Namespace chia.dotnet.bls

Classes

AffinePoint

Represents an affine point on an elliptic curve.

AugSchemeMPL

Provides extension methods for the AugSchemeMPL signature scheme. This is the scheme Chia uses for its signatures.

ByteUtils

Extension methods for working with byte arrays and conversions.

Hmac

Provides methods for HMAC (Hash-based Message Authentication Code) operations.

JacobianPoint

Represents a point in Jacobian coordinates on an elliptic curve. It can represent both a PublicKey and a Signature.

KeyDerivation

Provides methods for key derivation in the BLS cryptography library.

PrivateKey

Represents a private key used in BLS cryptography.

Enums

Endian

Enum representing the endianness of byte arrays.

Class AffinePoint

Namespace: chia.dotnet.bls

Assembly: chia-dotnet-bls.dll

Represents an affine point on an elliptic curve.

```
public class AffinePoint
```

Inheritance

object ← AffinePoint

Inherited Members

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

Properties

IsInfinity

Gets a value indicating whether the affine point is at infinity.

```
public bool IsInfinity { get; }
```

Property Value

bool

Represents an affine point on an elliptic curve.

IsOnCurve

Gets a value indicating whether the affine point is on the curve.

```
public bool IsOnCurve { get; }
```

Property Value

bool

Represents an affine point on an elliptic curve.

Methods

Add(AffinePoint)

Adds another affine point to the current affine point.

```
public AffinePoint Add(AffinePoint value)
```

Parameters

`value` AffinePoint

The affine point to add.

Returns

AffinePoint

The sum of the two affine points.

Clone()

Creates a new instance that is a copy of the current affine point.

```
public AffinePoint Clone()
```

Returns

AffinePoint

A new instance that is a copy of the current affine point.

Double()

Doubles the affine point.

```
public AffinePoint Double()
```

Returns

AffinePoint

The doubled affine point.

Equals(AffinePoint)

Determines whether the specified object is equal to the current affine point.

```
public bool Equals(AffinePoint value)
```

Parameters

`value` AffinePoint

The object to compare with the current affine point.

Returns

bool

`true` if the specified object is equal to the current affine point; otherwise, `false`.

Multiply(BigInteger)

Multiplies the affine point by a scalar value.

```
public AffinePoint Multiply(BigInteger value)
```

Parameters

`value` BigInteger

The scalar value.

Returns

AffinePoint

The result of the scalar multiplication.

Negate()

Negates the affine point.

```
public AffinePoint Negate()
```

Returns

AffinePoint

The negated affine point.

Subtract(AffinePoint)

Subtracts another affine point from the current affine point.

```
public AffinePoint Subtract(AffinePoint value)
```

Parameters

`value` AffinePoint

The affine point to subtract.

Returns

AffinePoint

The difference between the two affine points.

ToJacobian()

Converts the affine point to its Jacobian representation.

```
public JacobianPoint ToJacobian()
```

Returns

JacobianPoint

The Jacobian representation of the affine point.

ToString()

Returns a string that represents the current affine point.

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

Returns

string

A string that represents the current affine point.

Twist()

Twists the affine point.

```
public AffinePoint Twist()
```

Returns

AffinePoint

The twisted affine point.

Untwist()

Untwists the affine point.

```
public AffinePoint Untwist()
```

Returns

AffinePoint

The untwisted affine point.

Class AugSchemeMPL

Namespace: chia.dotnet.bls

Assembly: chia-dotnet-bls.dll

Provides extension methods for the AugSchemeMPL signature scheme. This is the scheme Chia uses for its signatures.

```
public static class AugSchemeMPL
```

Inheritance

object ← AugSchemeMPL

Inherited Members

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

Methods

Aggregate(JacobianPoint[])

Aggregates multiple signatures into a single signature.

```
public static JacobianPoint Aggregate(JacobianPoint[] signatures)
```

Parameters

`signatures` JacobianPoint[]

The array of signatures to be aggregated.

