plotly

Star 23,447

Dash Python ***> Adding CSS & JS and Overriding the Page-Load Template***

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Adding CSS & JS and Overriding the Page-Load Template

Dash apps are rendered in the web browser with CSS and JavaScript. On page load, Dash serves a small HTML template that includes references to the CSS and JavaScript that are required to render the app. This chapter covers everything that you need to know about configuring this HTML file and about including external CSS and JavaScript in Dash apps.

Adding Your Own CSS and JavaScript to Dash Apps

Dash supports adding custom CSS or JavaScript in your apps.

Create a folder named `assets` in the root of your app directory and include your CSS and JavaScript files in that folder. Dash automatically serves all the files that are included in this folder. By default, the URL to request the assets is `/assets`, but you can customize this with the `assets_url_path` argument to `dash.Dash`.

Important: If you're using Dash version 2.13 or earlier, you need to include `__name__` in your Dash constructor when running these examples.

That is, `app = dash.Dash(__name__)` instead of `app = dash.Dash()`. **Here's why**.

If you are using Dash 2.14 or later, `__name__` is no longer required.

Example: Including Local CSS and JavaScript

We'll create several files: `app.py`, a folder named `assets`, and three files in that folder:

```
- app.py
- assets/
    |-- typography.css
    |-- header.css
    |-- custom-script.js
```

`app.py`

```
from dash import Dash, html

app = Dash()

app.layout = html.Div([
    html.Div(
        className="app-header",
        children=[
            html.Div('Plotly Dash', className="app-header--title")
        ]
    ),
    html.Div(
        children=html.Div([
            html.H1('Overview'),
            html.Div('''
                This is an example of a simple Dash app with
                local, customized CSS.
            ''')
        ])
    )
])

if __name__ == '__main__':
    app.run(debug=True)
```

`typography.css`

```
body {
    font-family: sans-serif;
}
h1, h2, h3, h4, h5, h6 {
    color: hotpink
}
```

`header.css`

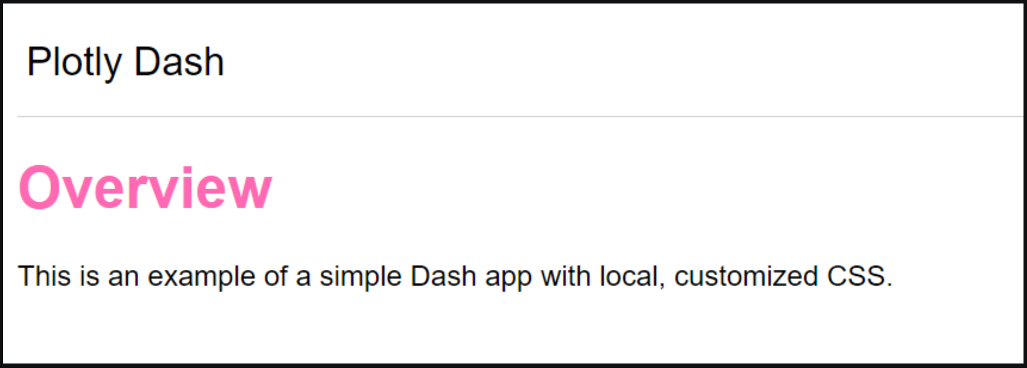
```
.app-header {
    height: 60px;
    line-height: 60px;
    border-bottom: thin lightgrey solid;
}

.app-header .app-header--title {
    font-size: 22px;
    padding-left: 5px;
}
```

`custom-script.js`

```
alert('If you see this alert, then your custom JavaScript script has run!')
```

When you run your app, it should look something like this:


Plotly Dash

Overview

This is an example of a simple Dash app with local, customized CSS.

How Dash Loads Assets

Dash automatically loads assets from the `assets` directory.

- The following file types will automatically be included:
    - CSS files suffixed with `.css`.
    - JavaScript files suffixed with `.js`.
    - A single file named `favicon.ico` (the page tab's icon).

  - JavaScript module files suffixed with `.mjs` (in Dash 2.16 and later).
- Dash will include the files in alphanumerical order by filename, so we recommend prefixing your filenames with numbers if you need to ensure their order (for example, `10_typography.css`, `20_header.css`).
- Your custom CSS will be included *after* the Dash component CSS.

Excluding Assets from Automatic Loading

- You can restrict which files in the `assets` folder that Dash automatically loads.

