ARENA
Panel Modules

This Hypercard stack was prepared by:
Dennis L. Bricker,
Dept. of Industrial Engineering,
University of Iowa,
Iowa City, Iowa 52242
e-mail: dennis-bricker@uiowa.edu

author

Common Panel Modules

- Actions
- AdvServer
- Animate
- Arrive
- Container
- Depart
- Enter
- Expressions
- Inspect
- Leave
- Menu
- Process
- Queue
- Recipes
- Resource
- Sequences
- Server
- Sets
- Simulate
- Statics
- Statistics
- Storage
- Variables

Action Module

The Actions module provides the capability to specify repeatable actions, or tasks, that an entity will go through at a given station. these actions include such items as assigning attributes or variables; getting and giving up resources, transporters, or conveyors; delaying; batching and unbatching; and waiting for and sending signals.

AdvServer (Advanced Server)

The Advanced Server (AdvServer) module is essentially the Enter, Process, and Leave modules combined into one module. An entity enters a station, obtains a server, experiences a processing delay, gives up the server, and is transferred to another station or the next connecting module.

Animate Module

The Animate module is used to demonstrate the status of the simulation system graphically. It includes animation constructs from the Animate toolbar for items such as resources, transporters, conveyors, queues, storages, stations, variables, and statistics. the particular object status may be shown graphically in a number of ways, including variables, plots, histograms, and levels.

Arrive Module

The Arrive module creates entity arrivals to the system and transfers each entity to another station or to the next connecting module.

Container Module

The Container module provides the capability to model continuous processes such as tanks and containers. Containers may be specified as one of three types: Source, Transfer, or Sink, each with different characteristics.

Depart Module

The Depart module collects statistics and disposes of entities.

Enter Module

The Enter module defines a station corresponding to a physical or logical location where processing occurs and is the first third of the Advanced Server module. An entity is transferred to an Enter module either by entering the station associated with the module or by a connection to the Enter module's label. After entering the module, an unloading delay can be specified and the entity may give up any transfer device used to transfer the entity.

Expressions Module

The Expressions module defines expression names and their associated value(s) for use in the model.

Inspect Module

The Inspect module includes the functionality of the Server module with two areas for entity departure. A probabilistic sample is taken to determine which of the two departures-- "passed" or "failed" -- is taken.

Leave Module

The Leave module transfers an entity to another station or the next connecting module and is the final third of the Advanced Server module. Transfer of entities out of the Leave module may require a transfer device such as a resource, transporter, or conveyor.

Menu Module

The Menu module may be used to develop a front-end menu system for a simulation model. Multiple Menu modules may be placed together to incorporate multiple levels of menus, depending upon the number of user options desired. A menu may be generated at the start of the simulation model as a one-time menu or may be triggered during the simulation run by a system event or keystroke.

Process Module

The Process module is used to define the processing that is to occur at a station and is the middle third of the Advanced Server module. Arriving entities wait to obtain a server and experience a processing delay. Overlapping resources may be released and seized in conjunction with the server in the Process module in order to model blocking within the modeled system. The server is given up after obtaining any overlapping resource.

Queue Module

Each placement of the Queue module defines one queue and generates its animation. This module is used to define queue element information (e.g., the queue ranking rule). In the Arena template, a queue element is created automatically by any module that references a queue so that, typically, the Queue module is not needed. However, some modules do not include the full set of queue element characteristics; the Queue module may be placed to

Recipes Module

The Recipes module defines recipe names and provides values for the statics that are to be associated with the recipe.

Resource Module

Each placement of the Resource module defines one resource and its associated animation. This module is used to define resource element information (e.g., the resource capacity). In the Arena template, a resource element is automatically created by any module that references a resource so that, typically, the Resource module is not needed. However, some modules do not include the full set of resource element characteristics (e.g., those that reference

Sequences Module

The Sequences module defines an ordered list of stations that an entity visits, as well as attribute, variable, or static assignments that are to be made at each of the stations in the sequence.

Server Module

The Server module is a simplified version of the Advanced Server module. In the Server module, an entity enters a station, seizes a server resource, experiences a processing delay, releases the server resource, and is transferred to another station or to the next connecting module.

