Business Process Modeling and Reengineering
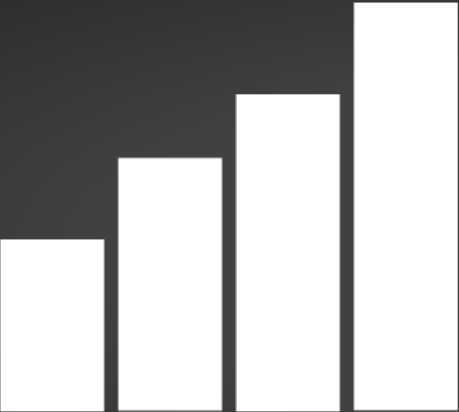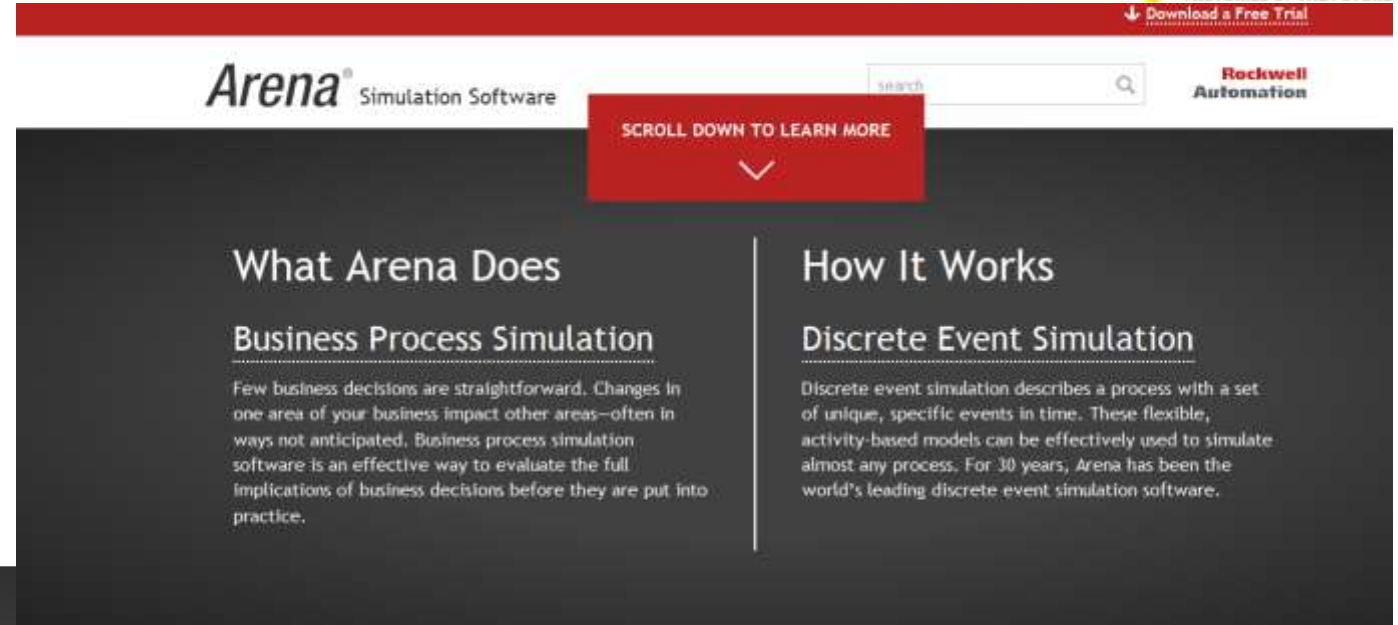
Module 2
Arena tutorial

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What is Arena?

Arena Simulation Software

SCROLL DOWN TO LEARN MORE

What Arena Does

Business Process Simulation

Few business decisions are straightforward. Changes in one area of your business impact other areas—often in ways not anticipated. Business process simulation software is an effective way to evaluate the full implications of business decisions before they are put into practice.

