**Case Study: Manufacturing Quality Assurance System**

**Problem Statement:**

Design and implement a Manufacturing Quality Assurance System using Oracle SQL and PL/SQL. The system will be used to manage quality checks, defect tracking, and quality control processes. Your task is to create the necessary database schema, populate the database with sample data, and develop PL/SQL procedures to handle quality checks, defect management, and generating quality assurance reports.

**Requirements:**

1. **Quality Check Management**:
   * Implement the functionality to record and manage quality checks.
   * Ensure that each quality check has attributes such as CHECK\_ID, PRODUCT\_ID, CHECK\_DATE, CHECK\_RESULT, and NOTES.
2. **Defect Management**:
   * Implement the functionality to log and track defects identified during quality checks.
   * Ensure that each defect has attributes such as DEFECT\_ID, CHECK\_ID, DEFECT\_DESCRIPTION, SEVERITY, and STATUS.
3. **Quality Assurance Reports**:
   * Implement the functionality to generate quality assurance reports.
   * Reports should include details such as product quality trends, defect analysis, and quality control process effectiveness.

**Tasks:**

1. **Design the Database Schema**:
   * Create the QualityChecks, Defects, and QualityAssuranceReports tables with the appropriate fields and constraints.
   * Define primary keys and foreign keys to maintain data integrity.
2. **Populate the Database with Sample Data**:
   * Insert sample records into the QualityChecks and Defects tables to facilitate testing of the system.
3. **Develop PL/SQL Procedures**:
   * Create a procedure to handle recording quality checks. The procedure should insert a new quality check record and update the product's quality status.
   * Create a procedure to manage defects. The procedure should insert a new defect record, update defect status, and analyze defect trends.
   * Create a procedure to generate quality assurance reports. The procedure should aggregate data from quality checks and defects to provide insights into product quality.

**Expected Outcomes:**

1. **QualityChecks Table**:
   * Contains all information about the quality checks performed on products.
2. **Defects Table**:
   * Tracks the defects identified during quality checks.
3. **QualityAssuranceReports Table**:
   * Stores the generated quality assurance reports.
4. **PL/SQL Procedures**:
   * Efficiently manage quality checks, defect tracking, and generate quality assurance reports, maintaining accurate records in the database.

**Deliverables:**

1. SQL scripts to create the QualityChecks, Defects, and QualityAssuranceReports tables.
2. SQL scripts to insert sample data into the QualityChecks and Defects tables.
3. PL/SQL scripts for the procedures to handle quality checks, defect management, and generate quality assurance reports.
4. Documentation explaining how to set up and use the system, including how to run the PL/SQL procedures.

**Database Schema:**

1. **QualityChecks Table**:
   * **CHECK\_ID**: Number, Primary Key
   * **PRODUCT\_ID**: Number
   * **CHECK\_DATE**: Date
   * **CHECK\_RESULT**: Varchar2(50)
   * **NOTES**: Varchar2(255)
2. **Defects Table**:
   * **DEFECT\_ID**: Number, Primary Key
   * **CHECK\_ID**: Number, Foreign Key References QualityChecks(CHECK\_ID)
   * **DEFECT\_DESCRIPTION**: Varchar2(255)
   * **SEVERITY**: Varchar2(50)
   * **STATUS**: Varchar2(50)
3. **QualityAssuranceReports Table**:
   * **REPORT\_ID**: Number, Primary Key
   * **REPORT\_DATE**: Date
   * **REPORT\_CONTENT**: Clob

**Case Study Task:**

* **Design**: Create the database schema as provided.
* **Implement**: Insert sample data into the QualityChecks and Defects tables.
* **Develop**: Write PL/SQL procedures for handling quality checks, defect management, and generating quality assurance reports.
* **Test**: Test the procedures with various scenarios (e.g., performing quality checks, logging defects, generating reports, ensuring proper updates).