Returns

JacobianPoint

The aggregated signature as a JacobianPoint.

AggregateVerify(JacobianPoint[], byte[][], JacobianPoint)

Verifies an aggregated signature against multiple public keys and messages.

```
public static bool AggregateVerify(this JacobianPoint[] publicKeys, byte[][] messages,
JacobianPoint signature)
```

Parameters

`publicKeys` JacobianPoint[]

The array of public keys used for verification.

`messages` byte[][]

The array of messages to be verified.

`signature` JacobianPoint

The aggregated signature to be verified.

Returns

bool

True if the aggregated signature is valid, false otherwise.

DeriveChildPkUnhardened(JacobianPoint, long)

Derives a child unhardened public key from the specified public key and index.

```
public static JacobianPoint DeriveChildPkUnhardened(this JacobianPoint publicKey,
long index)
```

Parameters

`publicKey` JacobianPoint

The parent public key.

`index` long

The index of the child public key.

Returns

JacobianPoint

The derived child unhardened public key.

DeriveChildSk(PrivateKey, long)

Derives a child private key from the specified private key and index.

```
public static PrivateKey DeriveChildSk(this PrivateKey privateKey, long index)
```

Parameters

`privateKey` PrivateKey

The parent private key.

`index` long

The index of the child private key.

Returns

PrivateKey

The derived child private key.

DeriveChildSkUnhardened(PrivateKey, long)

Derives a child unhardened private key from the specified private key and index.

```
public static PrivateKey DeriveChildSkUnhardened(this PrivateKey privateKey, long index)
```

Parameters

`privateKey` PrivateKey

The parent private key.

`index` long

The index of the child private key.

Returns

PrivateKey

The derived child unhardened private key.

KeyGen(byte[])

Generates a private key from the given seed.

```
public static PrivateKey KeyGen(this byte[] seed)
```

Parameters

`seed` byte[]

The seed used to generate the private key.

Returns

PrivateKey

The generated private key.

Sign(PrivateKey, byte[])

Signs a message using the specified private key.

```
public static JacobianPoint Sign(this PrivateKey privateKey, byte[] message)
```

Parameters

`privateKey` PrivateKey

The private key used for signing.

`message` byte[]

The message to be signed.

Returns

JacobianPoint

The signature as a JacobianPoint.

Sign(PrivateKey, string)

Signs a message using the specified private key.

```
public static JacobianPoint Sign(this PrivateKey privateKey, string message)
```

Parameters

`privateKey` PrivateKey

The private key used for signing.

`message` string

The message to be signed.

Returns

JacobianPoint

The signature as a JacobianPoint.

Verify(JacobianPoint, byte[], JacobianPoint)

Verifies the signature of a message using the specified public key.

```
public static bool Verify(this JacobianPoint publicKey, byte[] message,
JacobianPoint signature)
```

Parameters

`publicKey` JacobianPoint

The public key used for verification.

`message` byte[]

The message to be verified.

`signature` JacobianPoint

The signature to be verified.

Returns

bool

True if the signature is valid, false otherwise.

Verify(JacobianPoint, string, JacobianPoint)

Verifies the signature of a message using the specified public key.

```
public static bool Verify(this JacobianPoint publicKey, string message,
JacobianPoint signature)
```

Parameters

`publicKey` JacobianPoint

The public key used for verification.

`message` string

The message to be verified.

`signature` JacobianPoint

The signature to be verified.

Returns

bool

True if the signature is valid, false otherwise.

Class ByteUtils

Namespace: chia.dotnet.bls

Assembly: chia-dotnet-bls.dll

Extension methods for working with byte arrays and conversions.

```
public static class ByteUtils
```

Inheritance

object ← ByteUtils

Inherited Members

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

Methods

BigIntBitLength(BigInteger)

Calculates the number of bits required to represent a BigInteger.

```
public static long BigIntBitLength(BigInteger value)
```

Parameters

`value` BigInteger

The BigInteger value.

