
lina Documentation

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Lina is a minimal template system for Python, modelled after Google's [CTemplate](#) library. It is designed to provide fast, safe template evaluation to generate code or other text documents.

```
enum DataTypes {
{{#types:list-separator=,NEWLINE}}  {{name}}={{value:hex}}{{/types}}
}
```

evaluated with:

```
types = [{'name':'Vector3i', 'value': 0x301}, {'name':'Vector3f', 'value': 0x302}]
```

will produce:

```
enum DataTypes {
    Vector3i = 0x301,
    Vector3f = 0x302
}
```


CHAPTER 1

Overview

The base class in Lina is `lina.Template` which must be initialized with the template contents. It can be then evaluated to a string using `lina.Template.Render()` and `lina.Template.RenderSimple()`.

Lina has two main directives, *values* and *blocks*. A value is something which is replaced directly by the provided value, while a block is used to iterate over collections. Both blocks and values can be optionally formatted using a formatter, which allows for example to turn a string into uppercase inside the template.

Values are escaped using double curly braces:

```
Hello {{name}}!
```

Blocks have an additional prefix before the variable, `#` for the block start and `/` for the block end:

```
{{#users}}Hello {{name}}!{{/users}}
```

This requires to pass an array of named objects:

```
template.Render ( {'users': [ {'name': 'Alice'}, {'name': 'Bob'} ] })
```


CHAPTER 2

Element access

In some cases, accessing members by names is unnecessary complicated. Lina provides a special syntax to access the *current* element, using a single dot. Using a self-reference, the template above can be simplified to:

```
{{#users}}Hello {{.}}!{{/users}}
```

and rendered with:

```
template.Render ({'users': ['Alice', 'Bob']})
```

or even simpler using `lina.Template.RenderSimple()`:

```
template.RenderSimple (users = ['Alice', 'Bob'])
```

Both self-references as well as values can also access fields of an object. Assuming the `User` class has fields `name`, `age`, the following template will print the user name and age:

```
{{#users}}Hello {{.name}}, you are {{.age}} years old!{{/users}}
```

For an object, use `{{item.field}}`. The field accessor syntax works for both fields as well as associative containers, that is, for Lina, the following two objects are equivalent:

```
u = {'name': 'Alice'}
```

and:

```
class User:
    def __init__(self, name):
        self.name = name

u = User ('Alice')
```

It is also possible to directly reference indexed items using `[0]`, `[1]`, etc. For instance, the following template:

```
{{#vectors}}X: {{.[0]}}, Y: {{.[1]}}, Z: {{.[2]}}\n{{/vectors}}
```

rendered with:

```
template.RenderSimple (vectors = [[0, 1, 2], [3, 4, 5]])
```

will produce:

```
X: 0, Y: 1, Z: 2
X: 3, Y: 4, Z: 5
```

For blocks, Lina provides additional modifiers to check whether the current block execution is the first, an intermediate or the last one:

```
{{#block}}{{variable}}{{#block#Separator}}, {{/block#Separator}}{{/block}}
```

`#First` will be only expanded for the first iteration, `#Separator` will be expanded for every expansion which is neither first nor last and `#Last` will be expanded for the last iteration only. If there is only one element, it will be considered both first and last item of the sequence.

If a block variable is not found, or the block is `None`, the block will be not expanded. It is possible to capture this case using `!` blocks, which are only expanded if the variable is not present:

```
{{!users}}No users :({{/users}}
```

Rendered with `template.Render()`, this will yield `No users : (`. This can be used to emulate conditional statements.

