libsfmt19937 Reference

PlayStation®Vita Programmer Tool Runtime Library Release 3.50

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Constants

SCE_SFMT19937_ARRAY_SIZE

Array size for SFMT19937 pseudo random number calculation

Definition

```
#include <libsfmt19937.h>
#define SCE_SFMT19937_ARRAY_SIZE    156    /* (19937 / 128) + 1 */
```

Description

This constant defines the array size for pseudo random numbers in conformance with SFMT19937.

In addition to indicating the array size that is maintained as state in the `SceSfmt19937Context` structure, this constant is also used by the `sceSfmt19937FillArray32()` and `sceSfmt19937FillArray64()` functions to indicate the minimum size for generating random numbers.

See Also

`SceSfmt19937Context`, `sceSfmt19937FillArray32()`, `sceSfmt19937FillArray64()`

Datatypes

SceSfmt19937Context

Context information for SFMT19937 pseudo random number calculation

Definition

```
#include <libsfmt19937.h>
typedef struct SceSfmt19937Context {
        unsigned int idx;
        unsigned int sfmt[SCE_SFMT19937_ARRAY_SIZE][4];
} SceSfmt19937Context;
```

Description

This structure is a work area for calculating pseudo random numbers in conformance with SFMT19937.

One instance of this work area must be prepared for each random number sequence.

See Also

SCE_SFMT19937_ARRAY_SIZE, sceSfmt19937InitGenRand(), sceSfmt19937InitByArray()

Functions

sceSfmt19937InitGenRand

Initialize SFMT19937 pseudo random number work area

Definition

```
#include <libsfmt19937.h>
SceInt32 sceSfmt19937InitGenRand (
        SceSfmt19937Context *pCtx,
        SceUInt32 seed
);
```

Calling Conditions

Multithread safe

Arguments

pCtx Pointer to an `SceSfmt19937Context` structure, which represents a random number sequence as a context.

seed Specifies a random number sequence.

Return Values

If an error occurs, a negative value is returned.

Value	Result
`SCE_OK`	Normal completion

Description

This function uses a 32-bit seed to initialize an SFMT19937 random number sequence, which is represented by the `SceSfmt19937Context` structure. This function must be executed before the `sceSfmt19937GenRand32()`, `sceSfmt19937GenRand64()`, `sceSfmt19937FillArray32()`, and `sceSfmt19937FillArray64()` functions.

Since only the `SceSfmt19937Context` structure indicated by *pCtx* is initialized, multiple random number sequences can be handled simultaneously by having multiple `SceSfmt19937Context` structures.

See Also

`SceSfmt19937Context`, `sceSfmt19937InitByArray()`

sceSfmt19937InitByArray

Initialize SFMT19937 pseudo random number work area

Definition

```
#include <libsfmt19937.h>
SceInt32 sceSfmt19937InitByArray (
        SceSfmt19937Context *pCtx,
        const SceUInt32 initkey[],
        SceUInt32 keylength
);
```

Calling Conditions

Multithread safe

Arguments

pCtx	Pointer to an `SceSfmt19937Context` structure, which represents a random number sequence as a context.
initkey	Specifies the array to be used for initializing.
keylength	Number of elements in *initkey*.

Return Values

If an error occurs, a negative value is returned.

Value	Result
SCE_OK	Normal completion

Description

This function uses an array of 32-bit seeds to initialize an SFMT19937 random number sequence, which is represented by the `SceSfmt19937Context` structure. This function must be executed before the `sceSfmt19937GenRand32()`, `sceSfmt19937GenRand64()`, `sceSfmt19937FillArray32()`, and `sceSfmt19937FillArray64()` functions.

Since only the `SceSfmt19937Context` structure indicated by *pCtx* is initialized, multiple random number sequences can be handled simultaneously by having multiple `SceSfmt19937Context` structures.

See Also

`SceSfmt19937Context`, `sceSfmt19937InitGenRand()`

sceSfmt19937GenRand32

Generate an SFMT19937 32-bit pseudo random number

Definition

```
#include <libmt19937.h>
SceUInt32 sceSfmt19937GenRand32 (
        SceSfmt19937Context *pCtx
);
```

Calling Conditions

Multithread safe

Arguments

pCtx Pointer to an `SceSfmt19937Context` structure, which represents a random number sequence as a context.

Return Values

32-bit pseudo random number

Description

This function generates a 32-bit pseudo random number that conforms to SFMT19937.

Before using this function, the `SceSfmt19937Context` structure must be initialized by calling the `sceSfmt19937InitGenRand()` or `sceSfmt19937InitByArray()` functions.