  Prevent specific files in your `assets` folder from being automatically loaded by Dash by using `assets_ignore` when creating your Dash app instance. `assets_ignore` takes a regex string.

  ```
  app = dash.Dash(assets_ignore='.*ignored.*')
  ```

  New in Dash 3.1

  Prevent specific paths in your `assets` folder from being automatically loaded by Dash by using `assets_path_ignore` when creating your Dash app instance. `assets_path_ignore` takes a list of regex strings.

  ```
  assets_path_ignore=['folder_with_js']
  ```

  Files ignored for initial load will still be served if specifically requested.

  > You cannot use `assets_ignore` and `assets_path_ignore` to prevent access to sensitive files.

Loading Javascript Module Files

New in Dash 2.16

To load a JavaScript file as a module in your Dash app, include it in the assets folder with the suffix `.mjs`.

When the `<script>` is loaded in the browser, it will be loaded with `type="module"`.

Hot Reloading

By default, Dash includes "hot-reloading". This means that Dash will automatically refresh your browser when you make a change in your Python code *and* your CSS code.

Give it a try: Change the color in `typography.css` from `hotpink` to `orange` and see your app update.

> Don't like hot-reloading? You can turn this off with `app.run(dev_tools_hot_reload=False)`. Learn more in **Dash Dev Tools documentation**. Questions? See the **community forum hot reloading discussion**.

Load Assets from a Folder Hosted on a CDN

If you duplicate the file structure of your local assets folder to a folder hosted externally to your Dash app, you can use `assets_external_path='http://your-external-assets-folder-url'` in the Dash constructor to load the files from there instead of locally. Dash will index your local assets folder to find all of your assets, map their relative path onto `assets_external_path` and then request the resources from there. `app.scripts.config.serve_locally = False` must also be set in order for this to work.

NOTE: In Dash 0.43.0 and before, `app.scripts.config.serve_locally = False` was the default, except when dev bundles are served (such as during debugging). Starting with Dash 1.0.0, `serve_locally` defaults to `True`.

Example:

```
from dash import Dash, html
```

```
app = Dash(
    __name__,
    assets_external_path='http://your-external-assets-folder-url/'
)
app.scripts.config.serve_locally = False
```

Embedding Images in Your Dash Apps

In addition to CSS and JavaScript files, you can include images in the `assets` folder. An example of the folder structure:

```
- app.py
- assets/
    |-- image.png
```

In your `app.py` file you can use the relative path to that image:

```python
from dash import Dash, html

app = Dash()

app.layout = html.Div([
    html.Img(src='/assets/image.png')
])

if __name__ == '__main__':
    app.run(debug=True)
```

> If placing images inside the `assets` folder isn't an option, then you can also embed images "inline" with base64 encoding:

```python
import base64
from dash import Dash, html

app = Dash()

image_filename = 'my-image.png'

def b64_image(image_filename):
    with open(image_filename, 'rb') as f:
        image = f.read()
    return 'data:image/png;base64,' + base64.b64encode(image).decode('utf-8')

app.layout = html.Img(src=b64_image(image_filename))
```

Changing the Favicon

It is possible to override the default favicon by adding a file named `favicon.ico` to your `assets` folder. Changes to this file will implement cache-busting automatically.

```
- app.py
- assets/
    |-- favicon.ico
```

Adding External CSS/JavaScript

You can add resources hosted externally to your Dash app with the `external_stylesheets` & `external_scripts` init keywords.

The resources can be either a string or a dict containing the tag attributes (`src`, `integrity`, `crossorigin`, etc). You can mix both.

External css/js files are loaded before the assets.

Example:

```python
from dash import Dash, html


# external JavaScript files
external_scripts = [
    'https://www.google-analytics.com/analytics.js',
    {'src': 'https://cdn.polyfill.io/v2/polyfill.min.js'},
    {
        'src': 'https://cdnjs.cloudflare.com/ajax/libs/lodash.js/4.17.10/lodash.core.js',
        'integrity': 'sha256-Qqd/EfdABZUcAxjOkMi8eGEivtdTkh3b65xCZL4qAQA=',
        'crossorigin': 'anonymous'
    }
]

# external CSS stylesheets
external_stylesheets = [
    'https://codepen.io/chriddyp/pen/bWLwgP.css',
    {
        'href': 'https://stackpath.bootstrapcdn.com/bootstrap/4.1.3/css/bootstrap.min.css',
        'rel': 'stylesheet',
        'integrity': 'sha384-MCw98/SFnGE8fJT3GXwEOngsV7Zt27NXFoaoApmYm81iuXoPkFOJwJ8ERdknLPMO',
        'crossorigin': 'anonymous'
    }
]


app = Dash(__name__,
                external_scripts=external_scripts,
                external_stylesheets=external_stylesheets)

app.layout = html.Div()

if __name__ == '__main__':
    app.run(debug=True)
```

Controlling the Plotly.js Version Used by `dcc.Graph`

The `dcc.Graph` component leverages the **Plotly.js** library to render visualizations.

In Dash 2.13 and later, the `dcc.Graph` component uses the version of the Plotly.js library in the Plotly.py version you have installed. Each version of Dash prior to 2.13 included its own version of Plotly.js.

If you want to use a different version of Plotly.js in Dash 2.13 or later, you can use a different version of Plotly.py. See the **Plotly.py releases page** for more details on which version of Plotly.js was included with each release.

In all versions of Dash you can also override the Plotly.js version by placing a Plotly.js bundle **in the `assets` directory**.

You can override the Plotly.js version by placing a Plotly.js bundle in the `assets` directory.

This technique can be used to:

- take advantage of new features in a version of Plotly.js that is **more recent** than the one that is included in the currently installed version of Dash, Plotly.py, or Dash Design Kit.
- take advantage of more desirable behavior of a version of Plotly.js that is **less recent** than the one that is included in the currently installed version of Dash, Plotly.py, or Dash Design Kit. We strive to make Plotly.js releases completely backwards-compatible, so you shouldn't have to do this very often.
- use **a Plotly-distributed Plotly.js partial bundle** or **a custom-built Plotly.js bundle** which only includes the subset of Plotly.js features that your Dash app uses. Partial bundles are smaller than the full Plotly.js bundles that come with the `dcc.Graph` component and Plotly.pyand can therefore improve your app's loading time.

Rendering LaTeX Inside `dcc.Graph` Figures

To use the built-in Plotly.js capability of rendering LaTeX inside figure labels, the `external_script` functionality described above can be used: add `external_scripts=["https://cdnjs.cloudflare.com/ajax/libs/mathjax/2.7.5/MathJax.js?config=TeX-MML-AM_CHTML" ]` to the `app = dash.Dash()` call.

Sign up for Dash Club → Two free cheat sheets plus updates from Chris Parmer and Adam Schroeder delivered to your inbox every two months. Includes tips and tricks, community apps, and deep dives into the Dash architecture. **Join now**.

Customizing Dash's Document or Browser Tab Title

The document title is the name of the web page that appears in your web browser's tab.

By default, it is Dash.

As of Dash 1.14.0, you can customize this title with the `title=` keyword:

```
app = Dash(__name__, title='Weekly Analytics')
```

> Note - Prior to 1.14.0, setting `app.title` was an unofficial way to set this title. This is still possible but may be removed in the future. We recommend using `title=` instead.

Update the Document Title Dynamically Based on the URL or Tab

To set the document title dynamically, you can use a clientside callback that updates the `document.title` as a side effect. The example below sets the `document.title` based off of the currently selected tab.

```
from dash import Dash, html, dcc, Input, Output, clientside_callback

app = Dash()

app.layout = html.Div([
    html.Div(id='blank-output'),
    dcc.Tabs(id='tabs-example', value='tab-1', children=[
        dcc.Tab(label='Tab one', value='tab-1'),
        dcc.Tab(label='Tab two', value='tab-2'),
    ]),
])


clientside_callback(
    """
    function(tab_value) {
        if (tab_value === 'tab-1') {
            document.title = 'Tab 1'
        } else if (tab_value === 'tab-2') {
            document.title = 'Tab 2'
        }
    }
    """,
    Output('blank-output', 'children'),
    Input('tabs-example', 'value')
)

if __name__ == '__main__':
    app.run(debug=True)
```

Updating the page based off of the URL would be similar: the input of the callback would be the `pathname` property of `dcc.Location`. See the **URLs and Multi Page Apps** chapter for a `dcc.Location` example.

Customizing or Removing Dash's "Updating..." Message

When a callback is running, Dash updates the document title (the title that appears in your browser tab) with the "Updating..." message.

