Djula HTML templating system Documentation

Release 0.2

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Djula is an HTML templating system similar to Django templates for Common Lisp.

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INTRODUCTION

Djula is an HTML templating system similar to Django templates for Common Lisp.

Djula's template language is designed to strike a balance between power and ease. It's designed to feel comfortable to those used to working with HTML.

Philosophy

If you have a background in programming, or if you're used to languages which mix programming code directly into HTML, you'll want to bear in mind that the Djula template system is not simply Common Lisp code embedded into HTML. This is by design: the template system is meant to express presentation, not program logic.

The Djula template system provides tags which function similarly to some programming constructs – an if tag for boolean tests, a for tag for looping, etc. – but these are not simply executed as the corresponding Lisp code, and the template system will not execute arbitrary Lisp expressions. Only the tags, filters and syntax listed below are supported by default (although you can add your own extensions to the template language as needed).

1.1 Prerequisites

TODO: list of Common Lisp compilers Djula works on.

1.2 Installation

Djula is available on Quicklisp:

(ql:quickload :djula)

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BASICS

A template is simply a text file. It can generate any text-based format (HTML, XML, CSV, etc.).

A template contains **variables**, which get replaced with values when the template is evaluated, and **tags**, which control the logic of the template.

Below is a minimal template that illustrates a few basics. Each element will be explained later in this document.

6 Chapter 2. Basics

THREE

USAGE

To render our templates, they need to be compiled first. We do that with the COMPILE-TEMPLATE* function. For inheritance to work, we need to put all the templates in the same directory so that Djula can find them when resolving templates inheritance.

Djula looks for templates in the *CURRENT-STORE*. For our templates to be found, we have to add the template folder path the templates store. We can do that with the add-template-directory function.

Here is an example:

```
(add-template-directory (asdf:system-relative-pathname "webapp" "templates/"))
(defparameter +base.html+ (djula:compile-template* "base.html"))
(defparameter +welcome.html+ (djula:compile-template* "welcome.html"))
(defparameter +contact.html+ (djula:compile-template* "contact.html"))
```

Then we can render our compiled templates using the RENDER-TEMPLATE* function:

3.1 API

function (add-template-directorydirectory &optional) template-store *current-store*

generic (compile-templatecompiler name &optional error-p)

Provides a hook to customize template compilation.

Specializers

- (toplevel-compiler common-lisp:t)
- (compiler common-lisp:t)

function (compile-template*name)

Compiles template NAME with compiler in CURRENT-COMPILER

function (render-template*template &optional stream &rest *template-arguments*)

Render TEMPLATE into STREAM passing TEMPLATE-ARGUMENTS

8 Chapter 3. Usage

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VARIABLES

Variables look like this: {{ variable }}. When the template engine encounters a variable, it evaluates that variable and replaces it with the result. Variable names consist of any combination of alphanumeric characters and the underscore ("_"). The dot (".") also appears in variable sections, although that has a special meaning, as indicated below. Importantly, you cannot have spaces or punctuation characters in variable names.

Use a dot (.) to access attributes of a variable.

Behind the scenes

For accessing variables the ACCESS Common Lisp library is used: https://github.com/AccelerationNet/access

In the above example, {{ section.title }} will be replaced with the title attribute of the section object.

Note that "bar" in a template expression like { { foo.bar }} will be interpreted as a literal string and not using the value of the variable "bar", if one exists in the template context.

FIVE

TAGS

5.1 Overview

Tags look like this: {% tag %}. Tags are more complex than variables: Some create text in the output, some control flow by performing loops or logic, and some load external information into the template to be used by later variables.

Some tags require beginning and ending tags (i.e. $\{\% \text{ tag } \%\} \dots \text{ tag contents } \dots \text{ } \{\% \text{ endtag } \%\}$).

Here are some of the more commonly used tags:

for Loop over each item in an array. For example, to display a list of athletes provided in athlete-list:

```
{% for athlete in athlete-list %}
     {{ athlete.name }}
{% endfor %}
```

if, **else** Evaluates a variable, and if that variable is "true" the contents of the block are displayed:

```
{% if athlete-list %}
   Number of athletes: {{ athlete-list|length }}
{% else %}
   No athletes.
{% endif %}
```

block and extends Set up 'template inheritance'_ (see below), a powerful way of cutting down on "boilerplate" in templates.

