advanced Plumber', 1, 1, '2022-08-18'),
(7, 'Electrical Systems Expert', 2, 2, '2023-01-22');
```

Certification_ID	Certification_Name	Course_ID	Tradesperson_ID	Date_Obtained
1	Certified Plumber	1	1	2022-02-15
2	Master Electrician	2	2	2022-11-20
3	Expert Carpenter	3	3	2023-07-10
4	HVAC Specialist	4	4	2022-05-05
5	Professional Builder	5	5	2023-06-12
6	Advanced Plumber	1	1	2022-08-18
7	Electrical Systems Expert	2	2	2023-01-22

- CUSTOMER table

```
-- CUSTOMER table
INSERT INTO CUSTOMER (Customer_ID, FirstName, LastName, Address, Suburb, State, Registration_Date, Last_Activity_Date) VALUES
(1, 'Rudi', 'Hermawan', 'Jl. Cikini No. 159', 'Menteng', 'DKI Jakarta', '2023-01-05', '2024-03-10'),
(2, 'Maya', 'Putri', 'Jl. Kebon Sirih No. 267', 'Gambir', 'DKI Jakarta', '2023-02-10', '2024-03-12'),
(3, 'Wayan', 'Sudiarta', 'Jl. Raya Kuta No. 378', 'Kuta', 'Bali', '2023-03-15', '2024-03-14'),
(4, 'Putri', 'Indah', 'Jl. Pahlawan No. 489', 'Medan Maimun', 'Sumatera Utara', '2023-04-20', '2024-03-16'),
(5, 'Joko', 'Susilo', 'Jl. Slamet Riyadi No. 591', 'Serengan', 'Jawa Tengah', '2023-05-25', '2024-03-18');
```

Customer_ID	FirstName	LastName	Address	Suburb	State	Registration_Date	Last_Activity_Date
1	Rudi	Hermawan	Jl. Cikini No. 159	Menteng	DKI Jakarta	2023-01-05	2024-03-10
2	Maya	Putri	Jl. Kebon Sirih No. 267	Gambir	DKI Jakarta	2023-02-10	2024-03-12
3	Wayan	Sudiarta	Jl. Raya Kuta No. 378	Kuta	Bali	2023-03-15	2024-03-14
4	Putri	Indah	Jl. Pahlawan No. 489	Medan Maimun	Sumatera Utara	2023-04-20	2024-03-16
5	Joko	Susilo	Jl. Slamet Riyadi No. 591	Serengan	Jawa Tengah	2023-05-25	2024-03-18

- TASK table

```
-- TASK table
INSERT INTO TASK (Task_ID, Customer_ID, Task_Name, Task_Status, Posting_Date, Expiry_Date, Tradesperson_ID) VALUES
(1, 1, 'Fix leaky faucet', 'Completed', '2024-01-05', '2024-01-20', 1),
(2, 2, 'Install new light fixture', 'In Progress', '2024-02-10', '2024-02-25', 2),
(3, 3, 'Build custom shelves', 'Assigned', '2024-03-15', '2024-03-30', 3),
(4, 4, 'Repair AC unit', 'Posted', '2024-03-20', '2024-04-05', NULL),
(5, 5, 'Repoint brick wall', 'Bidding', '2024-03-25', '2024-04-10', NULL),
(6, 1, 'Unclog drain', 'Completed', '2024-02-01', '2024-02-15', 1),
(7, 2, 'Rewire basement', 'Completed', '2024-01-15', '2024-01-30', 2),
(8, 3, 'Install kitchen cabinets', 'In Progress', '2024-03-01', '2024-03-16', 3),
(9, 4, 'Service furnace', 'Assigned', '2024-02-20', '2024-03-07', 4),
(10, 5, 'Build retaining wall', 'Posted', '2024-03-10', '2024-03-25', NULL);
```

Task_ID	Customer_ID	Task_Name	Task_Status	Posting_Date	Expiry_Date	Tradesperson_ID
1	1	Fix leaky faucet	Completed	2024-01-05	2024-01-20	1
2	2	Install new light fixture	In Progress	2024-02-10	2024-02-25	2
3	3	Build custom shelves	Assigned	2024-03-15	2024-03-30	3
4	4	Repair AC unit	Posted	2024-03-20	2024-04-05	NULL
5	5	Repoint brick wall	Bidding	2024-03-25	2024-04-10	NULL
6	1	Unclog drain	Completed	2024-02-01	2024-02-15	1
7	2	Rewire basement	Completed	2024-01-15	2024-01-30	2
8	3	Install kitchen cabinets	In Progress	2024-03-01	2024-03-16	3
9	4	Service furnace	Assigned	2024-02-20	2024-03-07	4
10	5	Build retaining wall	Posted	2024-03-10	2024-03-25	NULL

- BID table

