Namespace SnowflakeID

Classes

Snowflake
: This class represents the Snowflake object. Wikipedia article about SnowflakeId

SnowflakeIDGenerator
: Generator class for SnowflakeID.

  This keeps track of time, machine number and sequence.

SnowflakeIdGeneratorOptions
: Option object for SnowflakeIDGenerator

SnowflakeIdGeneratorServiceCollectionExtensions
: Extension method to register SnowflakeIDGenerator

Interfaces

ISnowflakeIDGenerator
: Generator class for Snowflake.

  This keeps track of time, machine number and sequence.

ISnowflakeIDGeneratorClsCompliant
: Generator class for SnowflakeID.

  This keeps track of time, machine number and sequence.

Interface ISnowflakeIDGenerator

Namespace: SnowflakeID

Assembly: SnowflakeIDGenerator.dll

Generator class for Snowflake.

This keeps track of time, machine number and sequence.

```
[CLSCompliant(false)]
public interface ISnowflakeIDGenerator
```

Properties

ConfiguredEpoch

Date configured as epoch for the generator

```
DateTime ConfiguredEpoch { get; }
```

Property Value

DateTime

ConfiguredMachineId

Configured instance id for the generator

```
int ConfiguredMachineId { get; }
```

Property Value

int

Methods

GetCode()

Gets next Snowflake as number ()

```
ulong GetCode()
```

Returns

ulong

GetCodeString()

Gets next Snowflake as

```
string GetCodeString()
```

Returns

string

GetSnowflake()

Gets next Snowflake id

```
Snowflake GetSnowflake()
```

Returns

Snowflake

Interface ISnowflakeIDGeneratorClsCompliant

Namespace: SnowflakeID

Assembly: SnowflakeIDGenerator.dll

Generator class for SnowflakeID.

This keeps track of time, machine number and sequence.

```
public interface ISnowflakeIDGeneratorClsCompliant
```

Properties

ConfiguredEpoch

Date configured as epoch for the generator

```
DateTime ConfiguredEpoch { get; }
```

Property Value

DateTime

ConfiguredMachineId

Configured instance id for the generator

```
int ConfiguredMachineId { get; }
```

Property Value

int

Methods

GetCodeString()

Gets next Snowflake as

```
string GetCodeString()
```

Returns

string

GetSnowflake()

Gets next Snowflake id

```
Snowflake GetSnowflake()
```

Returns

Snowflake

Class Snowflake

Namespace: SnowflakeID

Assembly: SnowflakeIDGenerator.dll

This class represents the Snowflake object. Wikipedia article about SnowflakeId

```
public class Snowflake : IEquatable<Snowflake>, IComparable<Snowflake>, IComparable
```

Inheritance

object ← Snowflake

Implements

IEquatable<Snowflake>, IComparable<Snowflake>, IComparable

Inherited Members

object.Equals(object, object) , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object)

Constructors

Snowflake()

Class constructor using default epoch (UNIX time 1-1-1970)

```
public Snowflake()
```

Snowflake(DateTime)

Class constructor using a custom date as epoch.

```
public Snowflake(DateTime epoch)
```

Parameters

epoch DateTime

Date to use as epoch

Fields

MaxMachineId

Max number of machines / servers allowed. Range from 0 to MaxMachineId-1

```
public const long MaxMachineId = 1024
```

Field Value

long

MaxSequence

The amount of codes generated per millisecond. Sequence value is set to 0 when this value is reached.

```
public const long MaxSequence = 4096
```

Field Value

long

NumberOfDigits

Total number of digits for the generated code

```
public static readonly int NumberOfDigits
```

Field Value

int

Properties

Code

Gets snowflakeId from string

```
public string Code { get; }
```

Property Value

string

Epoch

Current epoch being used

```
public DateTime Epoch { get; }
```

Property Value

DateTime

Id

Gets snowflakeId.

```
[CLSCompliant(false)]
public virtual ulong Id { get; }
```

Property Value

ulong

MachineId

Gets / Sets machine / server number

```
[CLSCompliant(false)]
public ulong MachineId { get; set; }
```

Property Value

ulong

Exceptions

ArgumentOutOfRangeException

MachineIdInt32

Gets / Sets machine / server number

```
public int MachineIdInt32 { get; set; }
```