How It Works

Discrete Event Simulation

Discrete event simulation describes a process with a set of unique, specific events in time. These flexible, activity-based models can be effectively used to simulate almost any process. For 30 years, Arena has been the world's leading discrete event simulation software.

Arena

World's Leading Discrete Event Simulation Software for 30 Years!

- Arena is utilized by a majority of Fortune 100 companies.
- Arena is taught in more global universities than any other discrete event simulator.
- More than 25,000 students graduate yearly with Arena training.

https://www.arenasimulation.com/

Arena workspace

Toolbars

File management

View

Simulation controls

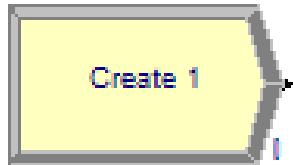**Draw, text, colours…**

Animation

Project bar

Flowchart module:
The flowchart view is a canvas to draw the process flow of entities using modules from the project bar. It can also have the animation and other drawing elements
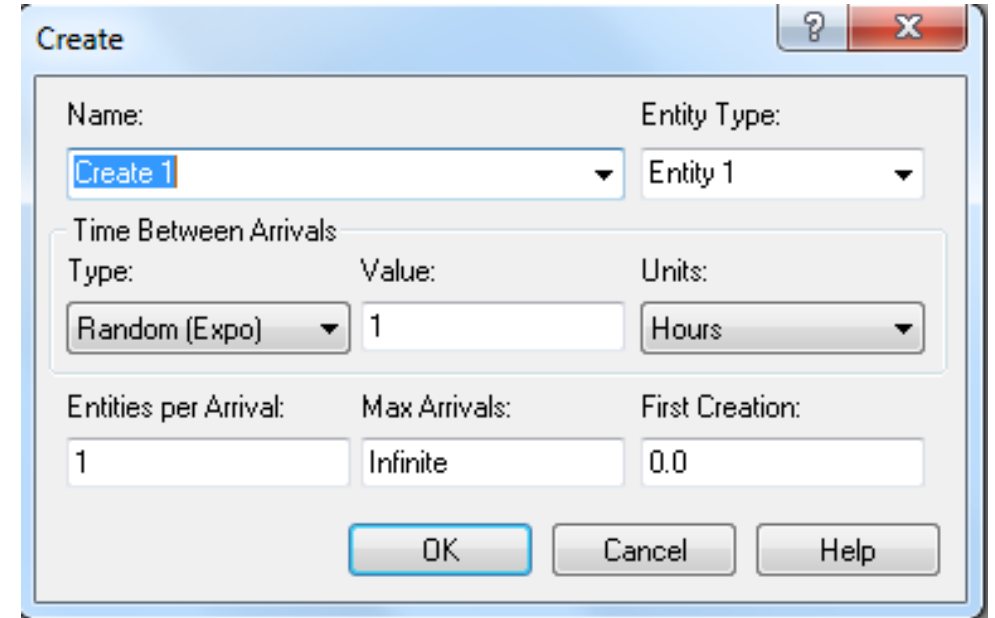
Data module:
The spreadsheet view displays the properties of selected module in the flowchart view or the project bar.
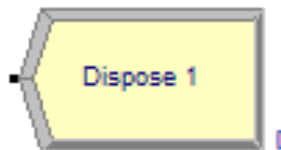
Some Arena modules

Create:
Entities enter the simulation here.