Returns

long

The number of bits required to represent the BigInteger.

BigIntToBits(BigInteger)

Converts a BigInteger to a byte array representing its binary representation.

```
public static byte[] BigIntToBits(this BigInteger i)
```

Parameters

`i` BigInteger

The BigInteger to convert.

Returns

byte[]

The byte array representing the binary representation of the BigInteger.

BigIntToBytes(BigInteger, int, Endian, bool)

Converts a BigInteger to a byte array.

```
public static byte[] BigIntToBytes(this BigInteger value, int size, Endian endian =
Endian.Big, bool signed = false)
```

Parameters

`value` BigInteger

The BigInteger to convert.

`size` int

The size of the resulting byte array.

`endian` Endian

The endianness of the byte array.

`signed` bool

Indicates whether the value is signed or unsigned.

Returns

byte[]

The byte array representation of the BigInteger.

BytesEqual(byte[], byte[])

Checks if two byte arrays are equal.

```
public static bool BytesEqual(this byte[] a, byte[] b)
```

Parameters

a byte[]

The first byte array.

b byte[]

The second byte array.

Returns

bool

True if the byte arrays are equal, false otherwise.

BytesToBigInt(byte[], Endian, bool)

Converts a byte array to a BigInteger.

```
public static BigInteger BytesToBigInt(this byte[] bytes, Endian endian = Endian.Big, bool
signed = false)
```

Parameters

bytes byte[]

The byte array to convert.

`endian` Endian

The endianness of the byte array.

`signed` bool

Indicates whether the value is signed or unsigned.

Returns

BigInteger

The BigInteger representation of the byte array.

BytesToInt(byte[], Endian, bool)

Converts a byte array to a long integer.

```
public static long BytesToInt(this byte[] bytes, Endian endian = Endian.Big, bool signed
= false)
```

Parameters

`bytes` byte[]

The byte array to convert.

`endian` Endian

The endianness of the byte array.

`signed` bool

Indicates whether the value is signed or unsigned.

Returns

long

The long integer representation of the byte array.

ConcatenateArrays(params byte[][])

Concatenates multiple byte arrays into a single byte array.

```
public static byte[] ConcatenateArrays(params byte[][] arrays)
```

Parameters

`arrays` byte[][]

The byte arrays to concatenate.

Returns

byte[]

The concatenated byte array.

EncodeBigInt(BigInteger)

Converts a BigInteger to a byte array, as signed and big endian, with a special case for zero returning an empty array.

```
public static byte[] EncodeBigInt(BigInteger value)
```

Parameters

`value` BigInteger

The BigInteger to convert.

Returns

byte[]

The byte array representation of the BigInteger.

EncodeInt(long)

Converts a long integer to a byte array, as signed and big endian, with a special case for zero returning an empty array.

```
public static byte[] EncodeInt(this long value)
```

Parameters

`value` long

The long integer to convert.

Returns

byte[]

The byte array representation of the long integer.

FromHex(string)

Converts a hexadecimal string to a byte array.

```
public static byte[] FromHex(this string hex)
```

Parameters

`hex` string

The hexadecimal string to convert.

Returns

byte[]

The byte array representation of the hexadecimal string.

HexStringToByteArray(string)

Converts a hexadecimal string to a byte array.

```
public static byte[] HexStringToByteArray(this string hex)
```

Parameters

`hex` string

The hexadecimal string to convert.

Returns

byte[]

The byte array representation of the hexadecimal string.

IntBitLength(long)

Calculates the number of bits required to represent a BigInteger.

```
public static int IntBitLength(long value)
```

Parameters

`value` long

The BigInteger value.

Returns

int

The number of bits required to represent the BigInteger.

