The Notebookinator

Easy formatting for robotics notebooks.

v1.0.0

https://github.com/BattleCh1cken/notebookinator

ABSTRACT

Welcome to the Notebookinator, a Typst package meant to simplify the notebooking process for the Vex Robotics Competition. Its theming capabilities handle all of the styling for you, letting you jump right into writing documentation.

While it was designed with VRC in mind, it could just as easily be used for other competitor systems such as the First Robotics Competition and the First Tech Challenge.

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1. Installation

i Info

This installation process is temporary, as we wait for Typst to overhaul its process for packaging templates and packages.

The best way to install the Notebookinator is as a local package. Make sure you have the following software installed on your computer:

- Typst
- Git
- VSCode
- just

Once you've installed everything, simply run the following commands:

```
git clone https://github.com/BattleCh1cken/notebookinator
cd notebookinator
just install
```

Info

If you're running this on Windows, you'll need to run these commands in a sh shell, like git-bash or the shell packaged with Cygwin or GitHub Desktop.

2. Basic Usage

Once the template is installed, you can import it into your project like this:

```
#import "@local/notebookinator:1.0.0": *
```

Once you've done that you can begin to write your notebook:

```
#import themes.default: default-theme, components

#show: notebook.with(theme: default-theme)

#create-body-entry(title: "My Entry")[
    #lorem(200)
]
```

You can then compile your notebook with the Typst CLI:

```
typst compile your-notebook-file.typ bash
```

3. API Reference

3.1. Template

3.1.1. notebook

The base notebook template. This function is meant to be applied to your entire document as a show rule.

```
#import themes.default: default-theme

#show: notebook.with(
   theme: default-theme
)
```

```
3.1.1.1. Parameters
  notebook(
   team-name: string,
   season: string,
   year: string,
   cover: content,
   theme: theme,
   body: content
  ) -> content
  team-name
                   string
  The name of your team.
  Default: none
  season
             string
  The name of the current season.
  Default: none
  year
          string
  The years in which the notebook is being written.
  Default: none
  cover
            content
  The title page of the notebook.
  Default: none
```

theme theme

The theme that will be applied to all of the entries. If no theme is specified, it will fall back on the default theme.

Default: (:)

body content

The content of the notebook. This will be ignored. Use the create-entry functions instead.

3.2. Entries

3.2.1. create-entry

The generic entry creation function. This function has three entry variants - frontmatter, body, and appendix - used to create each page.

3.2.1.1. Parameters

```
create-entry(
  section: string,
  title: string,
  type: string,
  date: datetime,
  author,
  witness,
  body: content
)
```

section string

The type of entry. Takes either "frontmatter", "body", or "appendix".

Default: none

title string

The title of the entry.

Default: ""

type string

The type of entry. The possible values for this are decided by the theme.

Default: none

```
date datetime

The date that the entry occured at.

Default: none

body content

The content of the entry.
```

3.2.2. create-frontmatter-entry

Variant of the #create-entry() function that creates a frontmatter entry.

Example Usage:

```
#create-frontmatter-entry(title: "Frontmatter")[
    #lorem(50)
]
```

3.2.3. create-body-entry

Variant of the #create-entry() function that creates a body entry.

Example Usage:

```
#create-body-entry(
   title: "Title",
   date: datetime(year: 2024, month: 1, day: 1),
   type: "identify", // Change this depending on what your theme allows
   author: "Bobert",
   witness: "Bobernius",
)[
   #lorem(50)
]
```

3.2.4. create-appendix-entry

Variant of the #create-entry() function that creates an appendix entry.

```
#create-appendix-entry(title: "Appendix")[
  #lorem(50)
]
```

3.3. Glossary

3.3.1. add-term

Adds a term and definition to the glossary

Example Usage

```
#glossary.add-term("Term")[
                                                                              typ
 Definition
```

```
3.3.1.1. Parameters
  add-term(
  word: string,
  definition: string
  word
           string
 The word you're defining
  definition
                string
  The definition of the word
```

3.4. Additional Datatypes

3.4.1. Theme

Themes are stored as dictionaries with a set number of fields.

rules function

The show and set rules that will be applied to the document

cover function

A function that returns the cover of the notebook. Must take ctx as input.

frontmatter-entry function

A function that returns a frontmatter entry. Must take ctx and body as input.

body-entry function

A function that returns a body entry. Must take ctx body as input.

appendix-entry function

A function that returns a appendix entry. Must take ctx and body as input.