Dispose:
Entities are removed from the simulation here

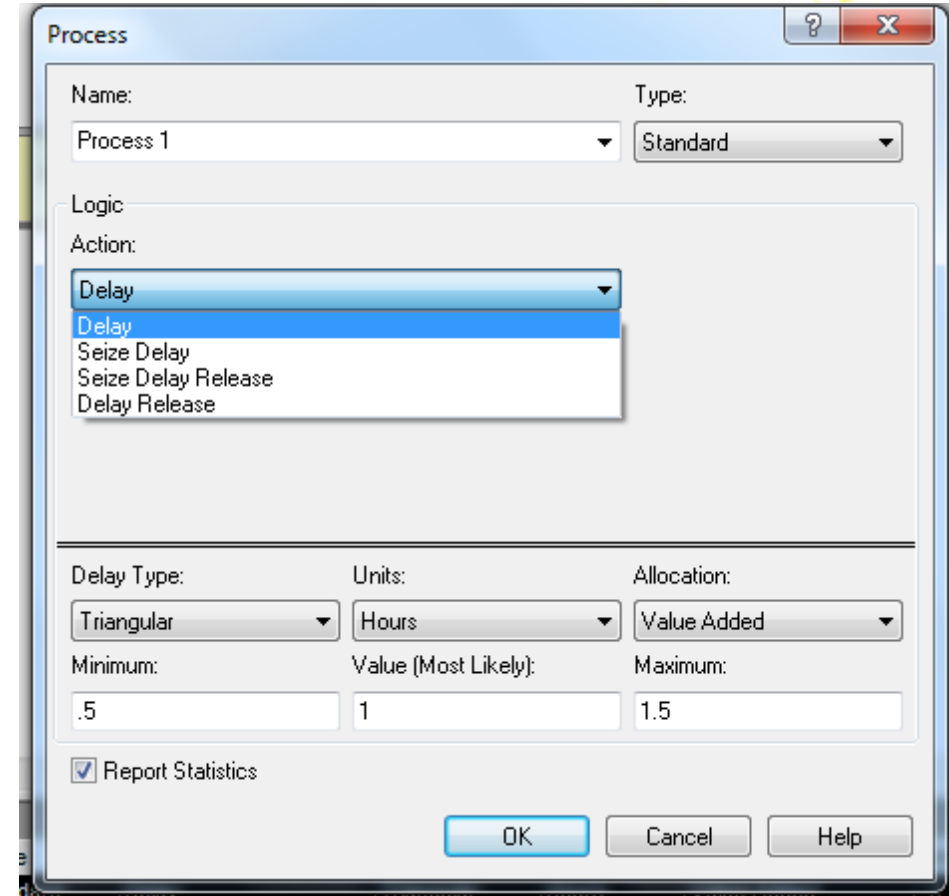# Some Arena modules
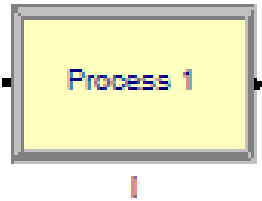
Process:
An activity, usually performed by one or more resources and requiring some time to complete

Seize Delay Release: the arriving entity seizes some number of units of a resource, then is delayed for a time, and then releases the resource

Delay: the arriving entity is simply delayed for some time and no resource is required

Seize Delay: seizes the resource and then is delayed, but does not release the resource

Delay Release: assuming that the resource is seized previously, the entity is delayed and then the resource is released
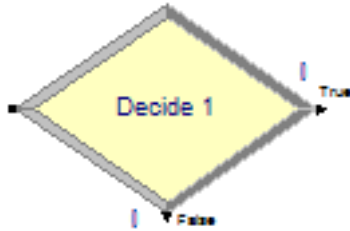
Some Arena modules