CHAPTER 4

Formatters

Lina comes with a few formatters which can be used to modify values or block elements. The value formatters are:

- `width, w`: This aligns a value to a specific width. Negative values align to the left. For example: `{{name:w=-8}}` using `name='Ton'` will yield “Ton”.
- `prefix` adds a prefix to a value. For example: `{{method:prefix=api_}}` with `method='Copy'` yields `api_Copy`
- `suffix` adds a suffix to a value. For example: `{{method:suffix=_internal}}` with `method='Copy'` yields `Copy_internal`
- `default` provides a default value in case the provided value is `None`. `{{name:default=Unknown}}` with `name=None` yields `Unknown`.
- `upper-case, uc` converts the provided value to upper case. `{{func:upper-case}}` with `func=Copy` yields `COPY`.
- `escape-newlines` escapes embedded newlines. `{{s:escape-newlines}}` with `s='foo\nbar'` yields `foo\\nbar`.
- `escape-string` escapes newlines, tabs, and quotes. `{{s:escape-string}}` with `s=a "string"` yields `a \"string\"`.
- `wrap-string` wraps the provided string with quotes. `{{s:wrap-string}}` with `s=string` yields `"string"`. If the value is not a string, it will not be wrapped.
- `cbool` converts booleans to `true` or `false`. `{{enabled:cbool}}` with `enabled=True` yields `true`. If the value is not a boolean, it will be returned as-is.
- `hex` prints numbers in hexadecimal notation. `{{i:hex}}` with `i=127` yields `0x7F`.

Lina provides the following block formatters:

- `indent` indents every line with a specified number of tabs. `{{#block:indent=2}}{{.}}{{/block}}` with `block=[1,2]` yields `\t\t1\t\t2`
- `list-separator, l-s` separates block repetitions using the provided value. `{{#block:l-s=,}}{{.}}{{/block}}` with `block=[1,2]` yields `1, 2`. `NEWLINE` is replaced with a new line, and `SPACE` with a space.

4.1 Whitespace & special characters

Whitespace in Lina is preserved. If you want to explicitly insert whitespace, you can use `{{_NEWLINE}}` to get a new line character inserted into the stream, and `{{_SPACE}}` to get a blank space. To produce a left brace or right brace, use `{{_LEFT_BRACE}}` and `{{_RIGHT_BRACE}}`.

5.1 API reference

class `lina.Formatter` (*formatterType*)

Bases: `object`

Base class for all formatters.

A formatter can be used to transform blocks/values during expansion.

Format (*text*)

Format a value or a complete block.

IsBlockFormatter ()

Check if this formatter is a block formatter.

IsValueFormatter ()

Check if this formatter is a value formatter.

OnBlockBegin (*isFirst*)

Called before a block is expanded.

Parameters **isFirst** – True if this is the first expansion of the block.

Returns String or None. If a string is returned, it is prepended before the current block expansion.

OnBlockEnd (*isLast*)

Called after a block has been expanded.

Parameters **isLast** – True if this is the last expansion of the block.

Returns String or None. If a string is returned, it is appended after the current block expansion.

class `lina.FormatterType`

Bases: `enum.Enum`

The formatter type, either `Block` or `Value`.

Block = 0

Value = 1

class `lina.IncludeHandler`

Bases: `object`

Base interface for include handlers.

Get (*name*)

exception `lina.InvalidBlock` (*message*, *position*)

Bases: `lina.TemplateException`

An invalid block was encountered.

exception `lina.InvalidFormatter` (*message*, *position*)

Bases: `lina.TemplateException`

An invalid formatter was encountered.

This exception is raised when a formatter could not be found or instantiated.

exception `lina.InvalidNamedCharacterToken` (*message*, *position*)

Bases: `lina.InvalidWhitespaceToken`

An invalid named character token was encountered.

exception `lina.InvalidToken` (*message*, *position*)

Bases: `lina.TemplateException`

An invalid token was encountered.

exception `lina.InvalidWhitespaceToken` (*message*, *position*)

Bases: `lina.TemplateException`

Only for backwards compatibility. Will be removed in 2.x.

class `lina.Template` (*template*, *includeHandler=None*, *, *filename=None*)

Bases: `object`

The main template class.