Property Value

int

Exceptions

ArgumentOutOfRangeException

Sequence

Gets / Sets sequence

```
[CLSCompliant(false)]
public ulong Sequence { get; set; }
```

Property Value

ulong

Exceptions

ArgumentOutOfRangeException

SequenceInt32

Gets / Sets machine / server number

```
public int SequenceInt32 { get; set; }
```

Property Value

int

Exceptions

ArgumentOutOfRangeException

Timestamp

Gets / Sets timeStamp as number of milliseconds since selected epoch

```
[CLSCompliant(false)]
public ulong Timestamp { get; set; }
```

Property Value

ulong

TimestampInt64

Gets / Sets timeStamp as number of milliseconds since selected epoch

```
public long TimestampInt64 { get; set; }
```

Property Value

long

Exceptions

ArgumentOutOfRangeException

UtcDateTime

Sets the timeStamp portion of the snowflake based on current time and selected epoch. Gets real time of the snowflake based on selected epoch.

```
public DateTime UtcDateTime { get; set; }
```

Property Value

DateTime

Methods

ChangeEpoch(DateTime)

Changes the snowflake's epoch keeping the code intact. This changes the represented Utc DateTime.

```
public void ChangeEpoch(DateTime newEpoch)
```

Parameters

`newEpoch` DateTime

CompareTo(Snowflake)

Implements of CompareTo(T)

```
public int CompareTo(Snowflake other)
```

Parameters

`other` Snowflake

Returns

int

Exceptions

SnowflakesUsingDifferentEpochsException

When comparing ids generated using different epochs, since there's not an order in that case

CompareTo(object)

Implements of CompareTo(object)

```
public int CompareTo(object obj)
```

Parameters

`obj` object

Returns

int

Exceptions

SnowflakesUsingDifferentEpochsException

When comparing ids generated using different epochs, since there's not an order in that case

Equals(Snowflake)

Checks equality between two SnowflakeId objects

```
public virtual bool Equals(Snowflake other)
```

Parameters

`other` Snowflake

Returns

bool

Equals(object)

Checks equality between two SnowflakeId objects

```
public override bool Equals(object obj)
```

Parameters

`obj` object

Returns

bool

FromString(string)

Explicit cast from string

```
public static Snowflake FromString(string s)
```

Parameters

`s` string

Returns

Snowflake

FromUInt64(ulong)

Explicit cast from ulong

```
[CLSCompliant(false)]
public static Snowflake FromUInt64(ulong s)
```

Parameters

s ulong

Returns

Snowflake

GetHashCode()

Serves as the default hash function. Override of GetHashCode()

```
public override int GetHashCode()
```

Returns

int

Parse(string)

Creates a SnowflakeId object from a SnowflakeId code

```
public static Snowflake Parse(string s)
```

Parameters

s string

Code

Returns

Snowflake

Parse(string, DateTime)

Creates a SnowflakeId object from a SnowflakeId code using a custom epoch

```
public static Snowflake Parse(string s, DateTime customEpoch)
```

Parameters

`s` string

Code

`customEpoch` DateTime

Date to use as epoch

Returns

Snowflake

Parse(ulong)

Creates a SnowflakeId object from a SnowflakeId code

```
[CLSCompliant(false)]
public static Snowflake Parse(ulong b)
```

Parameters

`b` ulong

Code

Returns

Snowflake

Parse(ulong, DateTime)

Creates a SnowflakeId object from a SnowflakeId code using a custom epoch

```
[CLSCompliant(false)]
public static Snowflake Parse(ulong b, DateTime customEpoch)
```

Parameters

`b` ulong

Code

`customEpoch` DateTime

Date to use as epoch

Returns

Snowflake

RebaseEpoch(DateTime)

Rebase the Snowflake to a new epoch CHANGING THE GENERATED CODE but keeping the same date and time.

```
public void RebaseEpoch(DateTime newEpoch)
```

Parameters

`newEpoch` DateTime

ToString()

Gets code as string

```
public override string ToString()
```

Returns

string

SnowflakeId code

ToUInt64()

