Manufacturing Workflow Management

Overview

In a factory setting, each part has an associated PDF file containing its fabrication drawing and its operational process chart (OPC). The production of a part progresses through a sequence of stages. At each stage, specific information is stored and validated before the next stage may begin.

Information Stored for Each Production Stage

For every stage in the process, the system records at least the following:

- **Workstation**: the station responsible for the current stage.
- **Required Operations**: the list of tasks that must be performed on the part at this stage.

Process Structure (OPC)

The process is hierarchical, with a strict precedence relation. In other words, a subsequent stage cannot start until all of its prerequisite (previous) stages are completed. Stage 1 must finish before Stage 2 is allowed to start, and so on, following the OPC dependency DAG.

Job Creation and Stage Activation

After a production order is placed for a given part, the system generates tasks for each relevant workstation in accordance with that part's process (OPC). When an operator at a workstation enters the required information and marks the stage as complete, the system activates the next stage for the next workstation in the sequence.

Data Captured at Runtime for Each Stage

During execution, the following data are stored for every stage:

- **Input Quantity**: the number of items entering the current workstation.
- **Timestamps**: the start date–time and the end date–time of the stage's operations.
- **Operator Identity**: operator's first name and last name.

Additionally, the stage form shall include a button that opens and displays the PDF drawing (fabrication map) of the part to the operator.

Reporting Requirements

The system shall provide at least the following reports:

1. **Completed Parts Report**: a report of parts whose manufacturing processes have been fully completed (all stages done).
2. **Repeat Orders Report**: a report listing parts that have been ordered more than once.

Optional Clarifications (Non-normative)

The following notes are suggested to guide implementation, but are not part of the formal translation:

- The OPC may be modeled as a directed acyclic graph (DAG) with explicit predecessor constraints for each stage.
- Stage activation can be implemented via state transitions (e.g., *Pending* $\rightarrow$ *Active* $\rightarrow$ *Completed*).
- PDF display can be implemented by storing a file path or a BLOB reference and rendering it in the operator UI on demand.