See Also

`SceSfmt19937Context`, `sceSfmt19937InitGenRand()`, `sceSfmt19937InitByArray()`

sceSfmt19937GenRand64

Generate an SFMT19937 64-bit pseudo random number

Definition

```
#include <libmt19937.h>
SceUInt64 sceSfmt19937GenRand64 (
        SceSfmt19937Context *pCtx
);
```

Calling Conditions

Multithread safe

Arguments

pCtx Pointer to an `SceSfmt19937Context` structure, which represents a random number sequence as a context.

Return Values

64-bit pseudo random number

Description

This function generates a 64-bit pseudo random number that conforms to SFMT19937.

Before using this function, the `SceSfmt19937Context` structure must be initialized by calling the `sceSfmt19937InitGenRand()` or `sceSfmt19937InitByArray()` functions.

Note that if the `sceSfmt19937GenRand32()` and `sceSfmt19937GenRand64()` functions are used together and the `sceSfmt19937GenRand64()` function is called after the `sceSfmt19937GenRand32()` function has been called an odd number of times, a full 64-bit random number will not be obtained. Instead, this function will return a 64-bit value in which the upper 32 bits are zero.

See Also

`SceSfmt19937Context`, `sceSfmt19937InitGenRand()`, `sceSfmt19937InitByArray()`

sceSfmt19937FillArray32

Generate an array of SFMT19937 32-bit pseudo random numbers

Definition

```
#include <libmt19937.h>
SceInt32 sceSfmt19937FillArray32 (
        SceSfmt19937Context *pCtx,
        SceUInt32 array[],
        SceUInt32 size
);
```

Calling Conditions

Multithread safe

Arguments

pCtx	Pointer to an SceSfmt19937Context structure, which represents a random number sequence as a context.
array	Buffer for receiving the generated random numbers
size	Number of elements in *array* (multiple of 4 that is larger than SCE_SFMT19937_ARRAY_SIZE*4)

Return Values

If an error occurs, a negative value is returned.

Value	Result
SCE_OK	Normal completion

Description

This function generates an arbitrary number of 32-bit pseudo random numbers that conform to SFMT19937. *size* specifies the number of elements in *array* and must be a multiple of 4 that is larger than (SCE_SFMT19937_ARRAY_SIZE * 4).

Before using this function, the SceSfmt19937Context structure must be initialized by calling the sceSfmt19937InitGenRand() or sceSfmt19937InitByArray() functions.

When the sceSfmt19937FillArray32() function is used together with the sceSfmt19937GenRand32() function, the sceSfmt19937FillArray32() function can be called only after the sceSfmt19937GenRand32() function has been called (SCE_SFMT19937_ARRAY_SIZE * 4) times.

When the sceSfmt19937FillArray32() function is used together with the sceSfmt19937GenRand64() function, the sceSfmt19937FillArray32() function can be called only after the sceSfmt19937GenRand64() function has been called (SCE_SFMT19937_ARRAY_SIZE * 2) times.

See Also

SceSfmt19937Context, sceSfmt19937InitGenRand(), sceSfmt19937InitByArray()

sceSfmt19937FillArray64

Generate an array of SFMT19937 64-bit pseudo random numbers

Definition

```
#include <libmt19937.h>
SceInt32 sceSfmt19937FillArray64 (
        SceSfmt19937Context *pCtx,
        SceUInt64 array[],
        SceUInt32 size
);
```

Calling Conditions

Multithread safe

Arguments

pCtx	Pointer to an SceSfmt19937Context structure, which represents a random number sequence as a context.
array	Buffer for receiving the generated random numbers
size	Number of elements in *array* (multiple of 2 that is larger than SCE_SFMT19937_ARRAY_SIZE*2)

Return Values

If an error occurs, a negative value is returned.

Value	Result
SCE_OK	Normal completion

Description

This function generates an arbitrary number of 64-bit pseudo random numbers that conform to SFMT19937. *size* specifies the number of elements in *array* and must be a multiple of 2 that is larger than (SCE_SFMT19937_ARRAY_SIZE * 2).

Before using this function, the SceSfmt19937Context structure must be initialized by calling the sceSfmt19937InitGenRand() or sceSfmt19937InitByArray() functions.

When the sceSfmt19937FillArray64() function is used together with the sceSfmt19937GenRand32() function, the sceSfmt19937FillArray64() function can be called only after the sceSfmt19937GenRand32() function has been called (SCE_SFMT19937_ARRAY_SIZE * 4) times.

When the sceSfmt19937FillArray64() function is used together with the sceSfmt19937GenRand64() function, the sceSfmt19937FillArray64() function can be called only after the sceSfmt19937GenRand64() function has been called (SCE_SFMT19937_ARRAY_SIZE * 2) times.

See Also

SceSfmt19937Context, sceSfmt19937InitGenRand(), sceSfmt19937InitByArray()