Render (*context*)

Render the template using the provided context.

RenderSimple (***items*)

Simple rendering function.

This is just a convenience function which creates the context from the passed items and forwards them to `Template.Render()`.

exception `lina.TemplateException` (*message*, *position*)

Bases: `Exception`

Base class for all exceptions thrown by Lina.

GetPosition ()

Get the position where the exception occurred.

Returns An object with two fields, `line` and `column`.

class `lina.TemplateRepository` (*templateDirectory*, *suffix=""*)

Bases: `lina.IncludeHandler`

A file template repository.

This template repository will load files from a specified folder.

Get (*name*)

class lina.**TextStream** (*text*, *, *filename=None*)

Bases: object

A read-only text stream.

The text stream is used for input only and keeps track of the current read pointer position in terms of line/column numbers.

Get ()

Get a character.

If the end of the stream has been reached, `None` is returned.

GetOffset ()

Get the current read offset in characters from the beginning of the stream.

GetPosition ()

Get the current read position as a pair (line, column).

IsAtEnd ()

Check if the end of the stream has been reached.

Peek ()

Peek at the next character in the stream if possible. Returns `None` if the end of the stream has been reached.

Reset ()

Reset back to the beginning of the stream.

Skip (*length*)

Skip a number of characters starting from the current position.

Substring (*start*, *end*)

Get a substring of the stream.

Unget ()

Move one character back in the input stream.

class lina.**Token** (*name*, *start*, *end*, *position*)

Bases: object

Represents a single token.

Each token may contain an optional list of flags, separated by colons. The grammar implemented here is:

```
[prefix]?[^[^:}]]+(:[^[^:}]]+), for example:
{{#Foo}} -> name = Foo, prefix = #
{{Bar:width=8}} -> name = Bar, prefix = None,
                    flags = {width:8}
```

The constructor checks if the formatter matches the token type. A block formatter can be only applied to a block token, and a value formatter only to a value.

EvaluateNamedCharacterToken (*position*)

Get the content of this token if this token is an escape character token.

If the content is not a valid character name, this function will raise `InvalidSpecialCharacterToken`.

GetEnd ()

Get the end offset.

GetFormatters ()
Get all active formatters for this token.

GetName ()
Get the name of this token.

GetPosition ()
Get the position as a (line, column) pair.

GetStart ()
Get the start offset.

IsBlockClose ()
Return true if this token is a block-close token.

IsBlockStart ()
Return true if this token is a block-start token.

IsInclude ()
Return true if this token is an include directive.

IsNamedCharacter ()
Return true if this token is a named character token.

IsNegatedBlockStart ()
Return true if this token is a negated block-start token.

IsSelfReference ()
Return true if this token is a self-reference.

IsValue ()

5.2 Release notes

5.2.1 1.0.10

- Added `{ {_LEFT_BRACE} }` and `{ {_RIGHT_BRACE} }` tokens.

5.2.2 1.0.9

- Applying block formatters to non-blocks and value formatters to non-values raises an error now. Previously, those were silently ignored.

5.2.3 1.0.8

- Packaging changes only.

5.2.4 1.0.7

- The formatter registration has been improved. Instead of a long `if-elif` cascade, it now jumps directly to the right formatter through a dictionary.

5.2.5 1.0.6

- Various build improvements.

5.2.6 1.0.5

- Handling of `None` blocks changed (i.e. set using `block_name = None`.) Instead of treating them as empty, they are now completely ignored. Only blocks initialized to an empty container (`{}`) are now treated as empty.

5.2.7 1.0.4

- Added a new `escape-string` formatter.

5.2.8 1.0.3

- Add support for negated blocks: `{{!block}}`

5.2.9 1.0.2

- Add support for self references via `{{.[0]}}`.

5.2.10 1.0.1

- Allow block formatters to write a suffix
- Add support for field access via `{{item.member}}`.

5.2.11 1.0

Initial public release.

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