**Problem:** Factories often face challenges with the real-time monitoring and management of production equipment, leading to downtime, inefficiencies, and costly repairs. Without an integrated system, managers struggle to quickly add new machinery, detect anomalies, or scale operations smoothly. This leads to delays in production and increased maintenance costs.

**Solution:** The factory management system provides real-time tracking of equipment status, output speed, and other critical metrics. It automatically alerts the maintenance team when anomalies occur, reducing downtime. Managers can easily add new equipment or production lines through an intuitive interface, ensuring scalability. Compared to other solutions, this system offers better data-driven insights by storing historical performance data, allowing factory managers to optimize operations over time.

1. **Real-time monitoring** ensures immediate response to operational issues, minimizing production delays.
2. **Automated alerts** for anomalies help reduce maintenance response time, lowering downtime.
3. **Easy scalability** allows managers to add machines or production lines effortlessly as the factory grows.
4. **Historical performance data** gives managers better insights for predictive maintenance and operational improvements, leading to optimized production efficiency.
5. The intuitive interface simplifies management, enabling even non-technical users to effectively handle factory operations.

**Nouns:**

Factory, production equipment, production lines, operational status, performance metrics, machine, managers, machines, anomaly, maintenance team, historical data, scalability, alert, predefined conditions, downtime, response time.

**Verbs:**

Contain, monitor, track, add, modify, alert, stored, analyzed, optimizing operations.

**Rules:**

1. **Factories** will contain **production equipment** organized into multiple **production lines**.
2. The system will **monitor** and **track** the **operational status** and **performance metrics** of each **machine** in real-time.
3. **Managers** can **add** or **modify** the attributes of **machines** and **production lines**.
4. **Anomalies** (e.g., output speed drops or power outages) will trigger **alerts** for the **maintenance team**.
5. **Historical data** will be **stored** and **analyzed** to improve **scalability** and assist in **optimizing** **factory operations**.
6. **Alerts** will be sent when **predefined conditions** are met, reducing **downtime** and improving **response times**.

**Concept Diagram:**

图示

描述已自动生成

**ERD:**

图示

描述已自动生成

**BCNF:**

Factory (factory\_id → factory\_name)

ProductionLine (pl\_id → factory\_id)

Machine (machine\_id → pl\_id)

AnomalyRecord (record\_id → machine\_id, time, reason, fixed\_team\_id)

MaintenanceTeam (team\_id → team\_leader)

Assertions (assert\_id → machine\_id, cond\_id)

Condition (cond\_id → cond\_expr)