Decide:
A branch in entity flow. Only one branch is taken.
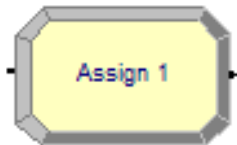
Assign:
Change the value of some parameter (during the simulation), such as the entity's type or model variable
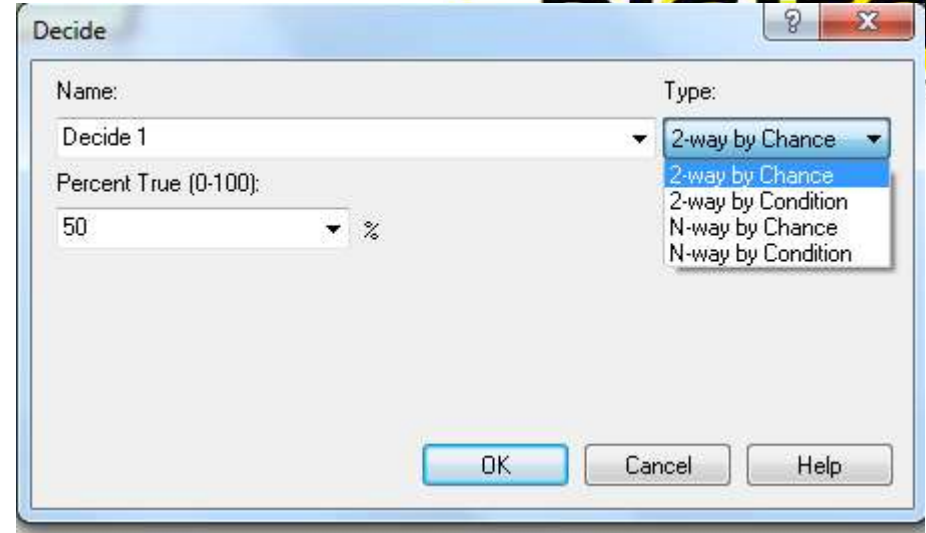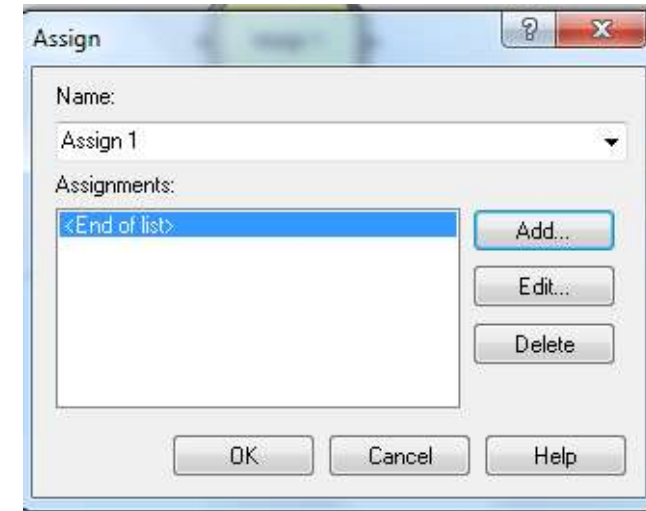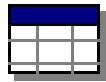
Some Arena modules

Entity

		Entity Type	Initial Picture	Holding Cost / Hour	Initial VA Cost	Initial NVA Cost	Initial Waiting Cost	Initial Tran Cost	Initial Other Cost	Report Statistics
1	▶	Entity 1	Picture.Report	0.0	0.0	0.0	0.0	0.0	0.0	☑

Entity - Basic Process

Double-click here to add a new row.

