

Operations Management Simulation

PROCESS ANALYTICS

FOR COURSES IN:

- **Operations Management**
- **Service Management**
- **Logistics**



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Operations Management Simulation: Process Analytics

Process Analytics provides an engaging, interactive environment for students to explore and master the fundamental concepts behind creating an effective operating process. Each discrete process is brought to life through an animated model. Problem sets guide students' exploration of the model.

Students develop their intuition by experimenting with different process parameters and observing how the effects play out in the animated models. They can test assumptions and validate results by calculating key performance metrics.

Process Analysis Simulation

prepare

analyze

customize

Problem 1 | Problem 2 | Problem 3 | **Problem 4** | Problem 5 | Problem 6 | Problem 7 | Problem 8 | Problem 9

Problem 4: Sub-Assembly: Asymmetrical

questions

process 1

process 2

Time
00:45
(hrs:mins)

Mode
Animated

Animation controls:
Speed:

[Clear Diagram](#)

Calculated

Calculate

[Show Results](#)

Process Metrics
Min Throughput Time (mins): 45.00
Cycle Time (mins): 15.00
Capacity per Hour: 4.00
Utilization: 73.33%

[Reset to Defaults](#)

Click on a workstation or inventory to configure its parameters.

Animated models allow students to visualize how changing parameters affect process flow.

▶ ANIMATED PROCESS MODELS

The simulation provides interactive tools for learning highly academic material. Students can animate each process model to study throughput time, cycle time, capacity, and utilization.

▶ WIDE VARIETY OF MODELS


Includes a wide variety of process models: three-step process, four-step process, batch process, sub-assembly process, inventory management, scrap and rework, random variations.

▶ EXAMINE BOTTLENECKS

Students can examine the causes of bottlenecks and learn how changing parameters such as batch size or inventory levels affects performance metrics.

PROBLEM SETS AND QUESTIONS

The simulation is organized around a multi-part problem set. Each problem in the set includes at least one process model and a series of questions designed to guide students' exploration of the scenario. The questions ask them to analyze changes in parameters, calculate metrics, or predict the change in performance measures. Through this guided exploration, students challenge their assumptions and develop intuition about the factors that improve or degrade product flow.



prepare
analyze
customize

Problem 1
Problem 2
Problem 3
Problem 4
Problem 5
Problem 6
Problem 7
Problem 8
Problem 9

Problem 8: Random Variation and Long Chains: Introduction

questions
process 1
line A
line B
line C
line D

Your Assignment

Please read the questions below and fill in your answers in the spaces provided.

For the processes in this assignment we will explicitly account for variability in process times, with those process times distributed according to a uniform distribution. Thus, a process time of 5 ± 1 minutes/unit indicated that there is equal probability that the process (machine or person) will have a process time of anywhere from four to six minutes/unit. There are no setups.

1. Consider an eight-workstation in-series line, with all workstation processing times at 5 ± 1 minutes per unit. Allocate 22 units of buffer capacity to this line so as to maximize average output. The best such allocation is characterized by:

For the rest of this part, consider four different production lines consisting of in-series workstations with no buffers between stations. The numbers under each workstation represent the process time per unit, in minutes.

2. Assuming that Line A has been operating for a while, the expected capacity of Line A is:

- ☐ A. Less than 6 units per hour
- ☐ B. Greater than 6 units per hour
- ☐ C. 6 units per hour
- ☐ D. Cannot be determined

Assignment questions guide students through different scenarios and test their knowledge.

CUSTOMIZATION OPTIONS

The simulation includes a complete problem set with nine problems with increasing levels of difficulty. Faculty can assign the supplied problems and questions or they can create new processes, design new problems, and write questions to support their particular course objectives.

In addition, faculty can allow students to create their own process models. With this additional flexibility, students explore specific aspects of process analytics in more depth at their own pace.

Model Editor

Select a Model: Process 1

Model My Process Edit

Raw Materials: Sugar Edit

Workstation: First Assembly Edit

Inventory: Hold for Inventory Edit

Workstation: Second Assembly Edit

Finished Goods Edit

Add None to My Process

Time

00:14
(hrs:mins)

Mode

Animated

Animation controls:

Speed:
Fast
Slow

[Clear Diagram](#)

Calculated

Calculate

[Show Results](#)

Process Metrics

Min Throughput Time (mins): 8.00

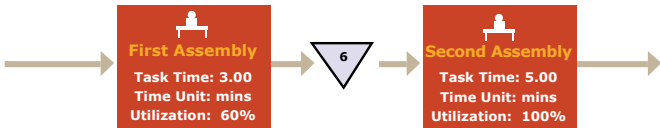
Cycle Time (mins): 5.00

Capacity per Hour: 12.00

Utilization: 80.00%

[Reset to Defaults](#)

Click on a workstation or inventory to configure its parameters.



Students can create their own models and test their own scenarios.

Administration Tools for Faculty

A comprehensive Facilitator's Guide covers key learning objectives, including:

- Exposing students to the fundamental concepts in process analytics in a dynamic, experiential manner.
- Increasing student intuition in understanding the interplay among the various elements of process analytics.
- Allowing students to learn process analysis through experimentation and through the proactive creation of simulation models.

Process Analytics offers:

- **Flexibility**—customize the problems and enable different model parameters to control the simulation environment.
- **Easy setup**—includes a complete problem set ranging from simple to complex.
- **Laboratory environment**—animated process models allow students to test assumptions and observe results.
- **Lecture tool**—use a particular problem to illustrate a point.

DESIGN AND EDIT PROBLEM SETS

Faculty can determine the level of difficulty and customize the student experience by designing their own process models and adding them to the problem set. They can also use custom models as lecture tools.

Faculty can customize the questions used in each problem set or create new questions to go along with any process model.

Process Analysis Simulation

class summary | **problems** | setup

assign problems | create/modify problem | delete problems

Create Problem

questions | models | Title: Three Step Process | Author: Professor Shapiro | Show Questions | Save | Edit a new problem

Your Assignment

Please read the questions below and fill in your answers in the spaces provided.
To begin, consider the three-step process model in the Process 1 tab. The process is staffed by three workers: Alice is assigned to step A, Bob is assigned to step B, and Charlie is assigned to step C. Please answer the questions below.

1. What is the cycle time of this process?

2. What is the capacity of this process?

3. What is the throughput time for a rush order (that is, an order arriving when the system is empty that is moved through the process without delay)?

Text Input Question Setup

Width: 250 | Max. Height: 22

HTML Question Text

What is the throughput time for a rush order (that is, an order arriving when the system is empty that is moved through the process without delay)?

Faculty can customize the simulation by creating their own problem sets.

Product #3291 | Single-player | Seat Time: approximately 90 minutes | Developed in partnership with Forio Business Simulations

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A **Preview** of the simulation is available on our web site at hbsp.harvard.edu.

A **Free Trial** allows full access to the entire simulation and is available to Premium Educators on our web site.

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