Implicit cast to ulong

```
[CLSCompliant(false)]
public ulong ToUInt64()
```

Returns

ulong

Operators

operator ==(Snowflake, Snowflake)

Equality operator

```
public static bool operator ==(Snowflake s1, Snowflake s2)
```

Parameters

`s1` Snowflake

`s2` Snowflake

Returns

bool

explicit operator Snowflake(string)

Explicit cast from string

```
public static explicit operator Snowflake(string s)
```

Parameters

s string

Returns

Snowflake

explicit operator Snowflake(ulong)

Explicit cast from ulong

```
[CLSCompliant(false)]
public static explicit operator Snowflake(ulong s)
```

Parameters

s ulong

Returns

Snowflake

operator >(Snowflake, Snowflake)

Greater than operator

```
public static bool operator >(Snowflake s1, Snowflake s2)
```

Parameters

s1 Snowflake

s2 Snowflake

Returns

bool

Exceptions

SnowflakesUsingDifferentEpochsException

When comparing ids generated using different epochs, since there's not an order in that case

operator >=(Snowflake, Snowflake)

Greater than or equal to operator

```
public static bool operator >=(Snowflake s1, Snowflake s2)
```

Parameters

`s1` Snowflake

`s2` Snowflake

Returns

bool

Exceptions

SnowflakesUsingDifferentEpochsException

When comparing ids generated using different epochs, since there's not an order in that case

implicit operator string(Snowflake)

Implicit cast to string

```
public static implicit operator string(Snowflake s)
```

Parameters

`s` Snowflake

Returns

string

implicit operator ulong(Snowflake)

Implicit cast to ulong

```
[CLSCompliant(false)]
public static implicit operator ulong(Snowflake s)
```

Parameters

`s` Snowflake

Returns

ulong

operator !=(Snowflake, Snowflake)

Inequality operator

```
public static bool operator !=(Snowflake s1, Snowflake s2)
```

Parameters

`s1` Snowflake

`s2` Snowflake

Returns

bool

operator <(Snowflake, Snowflake)

Less than operator

```
public static bool operator <(Snowflake s1, Snowflake s2)
```

Parameters

`s1` Snowflake

`s2` Snowflake

Returns

bool

Exceptions

SnowflakesUsingDifferentEpochsException

When comparing ids generated using different epochs, since there's not an order in that case

operator <=(Snowflake, Snowflake)

Less than or equal to operator

```
public static bool operator <=(Snowflake s1, Snowflake s2)
```

Parameters

`s1` Snowflake

`s2` Snowflake

Returns

bool

Exceptions

SnowflakesUsingDifferentEpochsException

When comparing ids generated using different epochs, since there's not an order in that case

Class SnowflakeIDGenerator

Namespace: SnowflakeID

Assembly: SnowflakeIDGenerator.dll

Generator class for SnowflakeID.

This keeps track of time, machine number and sequence.

```
public class SnowflakeIDGenerator : ISnowflakeIDGenerator,
ISnowflakeIDGeneratorClsCompliant
```

Inheritance

object ← SnowflakeIDGenerator

Implements

ISnowflakeIDGenerator, ISnowflakeIDGeneratorClsCompliant

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Constructors

SnowflakeIDGenerator(int)

Creates a SnowflakeIDGenerator for a given machine number

```
public SnowflakeIDGenerator(int machineId)
```

Parameters

`machineId` int

Machine number

Exceptions

ArgumentOutOfRangeException

`machineId` must be less than Snowflake.MaxMachineId

SnowflakeIDGenerator(int, DateTime)

Creates a SnowflakeIDGenerator for a given machine number using a custom date as epoch

```
public SnowflakeIDGenerator(int machineId, DateTime customEpoch)
```

Parameters

`machineId` int

Machine number

`customEpoch` DateTime

Date to use as epoch

Exceptions

ArgumentOutOfRangeException

`machineId` must be less than Snowflake.MaxMachineId

SnowflakeIDGenerator(ulong)

Creates a SnowflakeIDGenerator for a given machine number

```
[CLSCompliant(false)]
public SnowflakeIDGenerator(ulong machineId)
```