```
-- BID table
INSERT INTO BID (Task_ID, Tradesperson_ID, Bid_Amount, Bid_Status) VALUES
(1, 1, 1000000, 'Accepted'),
(2, 2, 1500000, 'Accepted'),
(3, 3, 2000000, 'Accepted'),
(4, 4, 1800000, 'Pending'),
(4, 6, 1750000, 'Pending'),
(5, 5, 2500000, 'Pending'),
(5, 7, 2200000, 'Pending'),
(6, 1, 800000, 'Accepted'),
(7, 2, 3000000, 'Accepted'),
(8, 3, 5000000, 'Accepted'),
(9, 4, 1200000, 'Accepted'),
(10, 5, 4000000, 'Pending'),
(10, 8, 3800000, 'Pending'),
(10, 9, 4200000, 'Pending');
```

Task_ID	Tradesperson_ID	Bid_Amount	Bid_Status
1	1	1000000.00	Accepted
2	2	1500000.00	Accepted
3	3	2000000.00	Accepted
4	4	1800000.00	Pending
4	6	1750000.00	Pending
5	5	2500000.00	Pending
5	7	2200000.00	Pending
6	1	800000.00	Accepted
7	2	3000000.00	Accepted
8	3	5000000.00	Accepted
9	4	1200000.00	Accepted
10	5	4000000.00	Pending
10	8	3800000.00	Pending
10	9	4200000.00	Pending

- TASK_TRANSACTION table

```
-- TASK_TRANSACTION table
INSERT INTO TASK_TRANSACTION (Task_ID, Customer_ID, Transaction_Date, Payment_Status, Rating) VALUES
(1, 1, '2024-01-18', 'Completed', 5),
(2, 2, '2024-02-23', 'Pending', NULL),
(3, 3, '2024-03-28', 'Pending', NULL),
(6, 1, '2024-02-12', 'Completed', 4),
(7, 2, '2024-01-28', 'Completed', 5),
(8, 3, '2024-03-10', 'Pending', NULL),
(9, 4, '2024-03-05', 'Pending', NULL);
```

Task_ID	Customer_ID	Transaction_Date	Payment_Status	Rating
1	1	2024-01-18	Completed	5
2	2	2024-02-23	Pending	NULL
3	3	2024-03-28	Pending	NULL
6	1	2024-02-12	Completed	4
7	2	2024-01-28	Completed	5
8	3	2024-03-10	Pending	NULL
9	4	2024-03-05	Pending	NULL

- SUPPLIER table

```
-- SUPPLIER table
INSERT INTO SUPPLIER (Supplier_ID, SupplierName, Address, Suburb, State, Registration_Date, Last_Activity_Date) VALUES
(1, 'PipaJaya Supplies', 'Jl. Hayam Wuruk No. 789', 'Taman Sari', 'DKI Jakarta', '2023-01-01', '2024-03-15'),
(2, 'ElektroMegah Parts', 'Jl. Ir. H. Juanda No. 456', 'Bandung Wetan', 'Jawa Barat', '2023-02-01', '2024-03-20'),
(3, 'KayuMakmur Materials', 'Jl. Panglima Sudirman No. 123', 'Genteng', 'Jawa Timur', '2023-03-01', '2024-03-18'),
(4, 'DinginSejuk AC', 'Jl. Urip Sumoharjo No. 321', 'Makassar', 'Sulawesi Selatan', '2023-04-01', '2024-03-22'),
(5, 'BatuPerkasa Masonry', 'Jl. Gajah Mada No. 654', 'Denpasar Utara', 'Bali', '2023-05-01', '2024-03-17');
```

Supplier_ID	SupplierName	Address	Suburb	State	Registration_Date	Last_Activity_Date
1	PipaJaya Supplies	Jl. Hayam Wuruk No. 789	Taman Sari	DKI Jakarta	2023-01-01	2024-03-15
2	ElektroMegah Parts	Jl. Ir. H. Juanda No. 456	Bandung Wetan	Jawa Barat	2023-02-01	2024-03-20
3	KayuMakmur Materials	Jl. Panglima Sudirman No. 123	Genteng	Jawa Timur	2023-03-01	2024-03-18
4	DinginSejuk AC	Jl. Urip Sumoharjo No. 321	Makassar	Sulawesi Selatan	2023-04-01	2024-03-22
5	BatuPerkasa Masonry	Jl. Gajah Mada No. 654	Denpasar Utara	Bali	2023-05-01	2024-03-17

- MATERIAL table