Entity/Resource:
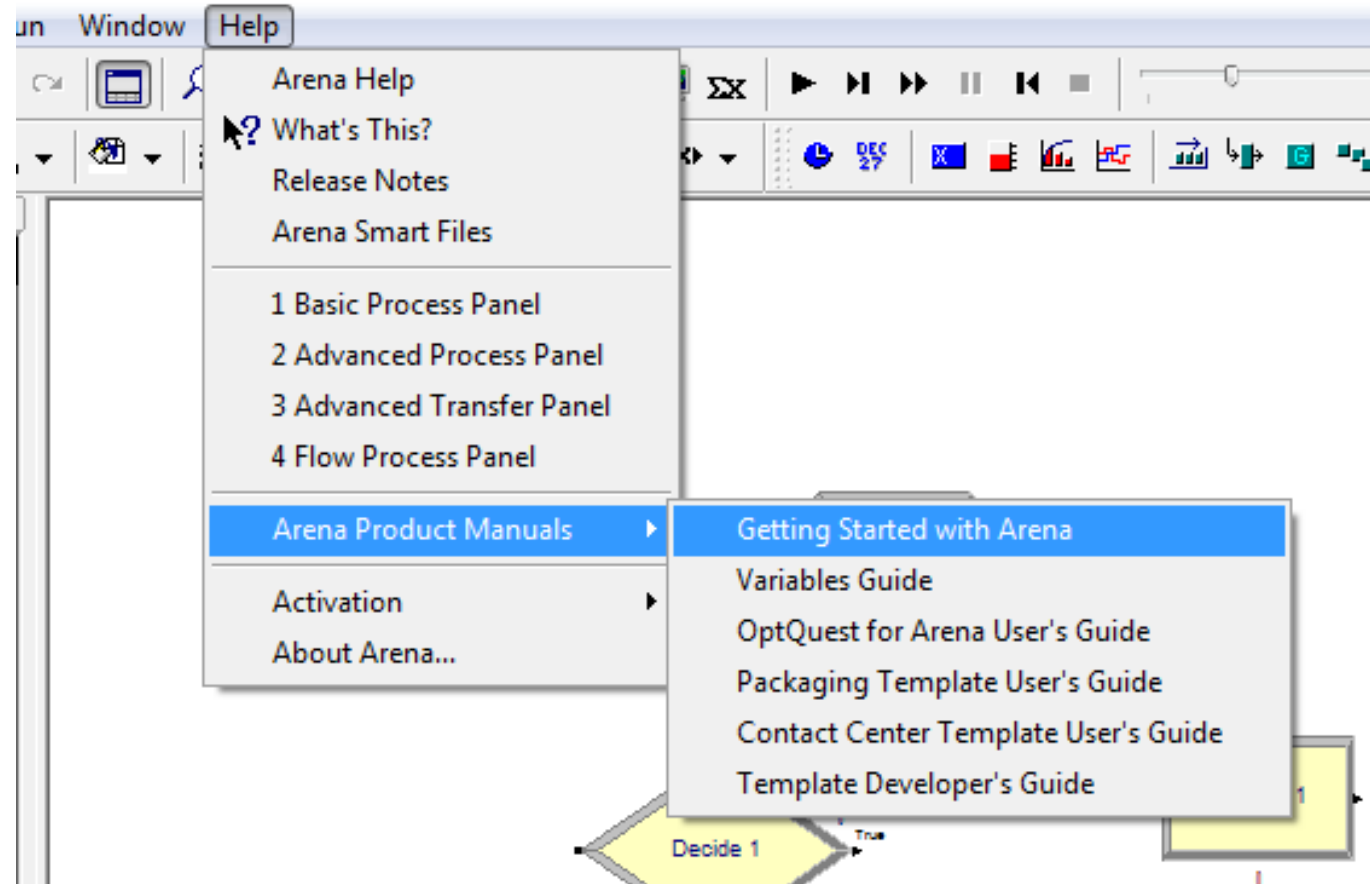Shows the tables through which it is possible to modify resources properties

Resource

Resource - Basic Process

		Name	Type	Capacity	Busy / Hour	Idle / Hour	Per Use	StateSet Name	Failures	Report Statistics
1	▶	Resource 1	Fixed Capacity ▼	1	0.0	0.0	0.0		0 rows	☑

Fixed Capacity
Based on Schedule

Double-click here
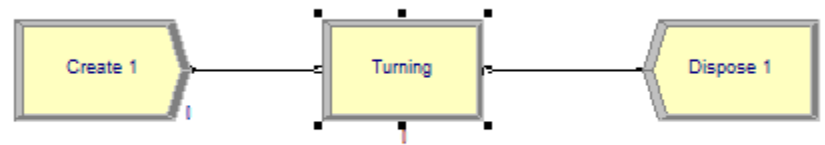
For further information

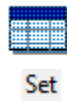# Example

- Model a machining process

Common problems – Resources working in parallel

- Define each resource (machine1, machine2)

- Group the resources into a set (set machines)

- In the process assign a «set».