Parameters

`machineId` ulong

Machine number

Exceptions

ArgumentOutOfRangeException

`machineId` must be less than Snowflake.MaxMachineId

SnowflakeIDGenerator(ulong, DateTime)

Creates a SnowflakeIDGenerator for a given machine number using a custom date as epoch

```
[CLSCompliant(false)]
public SnowflakeIDGenerator(ulong machineId, DateTime customEpoch)
```

Parameters

`machineId` ulong

Machine number

`customEpoch` DateTime

Date to use as epoch

Exceptions

ArgumentOutOfRangeException

`machineId` must be less than Snowflake.MaxMachineId

Properties

ConfiguredEpoch

Date configured as epoch for the generator

```
public DateTime ConfiguredEpoch { get; }
```

Property Value

DateTime

ConfiguredMachineId

Configured instance id for the generator

```
public int ConfiguredMachineId { get; }
```

Property Value

int

Methods

GetCode()

Gets next Snowflake as number ()

```
[CLSCompliant(false)]
public ulong GetCode()
```

Returns

ulong

GetCode(ulong)

Static method Gets next Snowflake as for a given

```
[CLSCompliant(false)]
public static ulong GetCode(ulong machineId)
```

Parameters

`machineId` ulong

Machine number

Returns

ulong

GetCode(ulong, DateTime)

Static method Gets next Snowflake as for a given using a custom date as epoch

```
[CLSCompliant(false)]
public static ulong GetCode(ulong machineId, DateTime customEpoch)
```

Parameters

`machineId` ulong

Machine number

`customEpoch` DateTime

Date to use as epoch

Returns

ulong

GetCodeString()

Gets next Snowflake as

```
public string GetCodeString()
```

Returns

string

GetCodeString(int)

Gets next Snowflake as for a given

```
public static string GetCodeString(int machineId)
```

Parameters

`machineId` int

Returns

string

GetCodeString(int, DateTime)

Gets next Snowflake as for a given using a custom date as epoch

```
public static string GetCodeString(int machineId, DateTime customEpoch)
```

Parameters

`machineId` int

`customEpoch` DateTime

Date to use as epoch

Returns

string

GetCodeString(ulong)

Gets next Snowflake as for a given

```
[CLSCompliant(false)]
public static string GetCodeString(ulong machineId)
```

Parameters

`machineId` ulong

Returns

string

GetCodeString(ulong, DateTime)

Gets next Snowflake as for a given using a custom date as epoch

```
[CLSCompliant(false)]
public static string GetCodeString(ulong machineId, DateTime customEpoch)
```

Parameters

`machineId` ulong

`customEpoch` DateTime

Date to use as epoch

Returns

string

GetSnowflake()

Gets next Snowflake id

```
public Snowflake GetSnowflake()
```

Returns

Snowflake

GetSnowflake(int)

Static method Gets next Snowflake id for a given

```
public static Snowflake GetSnowflake(int machineId)
```

Parameters

`machineId` int

Machine number

Returns

Snowflake

GetSnowflake(int, DateTime)

Static method Gets next Snowflake id for a given using a custom date as epoch

```
public static Snowflake GetSnowflake(int machineId, DateTime customEpoch)
```

Parameters

`machineId` int

Machine number

`customEpoch` DateTime

Date to use as epoch

Returns

Snowflake

GetSnowflake(ulong)

Static method Gets next Snowflake id for a given

```
[CLSCompliant(false)]
public static Snowflake GetSnowflake(ulong machineId)
```

Parameters

`machineId` ulong

Machine number

Returns

Snowflake

GetSnowflake(ulong, DateTime)

Static method Gets next Snowflake id for a given using a custom date as epoch

```
[CLSCompliant(false)]
public static Snowflake GetSnowflake(ulong machineId, DateTime customEpoch)
```

Parameters

`machineId` ulong

Machine number

`customEpoch` DateTime

Date to use as epoch

Returns

Snowflake

Class SnowflakeIdGeneratorOptions

Namespace: SnowflakeID

Assembly: SnowflakeIDGenerator.DependencyInjection.dll

Option object for SnowflakeIDGenerator

```
public class SnowflakeIdGeneratorOptions
```

Inheritance

object ← SnowflakeIdGeneratorOptions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Properties