5.2 List of tags

Tags

- block
- extends
- super
- comment
- cycle
- debug
- filter
- firstof
- for
- if
- Boolean operators
- ifchanged
- ifequal
- ifnotequal
- include

5.2.1 block

Defines a block that can be overridden by child templates.

Sample usage:

```
{% block stylesheets %}
...
{% endblock %}
```

See Template inheritance for more information.

5.2.2 extends

Extends a template

Sample usage:

```
{% extends "base.html" %}
```

5.2.3 super

Gets the content of the block from the parent template. You can pass the name of the block of the parent block you want to access. If no name is passed, then the current block's parent is used.

Sample usage:

```
{% super "stylesheets" %}

{% block stylesheets %}
  {% super %}

{% endblock %}
```

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5.2.4 comment

Ignores everything between {% comment %} and {% endcomment %}. An optional note may be inserted in the first tag. For example, this is useful when commenting out code for documenting why the code was disabled.

Sample usage:

```
Rendered text with {{ pub-date|date }}
{% comment "Optional note" %}
      Commented out text with {{ create-date|date }}
{% endcomment %}
```

comment tags cannot be nested.

5.2.5 cycle

Produces one of its arguments each time this tag is encountered. The first argument is produced on the first encounter, the second argument on the second encounter, and so forth. Once all arguments are exhausted, the tag cycles to the first argument and produces it again.

This tag is particularly useful in a loop:

The first iteration produces HTML that refers to class row1, the second to row2, the third to row1 again, and so on for each iteration of the loop.

You can use variables, too. For example, if you have two template variables, rowvalue1 and rowvalue2, you can alternate between their values like this:

You can mix variables and strings:

You can use any number of values in a cycle tag, separated by spaces. Values enclosed in double quotes (") are treated as string literals, while values without quotes are treated as template variables.

5.2.6 debug

Outputs a whole load of debugging information

5.2. List of tags

5.2.7 filter

Filters the contents of the block through one or more filters. Multiple filters can be specified with pipes and filters can have arguments, just as in variable syntax.

Note that the block includes *all* the text between the filter and endfilter tags.

Sample usage:

```
{% filter force-escape|lower %}
    This text will be HTML-escaped, and will appear in all lowercase.
{% endfilter %}
```

Note: The escape and safe filters are not acceptable arguments. Instead, use the autoescape tag to manage autoescaping for blocks of template code.

5.2.8 firstof

Outputs the first argument variable that is not False. Outputs nothing if all the passed variables are False.

Sample usage:

```
{% firstof var1 var2 var3 %}
```

You can also use a literal string as a fallback value in case all passed variables are False:

```
{% firstof var1 var2 var3 "fallback value" %}
```

5.2.9 for

Loops over each item in an array, making the item available in a context variable. For example, to display a list of athletes provided in athlete-list:

```
{% for athlete in athlete-list %}
     {i>{{ athlete.name }}
{% endfor %}
```

5.2.10 if

The {% if %} tag evaluates a variable, and if that variable is "true" (i.e. exists, is not empty, and is not a false boolean value) the contents of the block are output:

```
{% if athlete-list %}
    Number of athletes: {{ athlete-list|length }}
{% else %}
    No athletes.
{% endif %}
```

In the above, if athlete-list is not empty, the number of athletes will be displayed by the $\{\{athlete-list|length\}\}$ variable.

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5.2.11 Boolean operators

```
if tags may use and, or or not to test a number of variables or to negate a given variable:
```

```
{% if athlete-list and coach-list %}
   Both athletes and coaches are available.
{ % endif % }
{% if not athlete-list %}
   There are no athletes.
{ % endif % }
{% if athlete-list or coach-list %}
   There are some athletes or some coaches.
{ % endif % }
{% if not athlete-list or coach-list %}
   There are no athletes or there are some coaches (OK, so
   writing English translations of boolean logic sounds
   stupid; it's not our fault).
{ % endif % }
{% if athlete-list and not coach-list %}
   There are some athletes and absolutely no coaches.
{% endif %}
```

Use of both and and or clauses within the same tag is allowed, with and having higher precedence than or e.g.:

```
will be interpreted like:
(if (or (athlete-list and coach-list) cheerleader-list) ..)
```

{% if athlete-list and coach-list or cheerleader-list %}

Use of actual parentheses in the if tag is invalid syntax. If you need them to indicate precedence, you should use nested if tags.

