CMPE412 Final Project

Manufacturing System

Submitted By:
Emre Turan (CME)

Faculty of Engineering and Natural Sciences
Kadir Has University
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DESIGN

EventBased Simulation:

They consider events to be the forces that power the manufacturing process.

Some events are arrival of raw material, completion of goods production phase, machinery failure, and servicing.

The event are prioritized in priority queues based out of timestamps of the logs it addresses.

Production Line Modeling:

They include, supply of raw materials, production of the components, assembly of the parts, testing, and packaging.

Essentially, resources are provided depending on the production required or demand available.

Product Types:

A solution can satisfactorily cover different types of products.

It is important to note that each of the types has its own specific processing times, number of setups in the machines, and path in the production line.

Routing that depends on the sort of product that needs delivery.

Maintenance and Failure Handling:

To recreate the real-world experience, some machines are occasionally switched off at random time intervals.

It helps to minimize cases where production can stall when an organization is not prepared for a particular contingency.

IMPLEMENTATION

Event Processing:

They look into which event type and then into its type-specific logic for handling the event.

Arrival events as discussed above are interactive and ever-changing while other events take place at different times.

For the random occurrence of arrival events, it is standardized in terms of distribution by using exponential distribution.

Machine Failure and Maintenance:

It is disturbed randomly throughout the shift to mimic the experience of breakdowns in the field.

It is advisable to ensure that the failure is completely rectified so that it never occurs in the future again and hence the schedule maintenance period is fixed at certain intervals.

Product Routing and Setup Changes:

Setup changes take place when moving between products, i. e. from one product type to another.

Product specific routing allows how and where the production flows based on the type of product.

User Interaction:

Users can enter figures like, number of machines, time needed for setting up the machines, number of hours for maintenance.

Event logs also contain information about the occurrence of a certain event, the time it happened, and the type of event that occurred if it was a specific type of event.

FINDINGS / OUTPUTS

Throughput Optimization:

Adjust the number of machines and the time it takes to set them up to optimize for processing speed if possible.

Bottleneck Identification:

It is insightful to analyze the event log and other performance data and find process improvements.

Resource Utilization Analysis:

It also offers probability prediction to identify and analyze circumstances that can affect the scheduling of resources and allocation of machines.

Product Diversification:

Add new events and event processors for multiple products types processing.

Realistic Parameterization:

Such information as the time required for the processing, failure rate, and the time needed for maintenance improves the look and feel of a simulation.

Overall Impact:

Leads to improved understanding and practical decision for process improvement since simulation is used.