Epoch

String representing date to use as epoch Use this in options

```
public string Epoch { get; set; }
```

Property Value

string

MachineId

Machine number

```
public int MachineId { get; set; }
```

Property Value

int

Class SnowflakeIdGeneratorServiceCollectionExtensions

Namespace: SnowflakeID

Assembly: SnowflakeIDGenerator.DependencyInjection.dll

Extension method to register SnowflakeIDGenerator

```
public static class SnowflakeIdGeneratorServiceCollectionExtensions
```

Inheritance

object ← SnowflakeIdGeneratorServiceCollectionExtensions

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Methods

AddSnowflakeIdGeneratorService(IServiceCollection)

Registers a SnowflakeIDGenerator in ISnowflakeIDGenerator

```
public static IServiceCollection AddSnowflakeIdGeneratorService(this
IServiceCollection serviceCollection)
```

Parameters

`serviceCollection` IServiceCollection

The IServiceCollection to add services to.

Returns

IServiceCollection

AddSnowflakeIdGeneratorService(IServiceCollection, SnowflakeIdGeneratorOptions)

Registers a SnowflakeIDGenerator in ISnowflakeIDGenerator

```
public static IServiceCollection AddSnowflakeIdGeneratorService(this
IServiceCollection serviceCollection, SnowflakeIdGeneratorOptions options)
```

Parameters

`serviceCollection` IServiceCollection

The IServiceCollection to add services to.

`options` SnowflakeIdGeneratorOptions

Option object. Useful when obtaining from IConfigurationSection

Returns

IServiceCollection

AddSnowflakeIdGeneratorService(IServiceCollection, int)

Registers a SnowflakeIDGenerator in ISnowflakeIDGenerator

```
public static IServiceCollection AddSnowflakeIdGeneratorService(this
IServiceCollection serviceCollection, int machineId)
```

Parameters

`serviceCollection` IServiceCollection

The IServiceCollection to add services to.

`machineId` int

Machine number

Returns

IServiceCollection

AddSnowflakeIdGeneratorService(IServiceCollection, int, DateTime)

Registers a SnowflakeIDGenerator in ISnowflakeIDGenerator

```
public static IServiceCollection AddSnowflakeIdGeneratorService(this
IServiceCollection serviceCollection, int machineId, DateTime customEpoch)
```

Parameters

`serviceCollection` IServiceCollection

The IServiceCollection to add services to.

`machineId` int

Machine number

`customEpoch` DateTime

Date to use as epoch

Returns

IServiceCollection

AddSnowflakeIdGeneratorService(IServiceCollection, long, DateTime)

Registers a SnowflakeIDGenerator in ISnowflakeIDGenerator

```
public static IServiceCollection AddSnowflakeIdGeneratorService(this
IServiceCollection serviceCollection, long machineId, DateTime customEpoch)
```

Parameters

`serviceCollection` IServiceCollection

The IServiceCollection to add services to.

`machineId` long

Machine number

`customEpoch` DateTime

Date to use as epoch

Returns

IServiceCollection

AddSnowflakeIdGeneratorService(IServiceCollection, ulong)

Registers a SnowflakeIDGenerator in ISnowflakeIDGenerator

```
public static IServiceCollection AddSnowflakeIdGeneratorService(this
IServiceCollection serviceCollection, ulong machineId)
```

Parameters

`serviceCollection` IServiceCollection

The IServiceCollection to add services to.

`machineId` ulong

Machine number

Returns

IServiceCollection

AddSnowflakeIdGeneratorService(IServiceCollection, ulong, DateTime)

Registers a SnowflakeIDGenerator in ISnowflakeIDGenerator

```
public static IServiceCollection AddSnowflakeIdGeneratorService(this
IServiceCollection serviceCollection, ulong machineId, DateTime customEpoch)
```

Parameters

`serviceCollection` IServiceCollection

The IServiceCollection to add services to.