3.4.2. Context

Provides information to a callback about how it's being called.

Context is stored as a dictionary with the following fields:

title string

The title of the entry

type string or none

The type of the entry. This value is used differently by different templates. Refer to the template level documentation to see what this means for your theme.

start-date datetime

The date at which the entry started.

end-date datetime

The date at which the entry ended.

page-number integer or none

The page number of the first page of the entry. Only available while using the print-toc() utility function.

3.5. Default Theme

The default theme.

Warning

This theme is very minimal, and is generally intended as a fallback for stuff that other themes don't implement.

3.5.1. Components

3.5.1.1. toc

Print out the table of contents

Example Usage:

```
#create-frontmatter-entry(title: "Table of Contents")[
   #components.toc()
]
```

Parameters

toc()

3.5.1.2. glossary

Prints out the glossary.

```
#create-appendix-entry(title: "Glossary")[
  #components.glossary()
]
```

Parameters

glossary()

3.5.1.3. decision-matrix

A decision matrix table.

Example Usage

```
#components.decision-matrix(
    properties: (
        (name: "Flavor", weight: 2),
        (name: "Crunchiness"), // The weight defaults to 1
    ),
    ("Sweet Potato", 1, 2),
    ("Baked Potato", 2, 1)
)
```

Parameters

```
decision-matrix(
  properties: array,
    ..choices: array
) -> content
```

properties array

A list of the properties that each choice will be rated by and the weight of each property

Default: ()

..choices array

An array containing the name of the choices as its first member, and values for each of the properties at its following indices

3.5.1.4. pro-con

A table displaying pros and cons.

```
#components.pro-con(
pros: [
    #list(
        "Sweet potato",
        "Baked potato"
)
```

```
],
cons: [
    #list(
     "Fries",
     "Wedges"
    )
]
```

Parameters

```
pro-con(
pros: content,
cons: content
)-> content

The positive aspects

Default: []

cons content

The negative aspects

Default: []
```

3.6. Radial Theme

The Radial theme is a minimal theme focusing on nice, rounded corners.

You can change the look of body entries by changing their type. The following types are available:

- "identify": For entries about the identify stage of the engineering design process.
- "brainstorm": For entries about the brainstorm stage of the engineering design process.
- "decide": For entries about the decide stage of the engineering design process.
- "build": For entries about the build stage of the engineering design process.
- "program": For entries about the programming stage of the engineering design process.
- "test": For entries about the testing stage of the engineering design process.
- "management": For entries about team management
- "notebook": For entries about the notebook itself

Minimal starting point:

```
// Import the template and theme here

#show: notebook.with(theme: radial-theme)

#create-frontmatter-entry(title: "Table of Contents")[
    #components.toc()
]
```

```
#create-body-entry(
 title: "Sample Entry", type: "identify", start-date: datetime(year: 1984, month:
1, day: 1),
] (
= Top Level heading
#lorem(20)
#components.admonition(type: "note")[
  \#lorem(20)
#components.pro-con(pros: [
  #lorem(50)
], cons: [
 #lorem(20)
#components.decision-matrix(
 properties: ("Flavor", "Versatility", "Crunchiness"), ("Sweet Potato", 5, 3, 1),
("White Potato", 1, 2, 3), ("Purple Potato", 2, 2, 2),
]
#create-appendix-entry(title: "Glossary")[
 #components.glossary()
]
```

3.6.1. Components

3.6.1.1. toc

Print out the table of contents

Example Usage:

```
#create-frontmatter-entry(title: "Table of Contents")[
  #components.toc()
]
```

Parameters

toc()

3.6.1.2. glossary

Print out the glossary

```
#create-frontmatter-entry(title: "Glossary")[
#components.glossary()
```

]

Parameters

```
glossary()
```

3.6.1.3. admonition

A message in a colored box meant to draw the reader's attention.

Parameters

```
admonition(
  type: string,
  body: content
) -> content
```

type string

The type of admonition. Available types include:

- "note"
- "example"
- "quote"
- "equation"
- "decision"
- "build"

Default: none

body content

The content of the admonition

3.6.1.4. pro-con

A table displaying pros and cons.

Parameters

```
pro-con(
  pros: content,
  cons: content
) -> content
```

pros content

The positive aspects

Default: []

cons content

The negative aspects

Default: []

3.6.1.5. decision-matrix

A decision matrix table.

