Documentation

Accelerate / simd

API Collection

simd

Perform computations on small vectors and matrices.

Overview

simd provides types and functions for small vector and matrix computations. The types include integer and floating-point vectors and matrices, and the functions provide basic arithmetic operations, element-wise mathematical operations, and geometric and linear algebra operations.

simd supports vectors containing up to 16 elements (for single-precision values) or 8 elements (for double-precision values), and matrices up to 4 x 4 elements in size. Other frameworks, such as vForce, allow you to work with larger vectors.

Topics

Boolean Scalar Data Type

`typealias simd_bool`

A Boolean scalar value.

Signed Integer Vectors

8-Bit Signed Integer Vectors

Perform operations on vectors that contain signed 8-bit integer elements.

16-Bit Signed Integer Vectors

Perform operations on vectors that contain signed 16-bit integer elements.

32-Bit Signed Integer Vectors

Perform operations on vectors that contain signed 32-bit integer elements.

64-Bit Signed Integer Vectors

Perform operations on vectors that contain signed 64-bit integer elements.

Unsigned Integer Vectors

8-Bit Unsigned Integer Vectors

Perform operations on vectors that contain unsigned 8-bit integer elements.

16-Bit Unsigned Integer Vectors

Perform operations on vectors that contain unsigned 16-bit integer elements.

32-Bit Unsigned Integer Vectors

Perform operations on vectors that contain unsigned 32-bit integer elements.

64-Bit Unsigned Integer Vectors

Perform operations on vectors that contain unsigned 64-bit integer elements.

Floating-Point Vectors

Working with Vectors

Use vectors to calculate geometric values, calculate dot products and cross products, and interpolate between values.

Half-precision floating-point vectors

Perform operations on vectors that contain half-precision floating-point elements.

Single-precision floating-point vectors

Perform operations on vectors that contain single-precision floating-point elements.

Double-precision floating-point vectors

Perform operations on vectors that contain double-precision floating-point elements.

Matrices

Working with Matrices

Solve simultaneous equations and transform points in space.

Half-precision floating-point matrices

Perform operations on matrices that contain half-precision floating-point elements.

Single-precision floating-point matrices

Perform operations on matrices that contain single-precision floating-point elements.

Double-precision floating-point matrices

Perform operations on matrices that contain double-precision floating-point elements.

Quaternions

Working with Quaternions

Rotate points around the surface of a sphere, and interpolate between them.

Rotating a cube by transforming its vertices

Rotate a cube through a series of keyframes using quaternion interpolation to transition between them.

`struct simd_quatf`

A single-precision quaternion.

`struct simd_quatd`

A double-precision quaternion.

Constants

`var SIMD_COMPILER_HAS_REQUIRED_FEATURES: Int32`

`var SIMD_LIBRARY_VERSION: Int32`

Macros

simd Macros

See Also

Vectors, Matrices, and Quaternions

Working with Vectors

Use vectors to calculate geometric values, calculate dot products and cross products, and interpolate between values.

Working with Matrices

Solve simultaneous equations and transform points in space.

Working with Quaternions

Rotate points around the surface of a sphere, and interpolate between them.

Rotating a cube by transforming its vertices

Rotate a cube through a series of keyframes using quaternion interpolation to transition between them.

vForce

Perform transcendental and trigonometric functions on vectors of any length.