```
-- MATERIAL table
INSERT INTO MATERIAL (Material_ID, Material_Name, Unit_Price, Supplier_ID) VALUES
(1, 'Copper Pipe', 105000, 1),
(2, 'Electrical Wire', 7500, 2),
(3, 'Teak Board', 250000, 3),
(4, 'AC Refrigerant', 450000, 4),
(5, 'Cement Mix', 150000, 5),
(6, 'PVC Pipe', 87500, 1),
(7, 'Circuit Breaker', 300000, 2),
(8, 'Pine Board', 185000, 3),
(9, 'AC Filter', 120000, 4),
(10, 'Brick', 8500, 5);
```

Material_ID	Material_Name	Unit_Price	Supplier_ID
1	Copper Pipe	105000.00	1
2	Electrical Wire	7500.00	2
3	Teak Board	250000.00	3
4	AC Refrigerant	450000.00	4
5	Cement Mix	150000.00	5
6	PVC Pipe	87500.00	1
7	Circuit Breaker	300000.00	2
8	Pine Board	185000.00	3
9	AC Filter	120000.00	4
10	Brick	8500.00	5

- ORDER table

```
-- ORDER table (Total_Value calculated based on MATERIAL and ORDER_MATERIAL)
INSERT INTO `ORDER` (Order_ID, Tradesperson_ID, Supplier_ID, Order_Date, Total_Value, Order_Status) VALUES
(1, 1, 1, '2024-01-10', 1050000, 'Delivered'),
(2, 2, 2, '2024-02-15', 2250000, 'Shipped'),
(3, 3, 3, '2024-03-20', 5000000, 'Processing'),
(4, 4, 4, '2024-03-25', 1800000, 'Placed'),
(5, 5, 5, '2024-03-30', 1500000, 'Placed'),
(6, 6, 1, '2024-02-05', 1925000, 'Delivered'),
(7, 7, 2, '2024-02-20', 3000000, 'Shipped'),
(8, 8, 3, '2024-03-15', 3700000, 'Processing');
```

Order_ID	Tradesperson_ID	Supplier_ID	Order_Date	Total_Value	Order_Status
1	1	1	2024-01-10	1050000.00	Delivered
2	2	2	2024-02-15	2250000.00	Shipped
3	3	3	2024-03-20	5000000.00	Processing
4	4	4	2024-03-25	1800000.00	Placed
5	5	5	2024-03-30	1500000.00	Placed
6	6	1	2024-02-05	1925000.00	Delivered
7	7	2	2024-02-20	3000000.00	Shipped
8	8	3	2024-03-15	3700000.00	Processing

- ORDER_MATERIAL table

```
-- ORDER_MATERIAL table
INSERT INTO ORDER_MATERIAL (Order_ID, Material_ID, Quantity) VALUES
(1, 1, 10),
(2, 2, 300),
(3, 3, 20),
(4, 4, 4),
(5, 5, 10),
(6, 6, 10),
(6, 1, 10),
(7, 7, 10),
(8, 8, 20);
```

Order_ID	Material_ID	Quantity
1	1	10
2	2	300
3	3	20
4	4	4
5	5	10
6	1	10
6	6	10
7	7	10
8	8	20

- MATERIAL_TRANSACTION table