IntToBytes(long, int, Endian, bool)

Converts a long integer to a byte array.

```
public static byte[] IntToBytes(this long value, int size, Endian endian = Endian.Big, bool
signed = false)
```

Parameters

`value` long

The long integer to convert.

`size` int

The size of the resulting byte array.

`endian` Endian

The endianness of the byte array.

`signed` bool

Indicates whether the value is signed or unsigned.

Returns

byte[]

The byte array representation of the long integer.

ToBytes(string)

Converts a string to a byte array using UTF-8 encoding.

```
public static byte[] ToBytes(this string value)
```

Parameters

`value` string

The string to convert.

Returns

byte[]

The byte array representation of the string.

ToHex(byte[])

Converts a byte array to a hexadecimal string.

```
public static string ToHex(this byte[] bytes)
```

Parameters

`bytes` byte[]

The byte array to convert.

Returns

string

The hexadecimal string representation of the byte array.

Enum Endian

Namespace: chia.dotnet.bls

Assembly: chia-dotnet-bls.dll

Enum representing the endianness of byte arrays.

```
public enum Endian
```

Fields

`Big = 1`

Big endian byte order.

`Little = 0`

Little endian byte order.

Class Hmac

Namespace: chia.dotnet.bls

Assembly: chia-dotnet-bls.dll

Provides methods for HMAC (Hash-based Message Authentication Code) operations.

```
public static class Hmac
```

Inheritance

object ← Hmac

Inherited Members

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

Fields

HmacBlockSize

The block size used in HMAC operations.

```
public const int HmacBlockSize = 64
```

Field Value

int

Provides methods for HMAC (Hash-based Message Authentication Code) operations.

Methods

Hash256(ArraySegment<byte>)

Computes the SHA-256 hash of the specified message segment.

```
public static byte[] Hash256(ArraySegment<byte> messageSegment)
```

Parameters

`messageSegment` ArraySegment<byte>

The segment of the message to hash.

Returns

byte[]

The SHA-256 hash of the message segment.

Hash256(byte[])

Computes the SHA-256 hash of the specified message.

```
public static byte[] Hash256(this byte[] message)
```

Parameters

`message` byte[]

The message to hash.

Returns

byte[]

The SHA-256 hash of the message.

Hash512(byte[])

Computes the SHA-512 hash of the specified message.

```
public static byte[] Hash512(this byte[] message)
```

Parameters

`message` byte[]

The message to hash.

Returns

byte[]

The SHA-512 hash of the message.

Hmac256(byte[], byte[])

Computes the HMAC-SHA-256 of the specified message using the specified key.

```
public static byte[] Hmac256(byte[] message, byte[] k)
```

Parameters

`message` byte[]

The message to compute the HMAC for.

`k` byte[]

The key to use for HMAC computation.

Returns

byte[]

The HMAC-SHA-256 of the message.

Class JacobianPoint

Namespace: chia.dotnet.bls

Assembly: chia-dotnet-bls.dll

Represents a point in Jacobian coordinates on an elliptic curve. It can represent both a PublicKey and a Signature.

```
public class JacobianPoint
```

Inheritance

object ← JacobianPoint

Inherited Members

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

Extension Methods

AugSchemeMPL.DeriveChildPkUnhardened(JacobianPoint, long) , AugSchemeMPL.Verify(JacobianPoint, byte[], JacobianPoint) , AugSchemeMPL.Verify(JacobianPoint, string, JacobianPoint) , KeyDerivation.CalculateSyntheticOffset(JacobianPoint, byte[]) , KeyDerivation.CalculateSyntheticPublicKey(JacobianPoint, byte[]) , KeyDerivation.DerivePublicKeyPath(JacobianPoint, int[]) , KeyDerivation.DerivePublicKeyWallet(JacobianPoint, int)

Properties

IsInfinity

A flag indicating whether the point is at infinity.

```
public bool IsInfinity { get; }
```

Property Value

bool

Represents a point in Jacobian coordinates on an elliptic curve. It can represent both a PublicKey and a Signature.

