

# Computer Simulation

## Module 5: Arena

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Batch, Separate, and Record  
Modules

# Lesson Overview

Last Lesson: Looked at a bunch of ways to obtain information during and after the run – e.g., histograms, graphs, output reports.

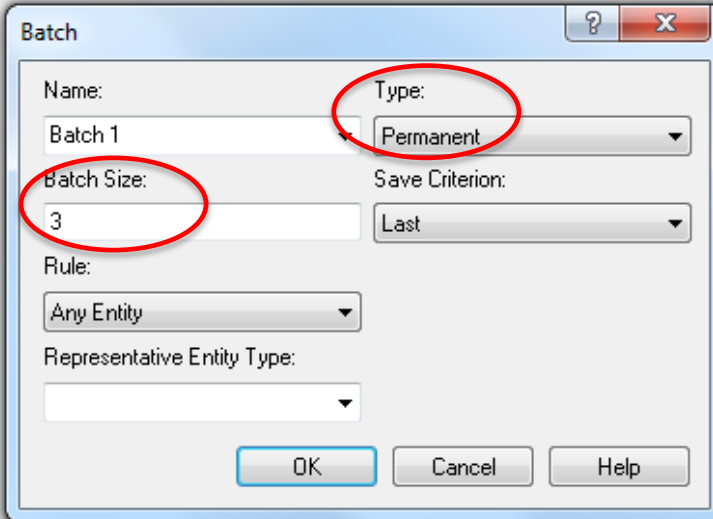
This Lesson: Discuss the Batch, Separate, and Record modules.

These are the last modules for the Basic Process template... We're making good progress!

# Batch Module

Batch

- Combine (“batch”) multiple customers into one “super”-customer.
- Batch Size = 3 accumulates 3 guys before sending off the super-customer.
- If info about the individual customers in a batch won’t be needed later on, then choose Type = Permanent.
- But if you want eventually to reconstitute the original members, set Type = Temporary.
- Temporary batches will need to be **split** before being Dispose’d (keep watching).



The screenshot shows a 'Batch' dialog box with the following fields and values:

- Name: Batch 1
- Type: Permanent (circled in red)
- Batch Size: 3 (circled in red)
- Save Criterion: Last
- Rule: Any Entity
- Representative Entity Type: (empty)

Buttons at the bottom: OK, Cancel, Help.

# Separate Module



Separate

- Duplicate a single entity, or split multiple entities that had been combined in a Batch module.
- If dealing with a **Permanent** batch, usually use Duplicate Original to get several customers all with the same attributes.
- If dealing with a **Temporary** batch, use Split Existing Batch to reproduce customers with original attributes.

The screenshot shows the 'Separate' dialog box with the following settings: Name: 'Separate 2', Type: 'Duplicate Original' (circled in red), Percent Cost to Duplicates (0-100): '50', and # of Duplicates: '1' (circled in red).

The screenshot shows the 'Separate' dialog box with the following settings: Name: 'Separate 1', Type: 'Split Existing Batch' (circled in red), Member Attributes: 'Retain Original Entry Values' (circled in red).

# Record Module



Record

- Collect statistics when an entity passes through the module.
- We'll talk more about this module as we encounter it in future examples.
- **Demo Time!** Now we'll look at a couple of permutations of the Batch and Separate modules.

# Summary

This Time: Finished off the Basic Resources template with the Batch, Separate, and Record modules.

Next Time: We'll look at a bunch of Run Setup and other control functionalities.

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Run Setup and Control

# Lesson Overview

Last Lesson: Finished off the Basic Resources template with the Batch, Separate, and Record modules.