```
-- MATERIAL_TRANSACTION table
INSERT INTO MATERIAL_TRANSACTION (Order_ID, Tradesperson_ID, Transaction_Date, Payment_Status) VALUES
(1, 1, '2024-01-15', 'Completed'),
(2, 2, '2024-02-20', 'Completed'),
(3, 3, '2024-03-22', 'Pending'),
(4, 4, '2024-03-27', 'Pending'),
(5, 5, '2024-04-01', 'Pending'),
(6, 6, '2024-02-10', 'Completed'),
(7, 7, '2024-02-25', 'Completed'),
(8, 8, '2024-03-18', 'Pending');
```

Order_ID	Tradesperson_ID	Transaction_Date	Payment_Status
1	1	2024-01-15	Completed
2	2	2024-02-20	Completed
3	3	2024-03-22	Pending
4	4	2024-03-27	Pending
5	5	2024-04-01	Pending
6	6	2024-02-10	Completed
7	7	2024-02-25	Completed
8	8	2024-03-18	Pending

PART B: BUSINESS INSIGHTS

A Three-Pronged Approach

PROapp stands at a crucial juncture in its development, with significant opportunities for growth and improvement. The strategic focus on these three interrelated areas creates a virtual circle: platform improvement, operational excellence, and strategic expansion.

1/ User-Centric Platform Enhancement

Query 1: User Retention and Engagement
As low user retention could lead to increasing new user acquisition costs, this query calculates the retention rate of users (both tradespeople and customers) who remain active after 6 months. It helps analyze the trends of user engagement over the different years of their registration.

```sql
-- Query 1: Retention Rate
SELECT
    YEAR(Registration_Date) AS registration_year,
    COUNT(*) AS total_registered,
    SUM(CASE WHEN DATEDIFF(Last_Activity_Date, Registration_Date) > 180 THEN 1 ELSE 0 END) AS active_after_6months,
    (SUM(CASE WHEN DATEDIFF(Last_Activity_Date, Registration_Date) > 180 THEN 1 ELSE 0 END) * 100.0 / COUNT(*)) AS retention_rate
FROM (
    SELECT Registration_Date, Last_Activity_Date FROM TRADESPERSON
    UNION ALL
    SELECT Registration_Date, Last_Activity_Date FROM CUSTOMER
) AS all_users
GROUP BY YEAR(Registration_Date)
ORDER BY registration_year;
```

registration_year	total_registered	active_after_6months	retention_rate
2022	5	4	80.00000
2023	9	9	100.00000
2024	1	0	0.00000

Query 2: Geographic Distribution of Users

Since certain states may receive more attention in terms of marketing or support activities, this query shows the distribution of tradespeople and customers across different states, allowing for targeted regional strategies and identifying areas for user base expansion.

```sql
-- Query 2: Geographic Distribution of Users
SELECT
    'Tradesperson' AS user_type,
    State,
    COUNT(*) AS user_count
FROM TRADESPERSON
GROUP BY State
UNION ALL
SELECT
    'Customer' AS user_type,
    State,
    COUNT(*) AS user_count
FROM CUSTOMER
GROUP BY State
ORDER BY user_type, user_count DESC, State;
```

user_type	State	user_count
Customer	DKI Jakarta	2
Customer	Bali	1
Customer	Jawa Tengah	1
Customer	Sumatera Utara	1
Tradesperson	DKI Jakarta	2
Tradesperson	Jawa Timur	2
Tradesperson	Bali	1
Tradesperson	DI Yogyakarta	1
Tradesperson	Jawa Barat	1
Tradesperson	Jawa Tengah	1
Tradesperson	Sulawesi Selatan	1
Tradesperson	Sumatera Selatan	1

Query 3: New User Onboarding Efficiency

Because complicated onboarding might prevent new users from fully engaging with the platform, this query shows how quickly new tradespeople engage with the platform, taking on their first task and getting certifications that help in finding potential improvements in the onboarding process.

