Advanced Modeling with Java > Java Basics for AnyLogic > Java arrays and collections

Arrays

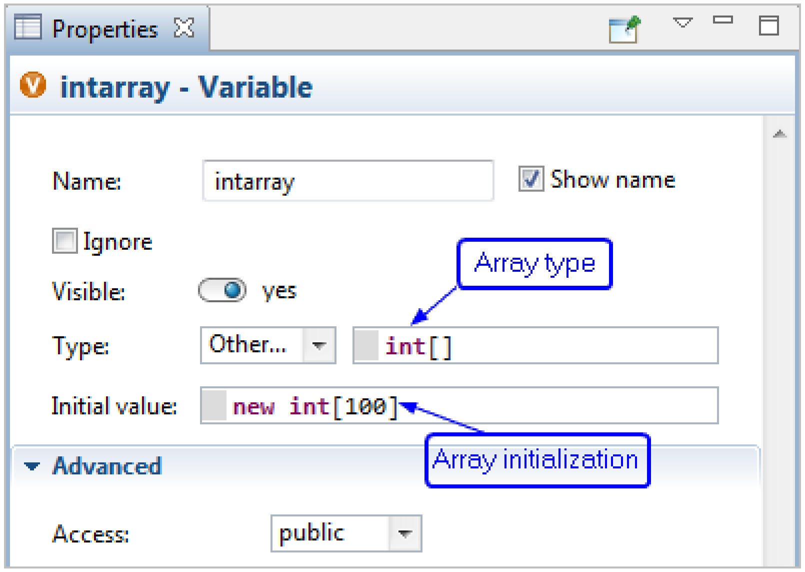
Java arrays are containers with linear storage of fixed size. To create an array you should declare a variable of array type and initialize it with a new array, like this:

```
int[] intarray = new int[100]; //array of 100 integer numbers
```

Array type is composed of the element type followed by square brackets, e.g. `int[]`, `double[]`, `String[]`, `Agent[]`. The size of the array is not a part of its type. Allocation of the actual storage space (memory) for the array elements is done by the expression `new int[100]`, and this is where the size is defined. Note that unless you initialize the array with the allocated storage, it will be equal to `null`, and you will not be able to access its elements.

A graphical declaration of the same array of 100 integers will look like the Figure. You should use a Variable or Parameter object, choose **Other** for **Type** and enter the array type in the field on the right.

Do not be confused by the checkbox **Array** in the properties of Parameter: that checkbox sets the type of parameter to System Dynamics `HyperArray` and not to Java array.



intarray - Variable

Name: intarray ☑ Show name

□ Ignore

Visible: yes

Type: Other... int[]

Initial value: new int[100]

Advanced

Access: public

Array variable declared graphically

All elements of the array initialized that way will be set to 0 (for numeric element type), `false` for `boolean` type and `null` for all classes including `String`. Another option is to explicitly provide initial values for all array elements. The syntax is the following:

```
int[] intarray = new int[] { 13, x-3, -15, 0, max{ a, 100 ) };
```

The size of the array is then defined by the number of expressions in braces. To obtain the size of an existing array you should write *`<array name>`*`.length`, for example:

```
intarray.length
```

The i^{th} element of an array (remember that array indexes are 0-based) can be accessed as:

```
intarray[i-1]
```

Iteration over array elements is done by index. The following loop increments each element of the array:

```
for( int i=0; i<intarray.length; i++ ) {
    intarray[i]++;
}
```

Java also supports a simpler form of the "for" loop for arrays. The following code calculates the sum of the array elements:

```
int sum = 0;
for( int element : intarray ) {
   sum +=  element;
}
```

Arrays can be *multidimensional*. This piece of code creates a two-dimensional array of double values and initializes it in a loop:

```
double[][] doubleArray = new double[10][20];
for( int i=0; i<doubleArray.length; i++ ) {
    for( int j=0; j<doubleArray[i].length; j++ ) {
        doubleArray[i][j] = i * j;
    }
}
```

You can think of a multidimensional array as of "array of arrays". The array initialized as `new double[10][20]` is array of 10 arrays of 20 double values each. Notice that `doubleArray.length` returns 10 and `doubleArray[i].length` returns 20.