Example

- **Simulation of a production process:**

- Assembly: usual duration 1,2 hours, max 1,5 hours, min 0,5 hours. Performed by assemblers

- Test: usual duration 0,5 hours, max 1 hours, min 0,2 hours. . Performed by tester

- Final preparation: usual duration 15 min, max 18 min, min 10 min. Performed by assemblers

- **Resources:**

- 2 assemblers working from 8.00 to 12.00 and from 13.00 to 17.00

- 1 tester working from 9.00 to 13.00 and from 14.00 to 18.00

- **Demand:**

- Random every 45 minutes 1 arrival

- In the 95% of cases the assembled product passes the test. In it does not pass the test, a new test is done. The probability to pass this new test is 50%. If the assembled product does not pass the second test is it discarded.
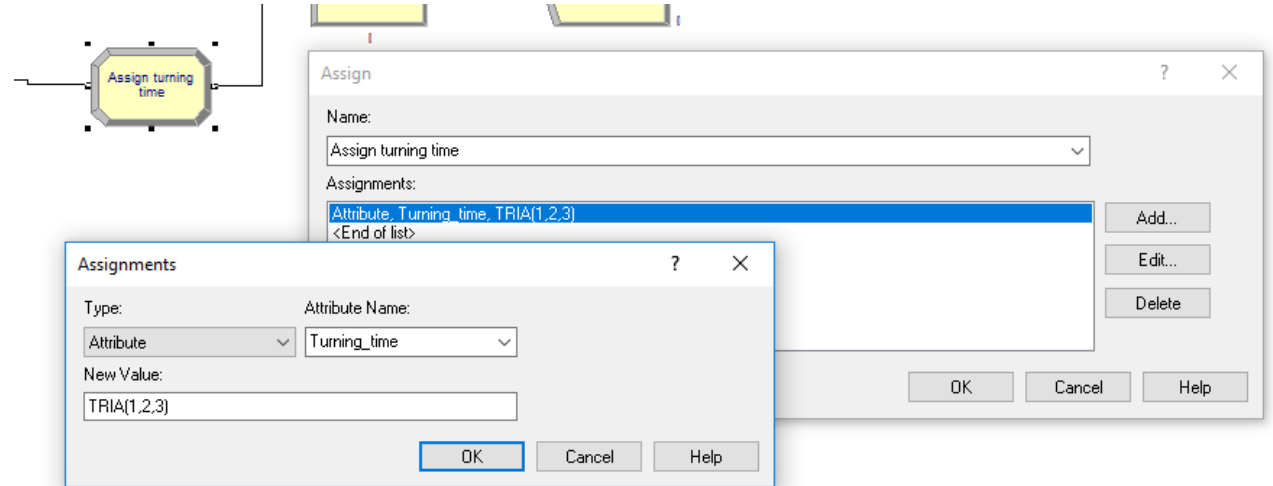
Common problems – different processing time

- Model the machining process of two pieces A and B.

- Both of them have to move through the «turning» activity but the time they spend in the process is different

- Entity type A: turning process (1h, 2h, 3h)