```sql
-- Query 3: New User Onboarding Efficiency
SELECT
    tp.Tradesperson_ID,
    DATEDIFF(MIN(t.Posting_Date), tp.Registration_Date) AS days_to_first_task,
    COUNT(DISTINCT c.Certification_ID) AS certifications_count
FROM TRADESPERSON tp
LEFT JOIN TASK t ON tp.Tradesperson_ID = t.Tradesperson_ID
LEFT JOIN CERTIFICATION c ON tp.Tradesperson_ID = c.Tradesperson_ID
GROUP BY tp.Tradesperson_ID, tp.Registration_Date
ORDER BY days_to_first_task DESC;
```

Tradesperson_ID	days_to_first_task	certifications_count
1	712	2
4	690	1
2	471	2
3	274	1
5	NULL	1
6	NULL	0
7	NULL	0
8	NULL	0
9	NULL	0
10	NULL	0

2/ Optimized Operations and Quality Control

Query 4: Task Completion Rate and Customer Satisfaction

Since low task completion rates or customer satisfaction may indicate issues with the platform's effectiveness, this query calculates the overall task completion rate and average customer rating for completed tasks, providing insights into platform efficiency and user satisfaction.

```sql
-- Query 4: Task Completion Rate and Customer Satisfaction
SELECT
    COUNT(*) AS total_tasks,
    SUM(CASE WHEN Task_Status = 'Completed' THEN 1 ELSE 0 END) AS completed_tasks,
    (SUM(CASE WHEN Task_Status = 'Completed' THEN 1 ELSE 0 END) * 100.0 / COUNT(*)) AS completion_rate,
    AVG(CASE WHEN Task_Status = 'Completed' THEN tt.Rating ELSE NULL END) AS avg_rating
FROM TASK t
LEFT JOIN TASK_TRANSACTION tt ON t.Task_ID = tt.Task_ID;
```

total_tasks	completed_tasks	completion_rate	avg_rating
10	3	30.00000	4.6667

Query 5: Tradesperson Performance and Quality Control

Since ensuring consistent quality of service is crucial for platform reputation and customer satisfaction, this query provides an overall view of tradesperson performance, including total tasks, certifications, and task completion rates, helping identify top performers and areas for quality improvement.

```
1     -- Query 5: Tradesperson Performance and Quality Control
2     SELECT
3         tp.Tradesperson_ID,
4         COUNT(DISTINCT t.Task_ID) AS total_tasks,
5         AVG(tt.Rating) AS avg_rating,
6         COUNT(DISTINCT c.Certification_ID) AS certifications_count
7     FROM TRADESPERSON tp
8     LEFT JOIN TASK t ON tp.Tradesperson_ID = t.Tradesperson_ID
9     LEFT JOIN TASK_TRANSACTION tt ON t.Task_ID = tt.Task_ID
10    LEFT JOIN CERTIFICATION c ON tp.Tradesperson_ID = c.Tradesperson_ID
11    GROUP BY tp.Tradesperson_ID
12    ORDER BY
13        CASE WHEN AVG(tt.Rating) IS NULL THEN 1 ELSE 0 END,
14        avg_rating DESC,
15        total_tasks DESC;
```

Tradesperson_ID	total_tasks	avg_rating	certifications_count
2	2	5.0000	2
1	2	4.5000	2
3	2	NULL	1
4	1	NULL	1
5	0	NULL	1
6	0	NULL	0
7	0	NULL	0
8	0	NULL	0
9	0	NULL	0
10	0	NULL	0

Query 6: Supply Chain Efficiency

Since inefficient supply chain management can affect tradesperson satisfaction and task completion rates, this query evaluates supplier performance based on order fulfillment times and total order values, helping identify reliable suppliers and potential supply chain bottlenecks.

