

Library Classes – API Changes

(Status 6-11-2014)

The recent introduction of new tools for developing and simulating POOSL models included changes in the API of several library classes, covering common data structures, distributions and performance monitors. A new version for such libraries has been introduced with the new version of the POOSL language (API version 3.0) as available from <http://poosl.esi.nl/support/libraries.dot>.

Data Structures

The following changes to the library of data structures have been made:

| API Version 2.0 Based | API Version 3.0 Based | Remarks |
|-----------------------|-----------------------|-----------------------------|
| Matrix | Array2D | Renamed, Changed & Extended |
| Queue* | Queue | Changed & Extended |
| Queue* | Stack | Changed & Extended |
| Dictionary | Map | Renamed, Changed & Extended |
| | Collection | New |
| | Bag | New |
| | Set | New |
| | Sequence | New |
| | Iterator | New |
| | MapIterator | New |
| | CollectionIterator | New |
| | BagIterator | New |
| | SequenceIterator | New |
| | Element | New |
| | MapElement | New |
| QueueElement | StructureElement | Renamed & Changed |
| | CollectionElement | New |

The next sections give an overview of the changes to the methods for the data structure classes. In all cases where Basic Modifications have been made, checks on the type of parameter objects have been added to improve robustness and provide more useful error messages. The original Queue class served as a means to create a First-In-First-Out or Last-In-First-Out ordered list. These variants have been split in a new Queue class (First-In-First-Out ordering) and Stack (Last-In-First-Out ordering).

Array2D (Replaces Matrix)

| API Version 2.0 Based | API Version 3.0 Based | Remarks |
|-----------------------|-----------------------|---------|
| | size | New |

| | | |
|-------------|-------------|-------------------------------|
| | rows | New |
| | columns | New |
| size | resize | Renamed & Basic Modifications |
| get | at | Renamed & Basic Modifications |
| put | putAt | Renamed & Basic Modifications |
| putAll | putAll | Basic Modifications |
| printString | printString | Minor Changes |
| getSize | | Deprecated |
| help | | Deprecated |

Queue (Replaces Queue with First-In-First-Out Ordering)

The original Queue class served as a means to create a First-In-First-Out or Last-In-First-Out ordered list. These variants have been split in a new Queue class (First-In-First-Out ordering) and Stack (Last-In-First-Out ordering). The following list compares against the new Queue class.

| API Version 2.0 Based | API Version 3.0 Based | Remarks |
|-----------------------|-----------------------|-------------------------------|
| | clear | New |
| setSize | resize | Renamed & Basic Modifications |
| getSize | size | Renamed & Basic Modifications |
| occupation | occupation | No Changes |
| | isEmpty | New |
| | isFull | New |
| | excludes | New |
| | includes | New |
| | count | New |
| put | add | Renamed |
| inspect | inspect | No Changes |
| remove | remove | No Changes |
| printString | printString | Minor Modifications |
| getPolicy | | Deprecated |
| init | | Deprecated |
| help | | Deprecated |
| isNotEmpty | | Deprecated |
| isNotFull | | Deprecated |
| setPolicy | | Deprecated |

unboundedSize

Deprecated

Stack (Replaces Queue with Last-In-First-Out Ordering)

The original Queue class served as a means to create a First-In-First-Out or Last-In-First-Out ordered list. These variants have been split in a new Queue class (First-In-First-Out ordering) and Stack (Last-In-First-Out ordering). The following list compares against the new Stack class.

| API Version 2.0 Based | API Version 3.0 Based | Remarks |
|-----------------------|-----------------------|-------------------------------|
| | clear | New |
| setSize | resize | Renamed & Basic Modifications |
| getSize | size | Renamed & Basic Modifications |
| occupation | occupation | No Changes |
| | isEmpty | New |
| | isFull | New |
| | excludes | New |
| | includes | New |
| | count | New |
| put | push | Renamed |
| inspect | inspect | No Changes |
| remove | pop | No Changes |
| printString | printString | Minor Modifications |
| getPolicy | | Deprecated |
| init | | Deprecated |
| help | | Deprecated |
| isNotEmpty | | Deprecated |
| isNotFull | | Deprecated |
| setPolicy | | Deprecated |
| unboundedSize | | Deprecated |

Map (Replaces Dictionary)

The new data class Map is based on a double linked list structure instead of Arrays.