FINDINGS / OUTPUTS

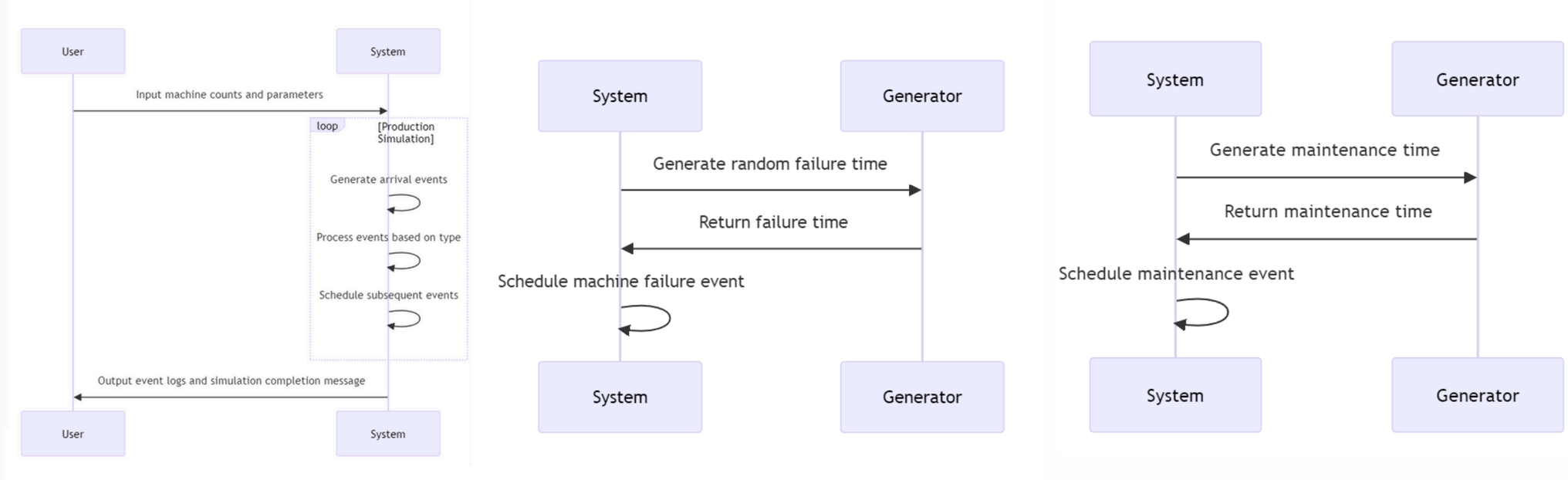

Figure 1. Sequence diagrams of the simulation

FINDINGS / OUTPUTS

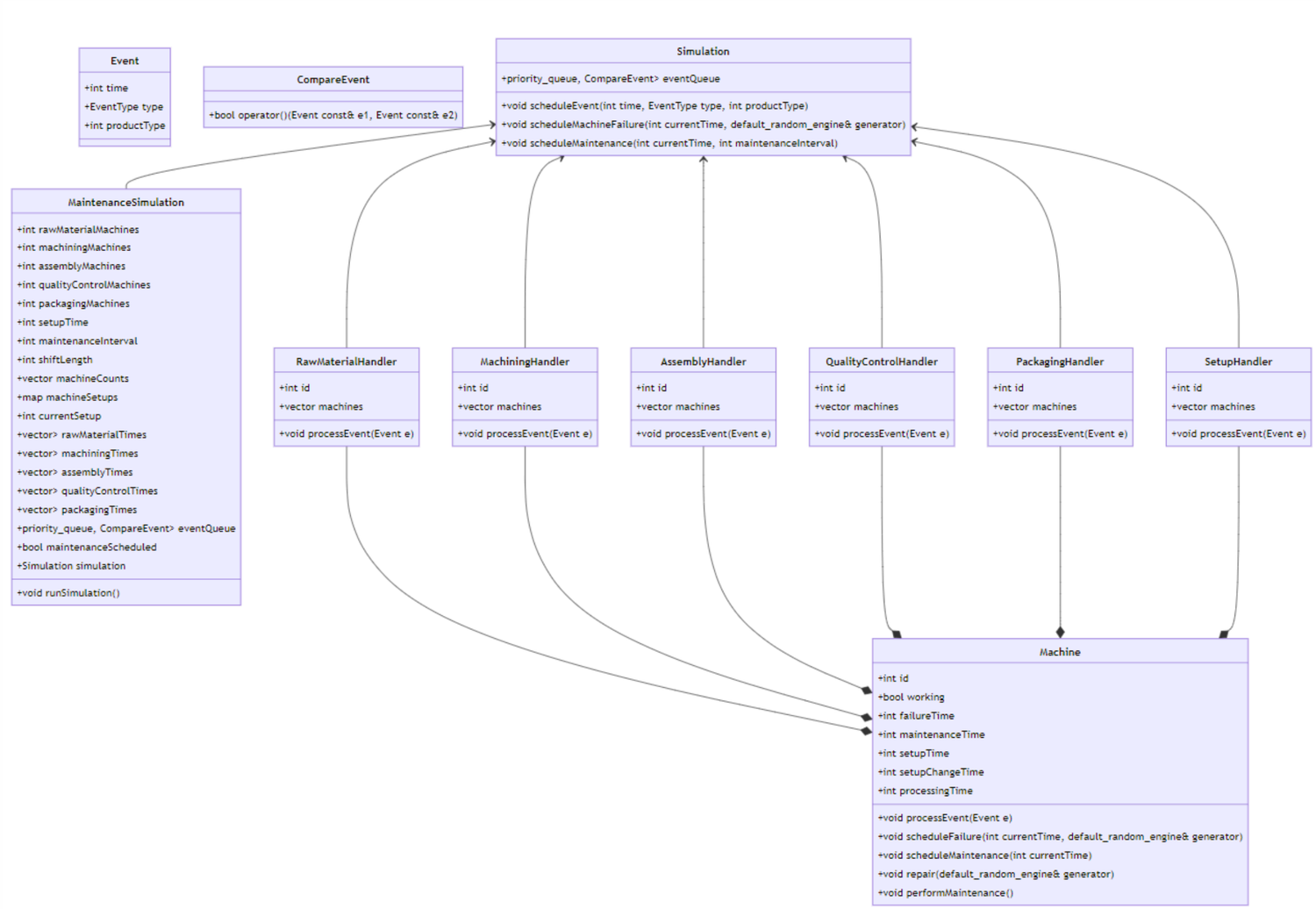

Figure 1. Class diagram of the simulation

CONCLUSION

- Studying manufacturing system by applying the event based simulation model that is easily adaptable to different forms of event occurrence.
- It is an easily measurable indicator that can easily be modified to fit a variety of situations or a variety of performance standards.
- Helps in differentiate system through put constraints and define the possible ways of generating more throughput within the applied resources.
- Accurate, descriptive, and realistic, which brings significant usefulness in decision-making for improving actual manufacturing systems.