Methods

Add(JacobianPoint)

Adds the point to another point.

```
public JacobianPoint Add(JacobianPoint value)
```

Parameters

`value` JacobianPoint

The other point

Returns

JacobianPoint

The resulting point

Clone()

Clones the point.

```
public JacobianPoint Clone()
```

Returns

JacobianPoint

The cloned point

Double()

Doubles the point.

```
public JacobianPoint Double()
```

Returns

JacobianPoint

JacobianPoint

Equals(JacobianPoint)

Compares the point to another point.

```
public bool Equals(JacobianPoint value)
```

Parameters

`value` JacobianPoint

The other point

Returns

bool

True if they are equal

FromBytes(byte[], bool)

Creates a JacobianPoint from a byte array.

```
public static JacobianPoint FromBytes(byte[] bytes, bool isExtension)
```

Parameters

`bytes` byte[]

`isExtension` bool

Returns

JacobianPoint

JacobianPoint

FromBytesG1(byte[], bool)

Creates a JacobianPoint from a byte array.

```
public static JacobianPoint FromBytesG1(byte[] bytes, bool isExtension = false)
```

Parameters

`bytes` byte[]

`isExtension` bool

Returns

JacobianPoint

FromBytesG2(byte[], bool)

Creates a JacobianPoint from a byte array.

```
public static JacobianPoint FromBytesG2(byte[] bytes, bool isExtension = true)
```

Parameters

`bytes` byte[]

`isExtension` bool

Returns

JacobianPoint

FromHex(string, bool)

Creates a JacobianPoint from a hexadecimal string.

```
public static JacobianPoint FromHex(string hex, bool isExtension)
```

Parameters

`hex` string

`isExtension` bool

Returns

JacobianPoint

FromHexG1(string, bool)

Creates a JacobianPoint from a hexadecimal string.

```
public static JacobianPoint FromHexG1(string hex, bool isExtension = false)
```

Parameters

`hex` string

`isExtension` bool

Returns

JacobianPoint

FromHexG2(string, bool)

Creates a JacobianPoint from a hexadecimal string.

```
public static JacobianPoint FromHexG2(string hex, bool isExtension = true)
```

Parameters

`hex` string

`isExtension` bool

Returns

JacobianPoint

GenerateG1()

Creates a JacobianPoint

```
public static JacobianPoint GenerateG1()
```

Returns

JacobianPoint

GenerateG2()

Creates a JacobianPoint

```
public static JacobianPoint GenerateG2()
```

Returns

JacobianPoint

GetFingerprint()

Gets the fingerprint of the point.

```
public long GetFingerprint()
```

Returns

long

InfinityG1(bool)

Creates a JacobianPoint at the G1 Infinity point.

```
public static JacobianPoint InfinityG1(bool isExtension = false)
```

Parameters

`isExtension` bool

Returns

JacobianPoint

InfinityG2(bool)

Creates a JacobianPoint at the G2 Infinity point.

```
public static JacobianPoint InfinityG2(bool isExtension = true)
```

Parameters

`isExtension` bool

Returns

JacobianPoint

IsOnCurve()

Checks if the point is on the curve.

```
public bool IsOnCurve()
```

Returns

bool

IsValid()

Checks if the point is valid.`

```
public bool IsValid()
```

Returns

bool

Multiply(BigInteger)

Multiplies the point by a scalar.

```
public JacobianPoint Multiply(BigInteger value)
```

Parameters

`value` BigInteger

Returns

JacobianPoint

Negate()

Negates the point.

```
public JacobianPoint Negate()
```

Returns

JacobianPoint

JacobianPoint

ToAffine()

Converts the point to an AffinePoint.

```
public AffinePoint ToAffine()
```

Returns

AffinePoint

AffinePoint

ToBytes()

Converts the point to a byte array.

```
public byte[] ToBytes()
```

Returns

byte[]

The byte array

ToHex()

Converts the point to a hexadecimal string.

```
public string ToHex()
```

Returns

string

Hex string

ToString()

Converts the point to a string. This is an alias for ToHex().