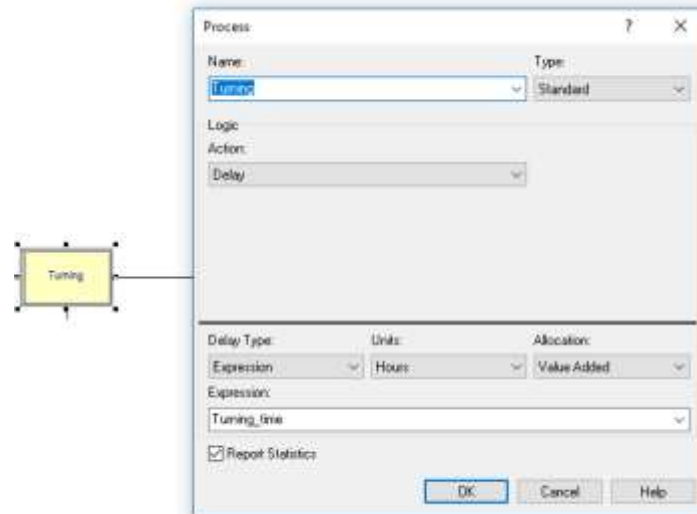- Entity type B: turning process (0.5 h, 1h, 1.5h)
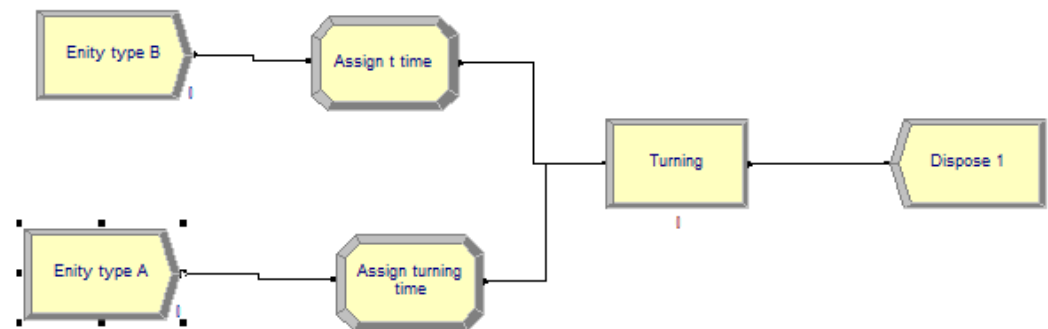
Common problems – different processing time

- «Assign module» is used to set an attribute that defines the process duration for each type of entity

- The activity duration inside the process module is defined as the name of the attribute previously defined
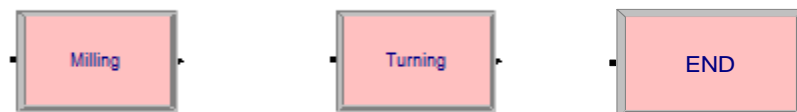
Common problems– Different sequence of activities for different type of entities

- This is how the process works in case both entity type A and B follow the same process
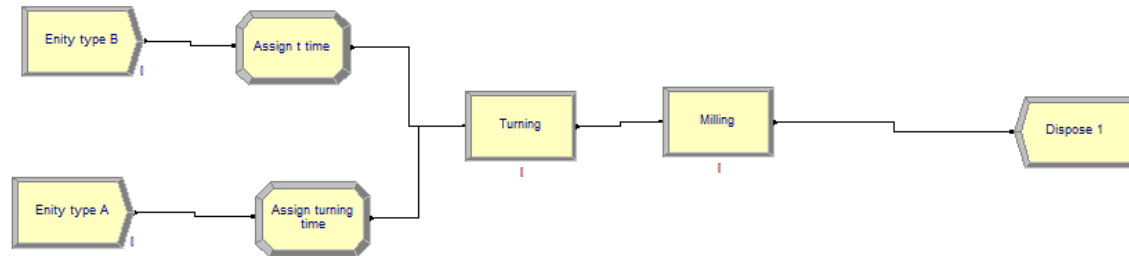