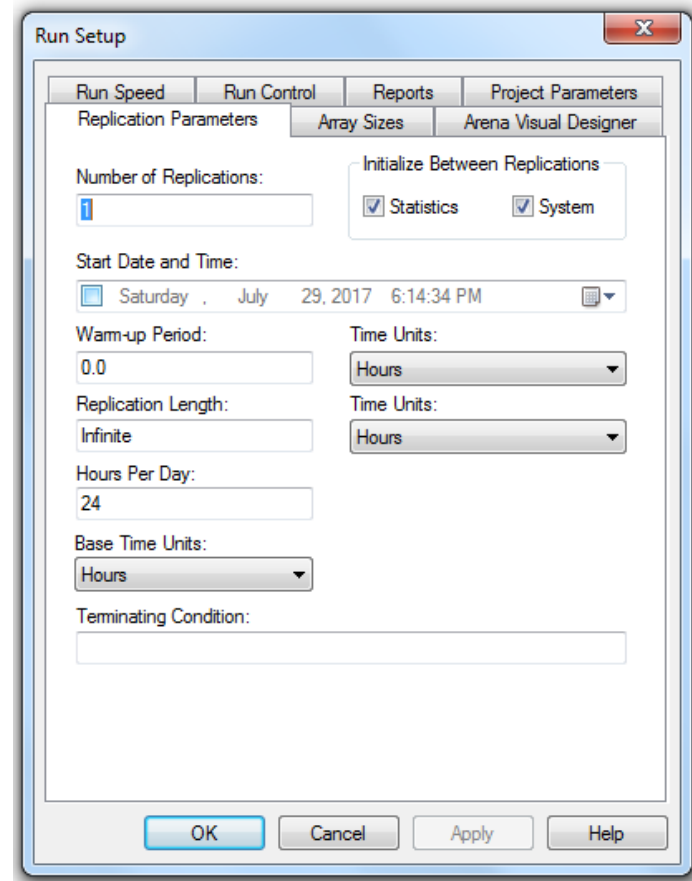
This Lesson: We'll be looking at a bunch of easy little trivia points to help you get your simulation runs going efficiently.



# Run Setup

Run > Setup gives you **lots** of stuff.

- Replication Parameters tab
  - Number of Reps: # of indep runs.
  - Initialize Between Reps: Do you start the stats collection and/or system state from scratch for each replication?
  - Warm-up Period: How long to run before you start keeping data.
  - Rep Length: How long each run is.
  - Terminating Condition: Any special ways to stop the simulation (besides rep length condition from this tab or max arrivals from Create module)?



# Run Setup (cont'd)

- Run Speed tab: Often need to speed up or slow down the simulation by more than what you can do on the main screen.
- Reports: Arena has a variety of reports that it gives upon completion of a run.
  - Contains info on customer waits, lengths of queues, server utilizations, user-defined variables, etc.
  - Category Overview summarizes all reps.
  - Category by Replication gives tedious info about each rep.
  - SIMAN Report gives concise text file.

ModelOut - Notepad

File Edit Format View Help

ARENA Simulation Results  
ISyE - License: STUDENT

Summary for Replication 1 of 10

Project: Unnamed Project  
Analyst: ISyE  
Run execution Model revision

Replication ended at time : 48.0 Hours  
Base Time Units: Hours

TALLY VARIABLES

Identifier	Average	Half width	Minimum	Maximum
Entity 1.VATime	1.0614	(Insuf)	.75651	1.0614
Entity 1.NVATime	.00000	(Insuf)	.00000	.00000
Entity 1.WaitTime	3.1369	(Insuf)	.00000	7.00000
Entity 1.TransTime	.00000	(Insuf)	.00000	.00000
Entity 1.OtherTime	.00000	(Insuf)	.00000	.00000
Entity 1.TotalTime	4.1983	(Insuf)	.92386	7.00000
Process 1.Queue.WaitingTime	3.1427	(Insuf)	.00000	7.00000

DISCRETE-CHANGE VARIABLES

Identifier	Average	Half width	Minimum	Maximum
Entity 1.WIP	3.9353	(Insuf)	.00000	8.00000
barber.NumberBusy	.98894	(Insuf)	.00000	1.00000
barber.NumberScheduled	1.0000	(Insuf)	1.0000	1.0000
barber.Utilization	.98894	(Insuf)	.00000	1.00000
Process 1.Queue.NumberInQueue	2.9463	(Insuf)	.00000	7.00000

OUTPUTS

Identifier	Value
Entity 1.NumberIn	45.000
Entity 1.NumberOut	44.000
barber.NumberSeized	45.000
barber.ScheduledUtilization	.98894

SIMAN report

# Run Control

Run > Setup > Run Control gives a variety of ways that you can run the simulation.

Example: Batch mode, which turns off all graphics and result in extremely fast runs.

Demo Time! Let's...

- Look at some reports.
- Stop the simulation the first time the queue size hits 4.

# Summary

This Time: Learned how to do various setup and run control tasks. For instance, we heard about independent reps, run termination from the setup menu, and output reports.

Next Time: A small case study for a two-channel manufacturing system, where we put a lot of the previous material together.