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

Returns

string

Class KeyDerivation

Namespace: chia.dotnet.bls

Assembly: chia-dotnet-bls.dll

Provides methods for key derivation in the BLS cryptography library.

```
public static class KeyDerivation
```

Inheritance

object ← KeyDerivation

Inherited Members

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

Fields

DEFAULT_HIDDEN_PUZZLE_HASH

Default hidden puzzle hash used in key derivation.

```
public static readonly byte[] DEFAULT_HIDDEN_PUZZLE_HASH
```

Field Value

byte[]

Provides methods for key derivation in the BLS cryptography library.

Methods

CalculateSyntheticOffset(JacobianPoint, byte[])

Calculates the synthetic offset for the given public key and hidden puzzle hash.

```
public static BigInteger CalculateSyntheticOffset(this JacobianPoint publicKey,
byte[] hiddenPuzzleHash)
```

Parameters

`publicKey` JacobianPoint

The public key.

`hiddenPuzzleHash` byte[]

The hidden puzzle hash.

Returns

BigInteger

The synthetic offset.

CalculateSyntheticPrivateKey(PrivateKey, byte[])

Calculates the synthetic private key for the given private key and hidden puzzle hash.

```
public static PrivateKey CalculateSyntheticPrivateKey(this PrivateKey privateKey,
byte[] hiddenPuzzleHash)
```

Parameters

`privateKey` PrivateKey

The original private key.

`hiddenPuzzleHash` byte[]

The hidden puzzle hash.

Returns

PrivateKey

The synthetic private key.

CalculateSyntheticPublicKey(JacobianPoint, byte[])

Calculates the synthetic public key for the given public key and hidden puzzle hash.

```
public static JacobianPoint CalculateSyntheticPublicKey(this JacobianPoint publicKey,
byte[] hiddenPuzzleHash)
```

Parameters

`publicKey` JacobianPoint

The original public key.

`hiddenPuzzleHash` byte[]

The hidden puzzle hash.

Returns

JacobianPoint

The synthetic public key.

DerivePrivateKey(PrivateKey, int, bool)

Derives a private key from the given master private key.

```
public static PrivateKey DerivePrivateKey(this PrivateKey masterPrivateKey, int index,
bool hardened)
```

Parameters

`masterPrivateKey` PrivateKey

The master private key.

`index` int

The index of the derived key.

`hardened` bool

Indicates if the derivation should be hardened.

Returns

PrivateKey

The derived private key.

DerivePrivateKeyPath(PrivateKey, int[], bool)

Derives a private key path from the given master private key.

```
public static PrivateKey DerivePrivateKeyPath(this PrivateKey privateKey, int[] path,
bool hardened)
```

Parameters

`privateKey` PrivateKey

The master private key.

`path` int[]

The path to derive.

`hardened` bool

Indicates if the derivation should be hardened.

Returns

PrivateKey

The derived private key.

DerivePublicKeyPath(JacobianPoint, int[])

Derives a public key path from the given master public key.

```
public static JacobianPoint DerivePublicKeyPath(this JacobianPoint publicKey, int[] path)
```

Parameters

`publicKey` JacobianPoint

The master public key.

`path` int[]

The path to derive.

Returns

JacobianPoint

The derived public key.

DerivePublicKeyWallet(JacobianPoint, int)

Derives a public key from the given master public key.

```
public static JacobianPoint DerivePublicKeyWallet(this JacobianPoint masterPublicKey,
int index)
```

Parameters

`masterPublicKey` JacobianPoint

The master public key.

`index` int

The index of the derived key.

Returns

JacobianPoint

The derived public key.