Sets Module

The Sets module defines set names and their members.

Simulate Module

The Simulate module defines information related to simulation execution, such as the number of replications and replication run length. It also provides a default animation picture for entities in the model.

Statics Module

The Statics module defines static names and their associated default values. Statics are used in conjunction with recipes.

Statistics Module

The Statistics module defines system statistics to be collected. Most statistics are collected automatically in other modules. For example, resource statistics are collected for the server resource in a Server module. However, the Statistics module permits definition of additional statistics to be collected. Also, the Statistics module is used to define the output data file to which observations of a statistic are to be written for analysis in the Arena Output

Storage Module

Each placement of the Storage module defines one storage and its associated animation. In the Arena template, a storage element is created automatically by any module that references a storage so that, typically, the Storage module is not needed. However, some modules do not include storage animation; the Storage module may be used in these cases.

Variables Module

The Variables module creates user-defined variables and establishes their initial value(s). In the Arena template, modules that assign values to user-defined variables also create the associated variable element. However, if a variable's initial value is non-zero or if it is an array, the Variables module may be used to define the initial value and/or the size of the array.

Support Panel Modules

- Assign
- Batch
- Chance
- Choose
- Count
- Create
- Delay
- Dispose
- Duplicate
- Match
- PickQueue
- PickStation
- Read
- Release
- Seize
- Signal
- Split
- Station
- store
- Tally
- Unstore
- Wait
- Write

Assign Module

The Assign module allows assignment of a value to an attribute, variable, picture, or resource state.

Batch Module

The Batch module collects entities into either a temporary or permanent group that is represented by a single entity.

Chance Module

The Chance module permits an entity to be redirected to exactly one module from among one or more specified modules based on a random probability.

Choose Module

The Choose module permits an entity to be redirected to one or more different modules based on one or more true/false conditions. The arriving entity always takes the first true condition. For all other true conditions up to the specified maximum, duplicates of the arriving entity are sent to the specified modules.

Count Module

The Count module increments or decrements a counter by an integer quantity.

Create Module

This module creates entity arrivals to the system and allows the assignment of values to attributes, pictures, and variables.

Delay Module

This module delays the entity by a specified amount of time.

Dispose Module

This module removes the entity from the system.

Duplicate Module

The Duplicate module creates one or more exact replicas of the arriving entity and sends the duplicates to specified modules.

Match Module

The Match module permits between two and five entities waiting in different queues to be matched together. Matching involves waiting for one entity to be available in each of the specified queues. Optionally, entities can be matched together only if they have the same value for a specified attribute.

PickQueue Module

The PickQueue module allows an entity to select a queue based on a specified criterion. The entity is then sent to the module containing the queue.

PickStation Module

The PickStation module allows an entity to select a station from among multiple stations based on a specified criterion involving the number of entities transferring to the stations, the number of entities in queues at the stations, the status of resources at the stations, and additional user-defined expressions.

Read Module

When an arriving entity enters a Read module, the specified data is read from an input file or from the keyboard. This data can be assigned to variables, attributes, or pictures.

Release Module

The Release module is used to release units of a resource that an entity previously had seized. The Release module may be used to release individual (simple) resources or may be used to release resources declared in a set. For each resource to be released, the name and quantity to release are specified. When the entity enters the Release module, it gives up control of the specified resource(s). Any entities waiting in queues for those

Seize Module

This module seizes one or more capacity units of one or more specified resources.

Signal Module

The Signal module sends a signal that releases entities waiting at Wait modules.

Split Module

This module splits apart a temporary batch of entities that was formed using the Batch module, removing the arriving representative entity from the model.

Station Module

The Station moudle represents a point in the model to which entities are transferred.

Store Module

The Store module adds an entity to a storage. Storages are often used to animte entities.

Tally Module

The Tally module records observations to a specified tally element.

Unstore Module

The Unstore module removes an entity from a storage.

Wait Module

The Wait module holds entities until a signal code is received.

Write Module

When an entity enters a Write module, the specified data is written to the screen, a specified file, or to the summary report.