- In case entity type A and B follow different sequence of activities the «process» module must be substituted by «station» module
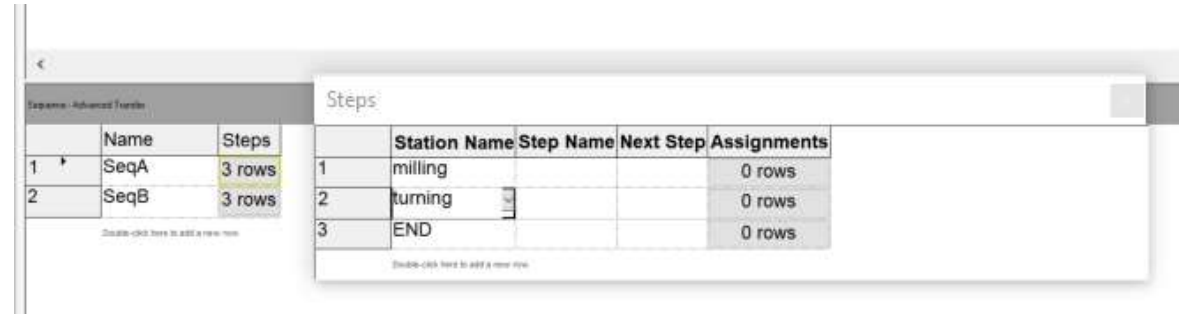
How to use the «station» module

- Define all the possible «stations» of the model (milling, turning, end)
- Add «processes» or «dispose» modules after «stations» modules
- Assign the attributes to entity A and B (turning time, SeqA, SeqB). For the sequence, assign an attribute name called «Entity.Sequence»
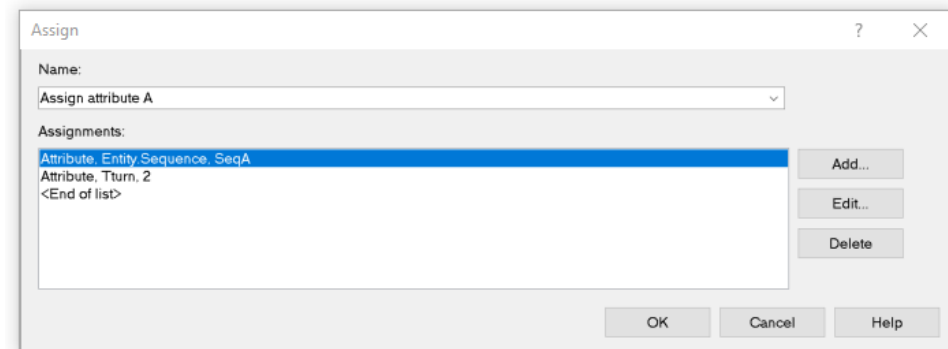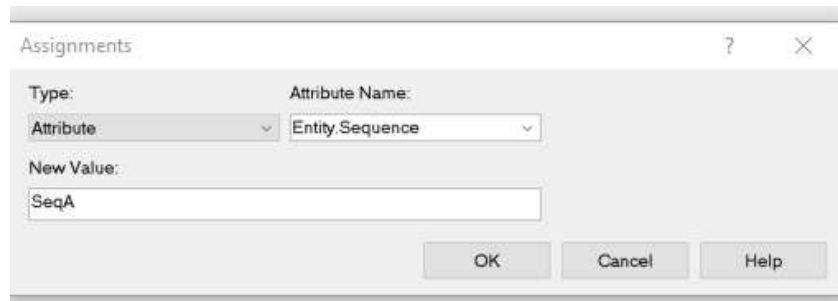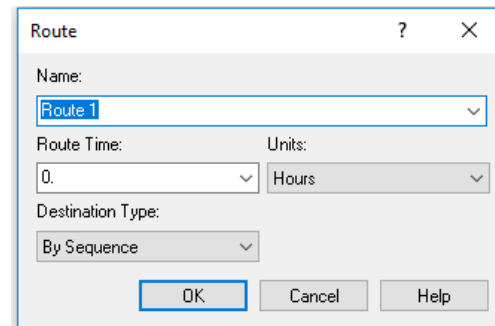
How to use the «station» module

Define the sequence of activities for each single entity type in the data module «sequence» (Advance transfer template)

Use the «route» modules to guide the entity process. Set «destination type» «by sequence».

How to use the «station» module

- The model works as following: