Scalite

A blog-aware static site generator

by M Ahsan Al Mahir
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What is it?

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The output is a static website with the HTML, CSS and JS files in proper directory structure.

» How it works

The user sets up a folder with the following folder structure:

```
.
+-- _assets
|   +-- website assets go here
+-- _layouts
|   +-- template files go here
+-- _plugins
|   +-- plugins go here
+-- _posts
|   +-- posts (in a blog) or other page contents go here
+-- _sass
|   +-- stylesheets go here
+-- _config.yml
```

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- For each specified page, loads its template, converted contents and compiles the files into final HTML files
- Creates the destination folder, copies the pages and assets to the destination folder

Listing: hello_world.md

```
---
# YAML header
# local variables, configs
title: Front Page
tag: tag1, tag2
---

Hello, **World**!
```

Listing: page.mustache

```
<html>
  <body>
    <header>
      {{ title }}
    </header>
    {{> content}}
  </body>
</html>
```

Listing: hello_world.html

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<html>
  <body>
    <header>
      Front Page
    </header>
    Hello, <b>World</b>!
  </body>
</html>
```

» Motivation

Scalite is inspired from **Jekyll**. It's is an attempt to recreate Jekyll while generalizing many of its features.

Scalite attempts to identify the core components, and make them as loosely coupled as possible.

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  - the website structure should be easily modifyable

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- Great deal of consideration is needed to define what plugins can and can't control
  - There might be data leakage bugs unless immutable data structures are used throughout

Project Structure

» Project structure: Basis

Basis modules that are more or less used by all other modules:

- **`documents`**: module defining interfaces for common features
  - **`Assets`**: Class to handle asset files
  - **`Convertible`**: files that need to be converted to some other format
  - **`Page, Renderable, SourceFile`**: Mixins defining properties

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- **`util`**: utility functions, parsers, logging mechanism etc.

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  - **`Layouts`**: Singleton object with all layouts of various languages available at runtime

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Contents of the website *are* defined *as* `Collections` of `Elements`.

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  - **`Collections`**: Singleton object holding all available collections

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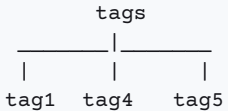

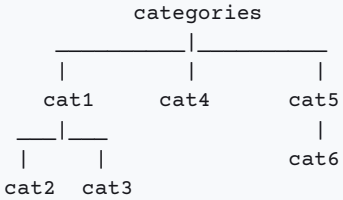

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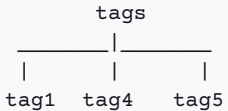

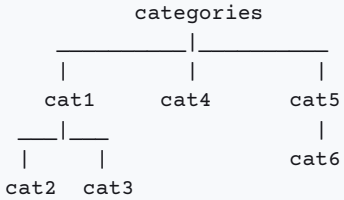

Here, each post, page or any other element can belong to any number of tag $\texttt{tag}_i$ and any number of category $\texttt{cat}_i$.

If the user wishes, these tree nodes can be rendered into seperate webpages to make navigation in the website easier.

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  - Hooks are implemented in Publisher-Subscriber pattern
  - They are added to the objects at runtime by the `PluginManager`.

» Project structure: Config file

The config file `/_config.yml` allows the user to set global configurations. It has the structure

```
#-- Global settings and variables --#
title: My site  # variable
show_excerpts: false  # setting

#-- Module settings --#
collections: #-- settings to be passed to Collections object --#
    posts: true
    articles:
        output: true
        folder: /_articles
plugins:
    textile: #-- settings to be passed to textile plugin --#
```

» Project structure: Putting it together

`Site` class at the root of the project puts all of the components together:

- Load global configurations from `/_config.yml`
- Send configurations to each module and load plugins
- `build()` command processes all the modules

» Libraries

- **`weePickle`**: To read configurations from YAML files and create internal repsentations of the data
- **`nscala-time`**: To handle date-time calculation
- **`scala-parallel-collections`**: For concurrency
- **`scala-uri`**: To parse/simplify url/uri
- **`laika`**: For the default Markdown->HTML converter
- **`scala-logging`** and **`logback-classic`**: To support logging
- **`scala-mustache`**: The default compiler for mustache templates

Implementation Details

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- Modules are written in builder design pattern.
  - The constructors for the objects are specified at the runtime, based on the plugins provided, or the configuration files
- Work is done by singleton objects, that
  - receive configurations
  - set up the constructors
  - fetches and arranges files
  - compilers/renders files
  - writes them back to the disk

» Collections

```
1  object Collections extends Configurable with Generator:
2    /** section in the configs */
3    val sectionName: String = "collections"
4
5    /** Avaiable Element styles */
6    private val styles = LinkedHashMap[String, ElemConstructor](
7      "post" -> PostConstructor,
8      "page" -> PageConstructor,
9      "item" -> ItemConstructor
10   )
11
12   /** Plugins may add more constructors to this table */
13   def addStyle(elemCons: ElemConstructor): Unit = ...
14   ...
```

» Collections: apply

```
1  ...
2  private val collections = ListBuffer[Collection]()
3
4  /** process all collections and writes to destination */
5  def process(dryRun: Boolean = false): Unit =
6    for col <- collections.par do col.process(dryRun)
7
8  /** Gets configuration set in "collections" section of
9    * '_configs.yml' and creates necessary Collection objects */
10 def apply(_configs: MObj, globals: IObj): Unit =
11   // update method is provided by data module
12   val configs = defaultConfigs update _configs
13
14   // get values from the configs
15   val base = /** base directory **/
16   val colsDir = /** relative directory where collections are */
```

» Collections: apply cont.

```
1    // create collection for each name in collecionsDir
2    for (name, config) <- configs do
3      config match
4        case config: MObj =>
5          // what kind of elements we want to make
6          val style = config.extractOrElse("style")("item")
7          val output = /** write the elements to destination? */
8          if !output then logger.debug(s"won't output ${RED(name)}")
9          else
10           val dir = /** absolute directory of elements */
11           val Col =
12             Collection( styles(style), // element constructor
13                         name, dir, configs, globals )
14           /** handle item collections so that other collections
15             * have access to the items */
16           collections += Col // add to the collections map
17       case _ => /** log error */
```

» Collection

```
class Collection(
    private val elemCons: ElemConstructor, // element constructor
    val name: String, // name of collection
    private val directory: String, // absolute directory
    _configs: MObj, // configs for this collection
    protected val globals: IObj // global configs and variables
) extends Renderable with Page:

  /** fetch all items of this collection */
  lazy val items: Map[String, Element] =
    lazy val constructor =  elemCons(name) // create the constructor
    val files = getListOfFilepaths(directory)

    def f(fn: String) = /** construct fn -> Element object pair */
    files.filter(Converters.hasConverter).map(f).toMap
```

» Collection:process

```
protected[collections] def process(dryrun: Boolean = false) =
  for item <- items.values do
    item match
      case item: Page => item.write(dryrun) // only write Pages
      case _          => ()
  write(dryrun) // write the index page of this collection
  CollectionHooks.afterWrites(globals)(this)
  // run after write hooks attached to the collections
```

» Page: write

```
1  trait Page:
2    this: Renderable =>
3
4    def write(dryRun: Boolean = false): Unit =
5      if !visible then return
6      val path = /** destination */
7
8      if !dryRun then
9        val up = PageHooks.beforeRenders(globals)(locals)
10       val str = render(IObj(up))
11       val r = PageHooks.afterRenders(globals)(locals, str)
12       writeTo(path, r)
13       PageHooks.afterWrites(globals)(this)
14     else return
```