Parameters

```
decision-matrix(
  properties: array,
    ..choices: array
) -> content
```

properties array

A list of the properties that each choice will be rated by

Default: none

..choices array

An array containing the name of the choices as its first member, and values for each of the properties at its following indices

3.6.1.6. tournament

A Series of tables displaying match data from a tournament. Useful for tournament analysis entries.

Parameters

tournament(..matches: dictionary) -> content

..matches dictionary

A list of all of the matches at the tournament. Each dictionary must contain the following fields:

- match (string) The name of the match
- red-alliance dictionary The red alliance
 - ▶ teams array
 - ▶ score integer
- blue-alliance dictionary The blue alliance
 - ▶ teams array
 - ▶ score integer
- won boolean Whether you won the match
- auton boolean Whether you got the autonomous bonus
- awp boolean Whether you scored the autonomous win point
- notes content Any additional notes you have about the match

3.6.1.7. pie-chart

Creates a labeled pie chart.

Example Usage:

```
#pie-chart(
  (value: 8, color: green, name: "wins"),
  (value: 2, color: red, name: "losses")
)
```

Parameters

```
pie-chart(..data: dictionary) -> content
```

```
..data dictionary
```

Each dictionary must contain 3 fields.

- value: integer The value of the section
- color: color The value of the section
- name: string The name of the section

3.6.1.8. plot

```
#plot(
    title: "My Epic Graph",
    (name: "thingy", data: ((1,2), (2,5), (3,5))),
    (name: "stuff", data: ((1,1), (2,7), (3,6))),
    (name: "potato", data: ((1,1), (2,3), (3,8))),
)
```

Parameters

```
plot(
 title: string,
 x-label: string,
 y-label: string,
length,
 ..data: dictionary
) -> content
title
         string
The title of the graph
Default: ""
x-label
            string
The label on the x axis
Default: ""
y-label
            string
The label on the y axis
Default: ""
```

3.6.1.9. gantt-chart

A gantt chart for task management

```
#gantt-chart(
    start: datetime(year: 2024, month: 1, day: 27),
    end: datetime(year: 2024, month: 2, day: 3),
    tasks: (
        ("Build Robot", (0,4)),
        ("Code Robot", (3,6)),
        ("Drive Robot", (5,7)),
        ("Destroy Robot", (7,8)),
      ),
      goals: (
        ("Tournament", 4),
      )
}
```

Parameters

```
gantt-chart(
  start: datetime,
  end: datetime,
  date-interval: integer,
  date-format: string,
  tasks: array,
  goals: array
) -> content
```

```
start datetime
```

Start date using datetime object

year: integermonth: integerday: integer

Example usage: datetime(year: 2024, month: 7, day: 16)

Default: datetime

end datetime

End date using datetime object

year: integermonth: integerday: integer

Example usage: datetime(year: 2024, month: 5, day: 2)

Default: datetime

date-interval integer

The interval between dates, seven would make it weekly

Default: 1

date-format string

The way the date is formated using the datetime.display() method

Default: "[month]/[day]"

```
tasks array
Specify tasks using an array of arrays that have three fields each
1. string or content The name of the task
2. array(integer or float, integer or float) The start and end point of the task
3. color The color of the task line (optional)
Example sub-array: ("Build Catapult", (1,5), red)
Default: ()
```

3.6.1.10. team

Display information about your team.

Example Usage:

Parameters

team(..members: dictionary) -> content

```
..members dictionary
```

A list of members in your team. Each dictionary must contain the following fields:

- name string: The name of the team member
- picture content: An image of the team member
- about content: About the team member

3.6.1.11. label

A label that corresponds with one of the entry types.

Parameters

```
label(
type: string,
size: size
) -> content

type string
Any of the radial entry types

size size
The size of the label
Default: 0.7em
```

3.7. Linear Theme

The Linear theme is a template that uses straight lines and boxes.

You can change the look of body entries by changing their type. The following types are available:

- "identify": For entries about the identify stage of the engineering design process.
- "brainstorm": For entries about the brainstorm stage of the engineering design process.
- "decide": For entries about the decide stage of the engineering design process/
- "build": For entries about the build stage of the engineering design process.
- "program": For entries about the programming stage of the engineering design process.
- "test": For entries about the testing stage of the engineering design process

Minimal starting point:

```
],
    cons: [
      #list(
        [Fries],
        [Wedges],
        [Mashed]
    )
   ]
]
#create-body-entry(title: "Day 2", type: "identify", date: datetime(year: 1984,
month: 1, day: 2))[
 = Another Heading
 #lorem(50)
 #components.decision-matrix(
    properties: (
      (name: "Lorem", weight: 2),
      (name: "Ipsum")
    ("Dolor", 1, 3),
    ("Sit", 2, 2),
    ("Amet", 3, 1)
 == A Smaller Heading
 #lorem(50)
]
#glossary.add-term("Term 1")[
 #lorem(10)
]
#glossary.add-term("Term 2")[
 #lorem(10)
#create-appendix-entry(title: "Glossary")[
 #components.glossary()
]
```

3.7.1. Components

3.7.1.1. decision-matrix

A decision matrix table.

```
#decision-matrix(
```

```
properties: (
    (name: "Versatility", weight: 2),
    (name: "Flavor", weight: 6),
    (name: "Crunchiness"), // Defaults to a weight of 1
),
    ("Sweet potato", 2, 5, 1),
    ("Red potato", 2, 1, 3),
    ("Yellow potato", 2, 2, 3),
)
```

Parameters

properties array

A list of the properties that each choice will be rated by

Default: none

..choices array

An array containing the name of the choices as its first member, and values for each of the properties at its following indices

3.7.1.2. pro-con

A table displaying pros and cons.

```
Parameters

pro-con(
pros: content,
cons: content
)-> content

The positive aspects
Default: []

cons content
The negative aspects
Default: []
```

3.7.1.3. toc

Print out the table of contents

Example Usage:

```
#create-frontmatter-entry(title: "Table of Contents")[
   #components.toc()
]
```

Parameters

toc()

4. Developer Documentation

4.1. Project Architecture

The Notebookinator is split into two sections, the base template, and the themes. The base template functions as the backend of the project. It handles all of the information processing, keeps track of global state, makes sure page numbers are correct, and so on. It exposes the main API that the user interacts for creating entries and creating glossary entries.

The themes act as the frontend to the project, and are what the user actually sees. The themes expose an API for components that need to be called directly inside of entries. This could include things like admonitions, charts, and decision matrices.

4.2. File Structure

- lib.typ: The entrypoint for the whole template.
- internals.typ: All of the internal function calls that should not be used by theme authors or users.
- entries.typ: Contains the user facing API for entries, as well as the internal template functions for printing out the entries and cover.
- glossary.typ: Contains the user facing API for the glossary.
- globals.typ: Contains all of the global variables for the entire project.
- utils.typ: Utility functions intended to help implement themes.
- themes/: The folder containing all of the themes.
 - ▶ themes.typ: An index of all the themes are contained in the template
- docs.typ: The entry point for the project documentation.
- docs-template.typ: The template for the project documentation.

4.3. Implementing Your Own Theme

The following section covers how to add a theme to the ones already in the template. It only covers how to write the code, and not how to get it merged into the main project. If you want to learn more about our contributing guidelines, check our CONTRIBUTING.MD file in our GitHub.

4.3.1. Creating the Entry Point

This section of the document covers how to add your own theme to the template. The first thing you'll have to do is create the entry point for your theme. Create a new directory inside the themes/ directory, then create a Typst source file inside of that directory. For example, if you had a theme called foo, the path to your entry point would look like this: themes/foo/foo.typ.

Once you do this, you'll have to add your theme to the themes/themes.typ file like this:

```
#import `./foo/foo.typ`
typ
```

Do not use a glob import, we don't want to pollute the namespace with the functions in the theme.

4.3.2. Implementing Theme Functions

Next you'll have to implement the functions contained inside the theme. These functions are all called internally by the template. While we recommend that you create implementations for all of them, if you omit one the template will fall back on the default theme.

The first functions you should implement are the ones that render the entries. You'll need three of these, one for each type of entry (frontmatter, body, and appendix).

Each of these functions must take a context parameter, and a body parameter. The context parameter provides important information, like the type of entry, and the date it was written at. The body parameter contains the content written by the user.

The template expects that each of these functions returns a #page() as content.