`machineId` ulong

Machine number

`customEpoch` DateTime

Date to use as epoch

Returns

IServiceCollection

Namespace SnowflakeID.Exceptions

Classes

SnowflakesUsingDifferentEpochsException

When trying to compare Ids using different epochs

Class SnowflakesUsingDifferentEpochsException

Namespace: SnowflakeID.Exceptions

Assembly: SnowflakeIDGenerator.dll

When trying to compare Ids using different epochs

```
[Serializable]
public class SnowflakesUsingDifferentEpochsException : ArgumentException,
ISerializable
```

Inheritance

object ← Exception ← SystemException ← ArgumentException ← SnowflakesUsingDifferentEpochsException

Implements

ISerializable

Inherited Members

ArgumentException.GetObjectData(SerializationInfo, StreamingContext) , ArgumentException.Message , ArgumentException.ParamName , Exception.GetBaseException() , Exception.GetType() , Exception.ToString() , Exception.Data , Exception.HelpLink , Exception.HResult , Exception.InnerException , Exception.Source , Exception.StackTrace , Exception.TargetSite , Exception.SerializeObjectState , object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.MemberwiseClone() , object.ReferenceEquals(object, object)

Constructors

SnowflakesUsingDifferentEpochsException()

Initializes a new instance of the SnowflakesUsingDifferentEpochsException class.

```
public SnowflakesUsingDifferentEpochsException()
```

SnowflakesUsingDifferentEpochsException(SerializationInfo, StreamingContext)

Initializes a new instance of the SnowflakesUsingDifferentEpochsException class with serialized data.

```
protected SnowflakesUsingDifferentEpochsException(SerializationInfo
serializationInfo, StreamingContext streamingContext)
```

Parameters

`serializationInfo` SerializationInfo

The object that holds the serialized object data.

`streamingContext` StreamingContext

The contextual information about the source or destination.

SnowflakesUsingDifferentEpochsException(string)

Initializes a new instance of the SnowflakesUsingDifferentEpochsException class with a specified error message.

```
public SnowflakesUsingDifferentEpochsException(string message)
```

Parameters

`message` string

The error message that explains the reason for the exception.

SnowflakesUsingDifferentEpochsException(string, Exception)

Initializes a new instance of the SnowflakesUsingDifferentEpochsException class with a specified error message and a reference to the inner exception that is the cause of this exception.

```
public SnowflakesUsingDifferentEpochsException(string message,
Exception innerException)
```

Parameters

`message` string

The error message that explains the reason for the exception.

`innerException` Exception

The exception that is the cause of the current exception. If the `innerException` parameter is not a null reference, the current exception is raised in a catch block that handles the inner exception.

SnowflakesUsingDifferentEpochsException(string, string)

Initializes a new instance of the SnowflakesUsingDifferentEpochsException class with a specified error message and the name of the parameter that causes this exception.

```
public SnowflakesUsingDifferentEpochsException(string message, string paramName)
```

Parameters

`message` string

The error message that explains the reason for the exception.

`paramName` string

The name of the parameter that caused the current exception.

SnowflakesUsingDifferentEpochsException(string, string, Exception)

Initializes a new instance of the SnowflakesUsingDifferentEpochsException class with a specified error message, the parameter name, and a reference to the inner exception that is the cause of this exception.

```
public SnowflakesUsingDifferentEpochsException(string message, string paramName,
Exception innerException)
```

Parameters

`message` string

The error message that explains the reason for the exception.

`paramName` string

The name of the parameter that caused the current exception.

`innerException` Exception

The exception that is the cause of the current exception. If the `innerException` parameter is not a null reference, the current exception is raised in a catch block that handles the inner exception.

Fields

DefaultMessage

Default message

```
public const string DefaultMessage = "When comparing SnowflakeIds, both should be
using the same epoch for the comparison to make sense."
```

Field Value

string

Namespace SnowflakeID.Helpers

Classes

GlobalConstants

Global constants.

Class GlobalConstants

Namespace: SnowflakeID.Helpers

Assembly: SnowflakeIDGenerator.dll

Global constants.

```
public static class GlobalConstants
```

Inheritance

object ← GlobalConstants

Inherited Members

object.Equals(object) , object.Equals(object, object) , object.GetHashCode() , object.GetType() , object.MemberwiseClone() , object.ReferenceEquals(object, object) , object.ToString()

Fields

DefaultEpoch

Default date used as epoch if not configured

```
public static readonly DateTime DefaultEpoch
```

Field Value

DateTime