

Arrays

Spoken Tutorial Project
<http://spoken-tutorial.org>

National Mission on Education through ICT
<http://sakshat.ac.in>

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Learning Objectives

In this tutorial, we are going to learn how to:



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- ▶ **declare array variables**



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- ▶ **construct arrays**



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- ▶ use **for** and **while** loops



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In this tutorial, we are going to learn how to:

- ▶ declare array variables
- ▶ construct arrays
- ▶ use **for** and **while** loops
- ▶ use **OMShell**



System Requirements

- ▶ **OpenModelica 1.9.2**

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- ▶ **Any OS: Linux, Windows, Mac OS X or FOSSEE OS on ARM**

Prerequisites

- ▶ **Knowledge of arrays in any programming language**



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- ▶ **Knowledge of class definition in Modelica**

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- ▶ Knowledge of arrays in any programming language
- ▶ Knowledge of class definition in Modelica
- ▶ Prerequisite tutorials are mentioned on our website

www.spoken-tutorial.org



Vector declaration

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Eg: `Real a[2];`

- ▶ **Syntax for parameter vector construction:**

`parameter <type>[vector_size] variable_name = {elements}`

Eg: `parameter Real a[2] = {2,3};`

Indexing vector elements

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- ▶ **Vector indexing starts from 1**
- ▶ **Indices must be integers**



Problem Statement

- ▶ **function -
'polynomialEvaluatorUsingVectors'**

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- ▶ **function -**
'polynomialEvaluatorUsingVectors'
- ▶ **replace a, b, c in 'polynomialEvaluator'**
with a vector a[3]

- ▶ **used to iterate statements a given number of times**

for loop

- ▶ used to iterate statements a given number of times
- ▶ can be used in **algorithm** and **equation**



Syntax of **for** loop

```
for <iteration_range> loop  
//statements or equations//  
end for;
```

Example:

```
for i=1:3 loop  
    a := a + 1;  
end for;
```



while loop

- ▶ used to iterate statements until a condition is satisfied



while loop

- ▶ used to iterate statements until a condition is satisfied
- ▶ cannot be used in **equation** section

while loop

- ▶ used to iterate statements until a condition is satisfied
- ▶ cannot be used in **equation** section
- ▶ not frequently used in Modelica

Arrays

- ▶ **Arrays are used to represent multi-dimensional data**



Arrays

- ▶ **Arrays are used to represent multi-dimensional data**
- ▶ **They can be constructed using vector notation**



Syntax

Syntax for Array declaration

`<type>[dim 1][dim 2]..[dim N] <variable_name>`

Syntax for Array indexing

`<variable_name>[index 1][index 2]..[index N]`

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Write a class named 'matrixAdder' which

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Write a class named 'matrixAdder' which

- ▶ adds 'myMatrix' and 'adder' matrices to give 'mySum'
- ▶ $\text{myMatrix} = \begin{pmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{pmatrix}$
- ▶ $\text{adder} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \\ 1 & 0 \end{pmatrix}$



Assignment

- ▶ Write a function 'vectorReversal' to reverse the order of elements in a vector



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- ▶ 'matrixReversal' to reverse the order of elements in each row of a matrix



Assignment

- ▶ Write a function 'vectorReversal' to reverse the order of elements in a vector
- ▶ 'matrixReversal' to reverse the order of elements in each row of a matrix
- ▶ 'functionTester' class to test these two functions



About the Spoken Tutorial Project

- ▶ Watch the video available at http://spoken-tutorial.org/What_is_a_Spoken_Tutorial
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Spoken Tutorial Workshops

The Spoken Tutorial Project Team

- ▶ Conducts workshops using spoken tutorials
- ▶ Gives certificates to those who pass an online test
- ▶ For more details, please write to contact@spoken-tutorial.org

Forum to answer questions

- ▶ Do you have questions in **THIS Spoken Tutorial?**
- ▶ Choose the minute and second where you have the question.
- ▶ Explain your question briefly.
- ▶ Someone from the **FOSSEE** team will answer them.

Please visit <http://forums.spoken-tutorial.org/>



Textbook Companion Project

- ▶ **The FOSSEE team coordinates coding of solved examples of popular books**
- ▶ **We give honorarium and certificate to those who do this**

For more details, please visit this site:

<http://OM.fossee.in/Textbook-Companion-Project>



Lab Migration Project

- ▶ **The FOSSEE team helps migrate commercial simulator labs to OpenModelica**
- ▶ **We give honorarium and certificates to those who do this**

For more details, please visit this site:

<http://OM.fossee.in/lab-migration-project>



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- ▶ More information on this Mission is available at <http://spoken-tutorial.org/NMEICT-Intro>



Thanks!

<http://openmodelica.org>