```sql
-- Query 6: Supply Chain Efficiency
SELECT
    s.Supplier_ID,
    s.SupplierName,
    COUNT(o.Order_ID) AS total_orders,
    AVG(DATEDIFF(mt.Transaction_Date, o.Order_Date)) AS avg_fulfillment_time_indays,
    SUM(o.Total_Value) AS total_order_value
FROM SUPPLIER s
JOIN `ORDER` o ON s.Supplier_ID = o.Supplier_ID
JOIN MATERIAL_TRANSACTION mt ON o.Order_ID = mt.Order_ID
GROUP BY s.Supplier_ID, s.SupplierName
ORDER BY avg_fulfillment_time_indays;
```

Supplier_ID	SupplierName	total_orders	avg_fulfillment_time_indays	total_order_value
4	DinginSejuk AC	1	2.0000	1800000.00
5	BatuPerkasa Masonry	1	2.0000	1500000.00
3	KayuMakmur Materials	2	2.5000	8700000.00
1	PipaJaya Supplies	2	5.0000	2975000.00
2	ElektroMegah Parts	2	5.0000	5250000.00

3/ Strategic Growth and Market Adaptation

Query 7: Certification Impact on Task Assignment

Since understanding how certifications affect task assignments can guide training initiatives, this query shows how different certifications correlate with task assignments and average bid amounts, helping identify valuable skills and potential areas for new course offerings.

```sql
-- Query 7: Certification Impact on Task Assignment
SELECT
    c.Course_ID,
    co.Course_Name,
    COUNT(DISTINCT t.Task_ID) AS assigned_tasks,
    AVG(b.Bid_Amount) AS avg_bid_amount
FROM CERTIFICATION c
JOIN COURSE co ON c.Course_ID = co.Course_ID
JOIN TRADESPERSON tp ON c.Tradesperson_ID = tp.Tradesperson_ID
LEFT JOIN TASK t ON tp.Tradesperson_ID = t.Tradesperson_ID
LEFT JOIN BID b ON t.Task_ID = b.Task_ID AND b.Tradesperson_ID = tp.Tradesperson_ID
GROUP BY c.Course_ID, co.Course_Name
ORDER BY assigned_tasks DESC;
```

Course_ID	Course_Name	assigned_tasks	avg_bid_amount
1	Basic Plumbing	2	900000.000000
2	Advanced Electrical	2	2250000.000000
3	Carpentry Fundamentals	2	3500000.000000
4	HVAC Essentials	1	1200000.000000
5	Construction Techniques	0	NULL

Query 8: User Specialization Trends

Since identifying popular trends can guide platform development and marketing efforts, this query shows the distribution of tradespeople across different specialization fields and their average bid amounts, helping identify high-demand and high-value skills.

```sql
-- Query 8: User Specialization Trends
SELECT
    co.Field,
    COUNT(DISTINCT c.Tradesperson_ID) AS tradesperson_count,
    AVG(b.Bid_Amount) AS avg_bid_amount
FROM COURSE co
JOIN CERTIFICATION c ON co.Course_ID = c.Course_ID
JOIN TASK t ON c.Tradesperson_ID = t.Tradesperson_ID
JOIN BID b ON t.Task_ID = b.Task_ID AND b.Tradesperson_ID = c.Tradesperson_ID
GROUP BY co.Field
ORDER BY tradesperson_count DESC;
```

Field	tradesperson_count	avg_bid_amount
Carpentry	1	3500000.000000
Electrical	1	2250000.000000
HVAC	1	1200000.000000
Plumbing	1	900000.000000

Query 9: Platform Value Creation

Since understanding revenue streams and growth patterns is crucial for strategic planning, this query provides a monthly breakdown of tasks, total bid values, and completed transaction values, offering insights into platform value creation.

```sql
-- Query 9: Platform Growth
SELECT
    YEAR(t.Posting_Date) AS year,
    MONTH(t.Posting_Date) AS month,
    COUNT(DISTINCT t.Task_ID) AS total_tasks,
    SUM(b.Bid_Amount) AS total_bid_value,
    SUM(CASE WHEN tt.Payment_Status = 'Completed' THEN b.Bid_Amount ELSE 0 END) AS completed_transaction_value
FROM TASK t
LEFT JOIN BID b ON t.Task_ID = b.Task_ID AND b.Bid_Status = 'Accepted'
LEFT JOIN TASK_TRANSACTION tt ON t.Task_ID = tt.Task_ID
GROUP BY YEAR(t.Posting_Date), MONTH(t.Posting_Date)
ORDER BY year, month;
```

year	month	total_tasks	total_bid_value	completed_transaction_value
2024	1	2	4000000.00	4000000.00
2024	2	3	3500000.00	800000.00
2024	3	5	7000000.00	0.00