Class PrivateKey

Namespace: chia.dotnet.bls

Assembly: chia-dotnet-bls.dll

Represents a private key used in BLS cryptography.

```
public class PrivateKey
```

Inheritance

object ← PrivateKey

Inherited Members

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

Extension Methods

AugSchemeMPL.DeriveChildSk(PrivateKey, long) , AugSchemeMPL.DeriveChildSkUnhardened(PrivateKey, long) , AugSchemeMPL.Sign(PrivateKey, byte[]) , AugSchemeMPL.Sign(PrivateKey, string) , KeyDerivation.CalculateSyntheticPrivateKey(PrivateKey, byte[]) , KeyDerivation.DerivePrivateKey(PrivateKey, int, bool) , KeyDerivation.DerivePrivateKeyPath(PrivateKey, int[], bool)

Constructors

PrivateKey(BigInteger)

Initializes a new instance of the PrivateKey class with the specified value.

```
public PrivateKey(BigInteger value)
```

Parameters

`value` BigInteger

The value of the private key.

Fields

Length

The length of the private key in bytes.

```
public const byte Length = 48
```

Field Value

byte

Represents a private key used in BLS cryptography.

Size

The size of the private key in bytes.

```
public const int Size = 32
```

Field Value

int

Represents a private key used in BLS cryptography.

Value

The value of the private key as a BigInteger.

```
public readonly BigInteger Value
```

Field Value

BigInteger

Represents a private key used in BLS cryptography.

Methods

Aggregate(PrivateKey[])

Aggregates an array of private keys into a single private key.

```
public static PrivateKey Aggregate(PrivateKey[] privateKeys)
```

Parameters

`privateKeys` PrivateKey[]

The array of private keys to aggregate.

Returns

PrivateKey

The aggregated private key.

Equals(PrivateKey)

Determines whether the specified PrivateKey object is equal to the current PrivateKey.

```
public bool Equals(PrivateKey value)
```

Parameters

`value` PrivateKey

The PrivateKey object to compare with the current PrivateKey.

Returns

bool

`true` if the specified object is equal to the current object; otherwise, `false`.

FromBigInt(BigInteger)

Creates a PrivateKey instance from the specified BigInteger value.

```
public static PrivateKey FromBigInt(BigInteger value)
```

Parameters

`value` BigInteger

The BigInteger value representing the private key.

Returns

PrivateKey

A new PrivateKey instance.

FromBytes(byte[])

Creates a PrivateKey instance from the specified byte array.

```
public static PrivateKey FromBytes(byte[] bytes)
```

Parameters

`bytes` byte[]

The byte array representing the private key.

Returns

PrivateKey

A new PrivateKey instance.

FromHex(string)

Creates a PrivateKey instance from the specified hexadecimal string.

```
public static PrivateKey FromHex(string hex)
```

Parameters

`hex` string

The hexadecimal string representing the private key.

Returns

PrivateKey

A new PrivateKey instance.

FromSeed(byte[])

Creates a PrivateKey instance from the specified seed.

```
public static PrivateKey FromSeed(byte[] seed)
```

Parameters

`seed` byte[]

The seed used to generate the private key.

Returns

PrivateKey

A new PrivateKey instance.

FromSeed(string)

Creates a PrivateKey instance from the specified seed.

```
public static PrivateKey FromSeed(string seed)
```

Parameters

`seed` string

The seed used to generate the private key.

Returns

PrivateKey

A new PrivateKey instance.

GetG1()

Gets the corresponding G1 point on the elliptic curve. The G1 point is the PublicKey.

```
public JacobianPoint GetG1()
```

Returns

JacobianPoint

The G1 point.

ToBytes()

Converts the private key to a byte array.

```
public byte[] ToBytes()
```

Returns

byte[]

The byte array representation of the private key.

ToHex()

Converts the private key to a hexadecimal string.

```
public string ToHex()
```

Returns

string

The hexadecimal string representation of the private key.

ToString()

Returns a string that represents the current private key.

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

Returns

string

A string representation of the private key.