| API Version 2.0 Based | API Version 3.0 Based | Remarks |
|-----------------------|-----------------------|---------|
| | = | New |
| | != | New |
| | clear | New |
| | isEmpty | New |

| | | |
|-------------|---------------|-------------------------------------|
| occupation | size | Renamed |
| | iterator | New |
| includesKey | includesKey | No Changes |
| | includesValue | New |
| keys | keys | Result is a Set instead of an Array |
| values | values | Result is a Bag instead of an Array |
| atPut | putAt | Renamed |
| at | at | No Changes |
| removeKey | removeAt | Renamed |
| printString | printString | Minor Modifications |
| find | | Deprecated |
| help | | Deprecated |
| init | | Deprecated |

StructureElement (Replaces QueueElement)

The new library of data structures relies on a different set of supporting data classes to store elements. The new data classes StructureElement is closes to the original QueueElement class.

| API Version 2.0 Based | API Version 3.0 Based | Remarks |
|-----------------------|-----------------------|------------------------|
| getNext | next | Renamed (Inherited) |
| getPrevious | previous | Renamed (Inherited) |
| setNext | setNext | No Changes (Inherited) |
| setPrevious | setPrevious | No Changes (Inherited) |
| getElement | element | Renamed |
| setElement | setElement | No Changes |
| printString | printString | Minor Modifications |
| help | | Deprecated |

Random Distributions

The following changes to the library of random distributions have been made:

| API Version 2.0 Based | API Version 3.0 Based | Remarks |
|-----------------------|-----------------------|----------------------------------|
| Distribution | Distribution | Cleaned ¹ |
| Bernoulli | Bernoulli | Basic Modifications ² |

| | | |
|-----------------|-----------------|--------------------------------------------|
| | Beta | New |
| | Beta4 | New |
| DiscreteUniform | DiscreteUniform | Basic Modifications ² |
| Exponential | Exponential | Basic Modifications ² |
| Gamma | Gamma | Basic Modifications ² |
| GenericDiscrete | Discrete | Renamed & Basic Modifications ² |
| Normal | Normal | Basic Modifications ² |
| | PERT | New |
| | Triangle | New |
| Uniform | Uniform | Basic Modifications ² |
| | Weibull | New |
| | Histogram | New ³ |

The changes in the API for these distributions classes are as follows:

- 1) The Distribution class is cleaned by removing the “help” and “ofType” methods. Explanation of using the distributions is available as comments in the library. The new Distribution class is to be considered as an abstract super class of all other distributions. Instances of the various distributions can no longer be created through method “ofType”.
- 2) The class is cleaned by removing the “help” method. Furthermore, method “withParameter” or “withParameters” has been made more robust to using them with incorrectly typed parameters.
- 3) The new Histogram class allows obtaining a histogram for measurements of random numbers.

Performance Monitors

The following changes to the library of performance monitors have been made:

| API Version 2.0 Based | API Version 3.0 Based | Remarks |
|-----------------------|-----------------------|---------------------|
| PerformanceMonitor | PerformanceMonitor | Basic Modifications |
| LongRunSampleAverage | LongRunSampleAverage | Basic Modifications |
| LongRunSampleVariance | LongRunSampleVariance | Basic Modifications |
| LongRunTimeAverage | LongRunTimeAverage | Basic Modifications |
| LongRunTimeVariance | LongRunTimeVariance | Basic Modifications |
| LongRunRateAverage | LongRunRateAverage | Basic Modifications |
| ConfidenceInterval | ConfidenceInterval | Basic Modifications |

The changes in the API for these performance monitor classes are cleaned by removing the “help” methods. Explanation of using the performance monitors is available as comments in the library. The new PerformanceMonitor class is to be considered as an abstract super class of all performance monitor classes. Instances of the monitors can no longer be created through method “ofType”. Furthermore, all methods that require parameters have been extended with check on the type of

objects given as parameters, where the “rewardRC” and “rewardBM” have been made robust for accepting Integers and Reals. Accompanied with the addition of a desired accuracy level to the “withParameters” methods, class PerformanceMonitor has been extended with method “accurate” to allow an easy check on whether the estimation result has reached the desired accuracy. In the future, the performance monitors will become subclasses of basic class Observer to allow for example automatic termination of the simulation through the functionality provided by Observer.