5.2.12 ifchanged

Check if a value has changed from the last iteration of a loop.

The {% ifchanged %} block tag is used within a loop.

If given one or more variables, check whether any variable has changed.

For example, the following shows the date every time it changes, while showing the hour if either the hour or the date has changed:

```
{% for date in days %}
    {% ifchanged date.date %} {{ date.date }} {% endifchanged %}
    {% ifchanged date.hour date.date %}
        {{ date.hour }}
        {% endifchanged %}
        {% endfor %}
```

The ifchanged tag can also take an optional {% else %} clause that will be displayed if the value has not changed:

5.2. List of tags

5.2.13 ifequal

Output the contents of the block if the two arguments equal each other.

Example:

```
{% ifequal user.pk comment.user-id %}
...
{% endifequal %}
```

As in the if tag, an {% else %} clause is optional.

The arguments can be hard-coded strings, so the following is valid:

```
{% ifequal user.username "adrian" %}
...
{% endifequal %}
```

An alternative to the ifequal tag is to use the if tag and the == operator.

5.2.14 ifnotequal

Just like ifequal, except it tests that the two arguments are not equal.

An alternative to the ifnotequal tag is to use the if tag and the != operator.

5.2.15 include

Loads a template and renders it with the current context. This is a way of "including" other templates within a template.

The template name can either be a variable or a hard-coded (quoted) string, in either single or double quotes.

This example includes the contents of the template "foo/bar.html":

```
{% include "foo/bar.html" %}
```

5.3 Custom tags

TODO

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COMMENTS

To comment-out part of a line in a template, use the comment syntax: $\{\# \#\}$.

For example, this template would render as 'hello':

```
{# greeting #}hello
```

A comment can contain any template code, invalid or not. For example:

```
{# {% if foo %}bar{% else %} #}
```

This syntax can only be used for single-line comments (no newlines are permitted between the { # and # } delimiters). If you need to comment out a multiline portion of the template, see the comment tag.

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FILTERS

7.1 Overview

You can modify variables for display by using filters.

Filters look like this: {{ name|lower}}}. This displays the value of the {{ name }} variable after being filtered through the lower filter, which converts text to lowercase. Use a pipe (|) to apply a filter.

Filters can be "chained." The output of one filter is applied to the next. {{ text|escape|linebreaks }} is a common idiom for escaping text contents, then converting line breaks to tags.

Some filters take arguments. A filter argument looks like this: $\{\{bio|truncatewords:30\}\}$. This will display the first 30 words of the bio variable.

Filter arguments that contain spaces must be quoted; for example, to join a list with commas and spaced you'd use { { list|join:", " } }.

Djula provides about thirty built-in template filters. You can read all about them in the *built-in filter reference*. To give you a taste of what's available, here are some of the more commonly used template filters:

7.2 List of filters

Filters

- add
- addslashes
- capfirst
- cut
- date
- time
- datetime
- default
- sort
- reverse
- first
- join
- last
- length
- linebreaks
- linebreaksbr
- lower
- safe
- slice
- format
- time
- truncatechars
- upper
- urlencode

7.2.1 add

Adds the argument to the value.

For example:

```
{{ value | add "2" }}
```

If value is 4, then the output will be 6.

7.2.2 addslashes

Adds slashes before quotes. Useful for escaping strings in CSV, for example.

For example:

```
{{ value|addslashes }}
```

If value is "I'm using Djula", the output will be "I\'m using Djula".

7.2.3 capfirst

Capitalizes the first character of the value. If the first character is not a letter, this filter has no effect.

For example:

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```
{{ value|capfirst }}
```

If value is "djula", the output will be "Djula".

7.2.4 cut

Removes all values of arg from the given string.

For example:

```
{{ value|cut:" " }}
```

If value is "String with spaces", the output will be "Stringwithspaces".

7.2.5 date

Formats a date

```
Example:: {{ date-today | date }}
```

A LOCAL-TIME format spec can be provided:

```
{{ date-today | date ()
```

7.2.6 time

Formats a time

Example:

```
{{ time-now | time }}
```

7.2.7 datetime

Formats a date and time

Example:

```
{{ time-now | datetime }}
```

7.2.8 default

If value evaluates to False, uses the given default. Otherwise, uses the value.

For example:

```
{{ value|default "nothing" }}
```

If value is "" (the empty string), the output will be nothing.

7.2. List of filters 21

7.2.9 sort

Takes a list and returns that list sorted.

For example:

```
{{ list | sort }}
```

7.2.10 reverse

Takes a list and returns that list reversed.

For example:

```
{{ list | reverse }}
```

7.2.11 first

Returns the first item in a list.

For example:

```
{{ value|first }}
```

If value is the list ("a" "b" "c"), the output will be "a".

7.2.12 join

Joins a list with a string.

For example:

```
{{ value|join:" // " }}
```

If value is the list ("a" "b" "c"), the output will be the string "a // b // c".

7.2.13 last

Returns the last item in a list.

For example:

```
{{ value|last }}
```

If value is the list ("a" "b" "c" "d"), the output will be the string "d".

7.2.14 length

Returns the length of the value. This works for both strings and lists.

For example:

```
{{ value|length }}
If value is ("a" "b" "c" "d") or "abcd", the output will be 4.
```

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7.2.15 linebreaks

Replaces line breaks in plain text with appropriate HTML; a single newline becomes an HTML line break (
p and a new line followed by a blank line becomes a paragraph break (</p>).

For example:

```
{{ value|linebreaks }}
```

If value is Joel\nis a slug, the output will be Joel
is a slug.

7.2.16 linebreaksbr

Converts all newlines in a piece of plain text to HTML line breaks (
).

For example:

```
{{ value|linebreaksbr }}
```

If value is Joel\nis a slug, the output will be Joel
is a slug.

7.2.17 lower

Converts a string into all lowercase.

For example:

```
{{ value|lower }}
```

If value is Still MAD At Yoko, the output will be still mad at yoko.

7.2.18 safe

Marks a string as not requiring further HTML escaping prior to output. When autoescaping is off, this filter has no effect.

Note: If you are chaining filters, a filter applied after safe can make the contents unsafe again. For example, the following code prints the variable as is, unescaped:

```
{{ var|safe|escape }}
```

7.2.19 slice

Returns a slice of a sequence (i.e. lists, vectors, strings)

Uses the Common Lisp cl-slice library.

Syntax:

```
{{ seq | slice: slices }}
```

Each slice selects a subset of subscripts along the corresponding axis.

• A nonnegative integer selects the corresponding index, while a negative integer selects an index counting backwards from the last index:

7.2. List of filters 23

```
{{ list | slice: 4 }}
```

if the list is (1 2 3 4 5 6) it will output (5)

• (start . end) to select a range. When end is NIL, the last index is included.

Each boundary is resolved according to the other rules if applicable, so you can use negative integers:

```
{{ string | slice: (0 . 5) }} {{ string | slice: (5 . nil) }}
```

if the string is "Hello world" is will output Hello and world.

7.2.20 format

Formats the variable according to the argument, a string formatting specifier. This specifier uses Common Lisp string formatting syntax

For example:

```
{{ value | format:"~:d" }}
```

If value is 1000000, the output will be 1,000,000.

7.2.21 time

Formats a time according to the given format.

For example:

```
{{ value | time }}
```

7.2.22 truncatechars

Truncates a string if it is longer than the specified number of characters. Truncated strings will end with a translatable ellipsis sequence ("...").

Argument: Number of characters to truncate to

For example:

```
{{ value|truncatechars:9 }}
```

If value is "Joel is a slug", the output will be "Joel i...".

7.2.23 upper

Converts a string into all uppercase.

For example:

```
{{ value|upper }}
```

If value is "Joel is a slug", the output will be "JOEL IS A SLUG".

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7.2.24 urlencode

Escapes a value for use in a URL.

For example:

```
{{ value|urlencode }}

If value is "http://www.example.org/foo?a=b&c=d", the output will be "http%3A//www.example.org/foo%3Fa%3Db%26c%3Dd".
```

An optional argument containing the characters which should not be escaped can be provided.

If not provided, the 'l' character is assumed safe. An empty string can be provided when *all* characters should be escaped. For example:

```
{{ value|urlencode:"" }}
```

If value is "http://www.example.org/", the output will be "http%3A%2F%2Fwww.example.org%2F".

7.3 Internationalization tags and filters

TODO

7.4 Custom filters

TODO

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TEMPLATE INHERITANCE

The most powerful – and thus the most complex – part of Djula's template engine is template inheritance. Template inheritance allows you to build a base "skeleton" template that contains all the common elements of your site and defines **blocks** that child templates can override.

It's easiest to understand template inheritance by starting with an example:

```
<!DOCTYPE html>
<html lang="en">
<head>
    <link rel="stylesheet" href="style.css" />
    <title>{% block title %}My amazing site{% endblock %}</title>
</head>
<body>
    <div id="sidebar">
        {% block sidebar %}
        <111>
           <a href="/">Home</a>
           <a href="/blog/">Blog</a>
        {% endblock %}
    </div>
    <div id="content">
        {% block content %}{% endblock %}
</body>
</html>
```

This template, which we'll call base.html, defines a simple HTML skeleton document that you might use for a simple two-column page. It's the job of "child" templates to fill the empty blocks with content.

In this example, the block tag defines three blocks that child templates can fill in. All the block tag does is to tell the template engine that a child template may override those portions of the template.

A child template might look like this:

```
{% endfor %}
{% endblock %}
```

The extends tag is the key here. It tells the template engine that this template "extends" another template. When the template system evaluates this template, first it locates the parent – in this case, "base.html".

At that point, the template engine will notice the three block tags in base.html and replace those blocks with the contents of the child template. Depending on the value of blog_entries, the output might look like:

```
<!DOCTYPE html>
<html lang="en">
<head>
   <link rel="stylesheet" href="style.css" />
   <title>My amazing blog</title>
</head>
<body>
   <div id="sidebar">
       <u1>
           <a href="/">Home</a>
           <a href="/blog/">Blog</a>
       </div>
   <div id="content">
       <h2>Entry one</h2>
       This is my first entry.
       <h2>Entry two</h2>
       This is my second entry.
   </div>
</body>
</html>
```

Note that since the child template didn't define the sidebar block, the value from the parent template is used instead. Content within a {% block %} tag in a parent template is always used as a fallback.

You can use as many levels of inheritance as needed. One common way of using inheritance is the following three-level approach:

- Create a base.html template that holds the main look-and-feel of your site.
- Create a base_SECTIONNAME.html template for each "section" of your site. For example, base_news.html, base_sports.html. These templates all extend base.html and include section-specific styles/design.
- Create individual templates for each type of page, such as a news article or blog entry. These templates extend the appropriate section template.

This approach maximizes code reuse and makes it easy to add items to shared content areas, such as section-wide navigation.

Here are some tips for working with inheritance:

- If you use {% extends %} in a template, it must be the first template tag in that template. Template inheritance won't work, otherwise.
- More {% block %} tags in your base templates are better. Remember, child templates don't have to define all parent blocks, so you can fill in reasonable defaults in a number of blocks, then only define the ones you need later. It's better to have more hooks than fewer hooks.

- If you find yourself duplicating content in a number of templates, it probably means you should move that content to a {% block %} in a parent template.
- If you need to get the content of the block from the parent template, the {{ block.super }} variable will do the trick. This is useful if you want to add to the contents of a parent block instead of completely overriding it. Data inserted using {{ block.super }} will not be automatically escaped (see the 'next section'_), since it was already escaped, if necessary, in the parent template.
- For extra readability, you can optionally give a *name* to your {% endblock %} tag. For example:

```
{% block content %}
...
{% endblock content %}
```

In larger templates, this technique helps you see which {% block %} tags are being closed.

Finally, note that you can't define multiple block tags with the same name in the same template. This limitation exists because a block tag works in "both" directions. That is, a block tag doesn't just provide a hole to fill – it also defines the content that fills the hole in the *parent*. If there were two similarly-named block tags in a template, that template's parent wouldn't know which one of the blocks' content to use.

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NINE

ERROR HANDLING

Djula catches errors and barfs them to the template output by default.

That is controlled via the \star CATCH-TEMPLATE-ERRORS-P \star . If changed to NIL, then errors are not caught anymore and are debuggable from the lisp listener.

Djula provides more or less verbosity in template errors. Verbosity is controlled via the variable $\star VERBOSE-ERRORS-P\star$.

Also, there's a fancy page to display errors, which can be disabled if desired. That is controlled via the variable *FANCY-ERROR-TEMPLATE-P*

9.1 API

variable *catch-template-errors-p*
variable *fancy-error-template-p*
variable *verbose-errors-p*

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