Here's a minimal example of what these functions might look like:

```
#let frontmatter-entry(ctx: (:), body) = {
    show: page.with(
    header: [ = Frontmatter header ],
    footer: counter(page).display("i")
    )
```

```
body
}
#let body-entry(ctx: (:), body) = {
                                                                                typ
  show: page.with(
    header: [ = Body header ],
    footer: counter(page).display("1")
 )
  body
}
                                                                                typ
#let appendix-entry(ctx: (:), body) = {
  show: page.with(
    header: [ = Appendix header ],
    footer: counter(page).display("i")
  body
}
```

Next you'll have to define the rules. This function defines all of the global configuration and styling for your entire theme. This function must take a doc parameter, and then return that parameter. The entire document will be passed into this function, and then returned. Here's and example of what this could look like:

```
#let rules(doc) = {
    set text(fill: red) // Make all of the text red

doc // Return the entire document
}
```

Then you'll have to implement a cover. The only required parameter here is a context variable, which stores information like team number, game season and year.

Here's an example cover:

```
#let cover(ctx: (:)) = [
    #set align(center)
    *Foo Cover*
]
```

4.3.3. Defining the Theme

Once you define all of your functions you'll have to actually define your theme. The theme is just a dictionary which stores all of the functions that you just defined.

The theme should be defined in your theme's entry point (themes/foo/foo.typ for this example).

Here's what the theme would look like in this scenario:

```
#let foo-theme = (
    // Global show and set rules
rules: rules,
```

```
cover: cover,

// Entry pages
frontmatter-entry: frontmatter-entry,
body-entry: body-entry,
appendix-entry: appendix-entry
)
```

4.3.4. Creating Components

With your base theme done, you may want to create some additional components for you to use while writing your entries. This could be anything, including graphs, tables, Gantt charts, or anything else your heart desires.

4.4. Utility Functions

4.4.1. print-toc

Utility function to help themes implement a table of contents.

Example Usage:

```
#let toc() = utils.print-toc((frontmatter, body, appendix) => {
  for entry in body [
    #entry.title
    #box(width: 1fr, line(length: 100%, stroke: (dash: "dotted")))
    #entry.page-number
  ]
})
```

4.4.1.1. Parameters

```
print-toc(callback: function) -> content
```

```
callback function
```

A function which takes the <u>ctx</u> of all entries as input, and returns the content of the entire table of contents.

4.4.2. print-glossary

A utility function meant to help themes implement a glossary

4.4.2.1. Parameters

```
print-glossary(callback: function) -> content
```

```
callback function
```

A function that returns the content of the glossary

4.4.3. calc-decision-matrix

A utility function that does the calculation for decision matrices for you

Example Usage:

```
#calc-decision-matrix(
    properties: (
        (name: "Versatility", weight: 2),
        (name: "Flavor", weight: 6),
        (name: "Crunchiness"), // Defaults to a weight of 1
    ),
    ("Sweet potato", 2, 5, 1),
    ("Red potato", 2, 1, 3),
    ("Yellow potato", 2, 2, 3),
)
```

The function returns an array of dictionaries, one for each choice. Here's an example of what one of these dictionaries might look like:

```
#(name: "Sweet potato", values: (
   Versatility: (value: 3, highest: true),
   Flavor: (value: 1, highest: false),
   Crunchiness: (value: 1, highest: false),
   total: (value: 5, highest: false),
)),
```

4.4.3.1. Parameters

```
calc-decision-matrix(
properties: array string,
...choices: array
) -> array

properties array string
A list of the properties that each choice will be rated by
Default: ()

...choices array
```

4.4.4. change-icon-color

Returns the raw image data, not image content You'll still need to run image.decode on the result

All of the choices that are being rated. The first element of the array should be the name of the

4.4.4.1. Parameters

```
change-icon-color(
  raw-icon: string,
  fill: color
) -> string

The raw data for the image. Must be svg data.

Default: ""

fill color

The new icon color

Default: red
```

4.4.5. colored-icon

Takes the path to an icon as input, recolors that icon, and then returns the decoded image as output.

4.4.5.1. Parameters

```
colored-icon(
  path: string,
  fill: color,
  width: ratio length,
  height: ratio length,
  fit: string
) -> content
```

path string

The path to the icon. Must point to a svg.

fill color

The new icon color.

Default: red

```
width ratio length
Width of the image
Default: 100%
```

height ratio length

height of the image

Default: 100%

fit string

How the image should adjust itself to a given area. Takes either "cover", "contain", or "stretch"

Default: "contain"