

ASSIGNMENT ACTIVITY 4:

GIVEN:

A database in a retail chain:

SHOP(shopID, region, managerID, floorSize)
WORKER(workerID, workWhere, workerName, workerAddress)
DEPARTMENT(departmentID, managerID, salesQuota)
SCHEDULE(departmentID, workerID, date)

Implicit Handling of System Time:

```
CREATE TABLE SHOP (  
    shopID INT PRIMARY KEY,  
    region VARCHAR(100),  
    managerID INT,  
    floorSize INT,  
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,  
    updated_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP ON UPDATE  
    CURRENT_TIMESTAMP  
);
```

Explicit Handling of System Time:

```
INSERT INTO SHOP (shopID, region, managerID, floorSize, created_at, updated_at)  
VALUES (1, 'North', 101, 1500, NOW(), NOW());
```

Opportunities for Denormalization:

1. Combining SHOP and WORKER:

```
CREATE TABLE SHOP_WORKER (  
    shopID INT,  
    region VARCHAR(100),  
    managerID INT,  
    floorSize INT,
```

```

workerID INT,
workerName VARCHAR(100),
workerAddress VARCHAR(255),
created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
    updated_at  TIMESTAMP  DEFAULT  CURRENT_TIMESTAMP  ON  UPDATE
CURRENT_TIMESTAMP,
    PRIMARY KEY (shopID, workerID)
);

```

2. Combining DEPARTMENT and WORKER:

```

CREATE TABLE DEPARTMENT_WORKER (
    departmentID INT,
    managerID INT,
    salesQuota DECIMAL(10, 2),
    workerID INT,
    workerName VARCHAR(100),
    workerAddress VARCHAR(255),
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
        updated_at  TIMESTAMP  DEFAULT  CURRENT_TIMESTAMP  ON  UPDATE
CURRENT_TIMESTAMP,
    PRIMARY KEY (departmentID, workerID)
);

```

3. Combining SCHEDULE with DEPARTMENT and WORKER:

```

CREATE TABLE SCHEDULE_DEPARTMENT_WORKER (
    departmentID INT,
    workerID INT,
    date DATE,
    managerID INT,
    salesQuota DECIMAL(10, 2),
    workerName VARCHAR(100),
    workerAddress VARCHAR(255),
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
        updated_at  TIMESTAMP  DEFAULT  CURRENT_TIMESTAMP  ON  UPDATE
CURRENT_TIMESTAMP,
    PRIMARY KEY (departmentID, workerID, date)
);

```

Circumstances for Denormalization:

Implicit:

```
CREATE TABLE SHOP (  
    shopID INT PRIMARY KEY,  
    region VARCHAR(100),  
    managerID INT,  
    floorSize INT,  
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,  
    updated_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP ON UPDATE  
    CURRENT_TIMESTAMP  
);
```

Explicit:

```
CREATE TABLE SHOP (  
    shopID INT PRIMARY KEY,  
    region VARCHAR(100),  
    managerID INT,  
    floorSize INT,  
    created_at TIMESTAMP NOT NULL,           -- Explicitly set by application  
    updated_at TIMESTAMP NOT NULL           -- Explicitly set by application  
);
```