Customize this message with the `update_title=` property:

```
app = Dash(__name__, update_title='Loading...')
```

Or, prevent this message from appearing at all by setting `update_title=None`:

```
app = Dash(__name__, update_title=None)
```

Customizing Dash's HTML Index Template

Dash's UI is generated dynamically with Dash's React.js front-end. So, on page load, Dash serves a very small HTML template string that includes the CSS and JavaScript that is necessary to render the page and some simple HTML meta tags.

This simple HTML string is customizable. You might want to customize this string if you wanted to:

- Customize the way that your CSS or JavaScript is included in the page. For example, if you wanted to include remote scripts or if you wanted to include the CSS *before* the Dash component CSS
- Include custom meta tags in your app. Note that meta tags can also be added with the `meta_tags` argument (example below).
- Include a custom version of `dash-renderer`, by instantiating the `DashRenderer` JavaScript class yourself. You can add request hooks this way, by providing a `hooks` config object as in the example below.

Usage

Option 1 - `index_string`

Add an `index_string` to modify the default HTML Index Template:

```
from dash import Dash, html

external_stylesheets = ['https://codepen.io/chriddyp/pen/bWLwgP.css']

app = Dash(__name__, external_stylesheets=external_stylesheets)

app.index_string = '''
<!DOCTYPE html>
<html>
    <head>
        {%metas%}
        <title>{%title%}</title>
        {%favicon%}
        {%css%}
    </head>
    <body>
        <div>My Custom header</div>
        {%app_entry%}
        <footer>
            {%config%}
            {%scripts%}
            {%renderer%}
        </footer>
        <div>My Custom footer</div>
    </body>
</html>
'''

app.layout = html.Div('Simple Dash App')
```

```
if __name__ == '__main__':
    app.run(debug=True)
```

The `{%key%}`s are template variables that Dash will fill in automatically with default properties. The available keys are:

`{%metas%}` (optional)

The registered meta tags included by the `meta_tags` argument in `dash.Dash`

`{%favicon%}` (optional)

A favicon link tag if found in the `assets` folder.

`{%css%}` (optional)

`<link/>` tags to css resources. These resources include the Dash component library CSS resources as well as any CSS resources found in the `assets` folder.

`{%title%}` (optional)

The contents of the page `<title>` tag. **Learn more about `<title/>`**

`{%config%}` (required)

An auto-generated tag that includes configuration settings passed from Dash's backend to Dash's front-end (`dash-renderer`).

`{%app_entry%}` (required)

The container in which the Dash layout is rendered.

`{%scripts%}` (required)

The set of JavaScript scripts required to render the Dash app. This includes the Dash component JavaScript files as well as any JavaScript files found in the `assets` folder.

`{%renderer%}` (required)

The JavaScript script that instantiates `dash-renderer` by calling `new DashRenderer()`

Option 2 - `interpolate_index`

If your HTML content isn't static or if you would like to introspect or modify the templated variables, then you can override the `Dash.interpolate_index` method.

```
from dash import Dash, html

class CustomDash(Dash):
    def interpolate_index(self, **kwargs):
        # Inspect the arguments by printing them
        print(kwargs)
        return '''
        <!DOCTYPE html>
        <html>
            <head>
                <title>My App</title>
            </head>
            <body>

                <div id="custom-header">My custom header</div>
                {app_entry}
                {config}
                {scripts}
                {renderer}
                <div id="custom-footer">My custom footer</div>
            </body>
        </html>
        '''.format(
            app_entry=kwargs['app_entry'],
            config=kwargs['config'],
            scripts=kwargs['scripts'],
            renderer=kwargs['renderer'])

app = CustomDash()

app.layout = html.Div('Simple Dash App')
```

```
if __name__ == '__main__':
    app.run(debug=True)
```

Unlike the `index_string` method, where we worked with template string variables, the keyword variables that are passed into `interpolate_index` are already evaluated.

In the example above, when we print the input arguments of `interpolate_index` we should see an output like this:

```
{
    'title': 'Dash',
    'app_entry': '\\n<div id="react-entry-point">\\n    <div class="_dash-loading">\\n        l
    'favicon': '',
    'metas': '<meta charset="UTF-8"/>',
    'scripts': '<script src="https://unpkg.com/react@15.4.2/dist/react.min.js"></script>\\n<sc
    'renderer': '<script id="_dash-renderer" type="application/javascript">var renderer = new [
    'config': '<script id="_dash-config" type="application/json">{"requests_pathname_prefix": '
    'css': ''
}
```

The values of the `scripts` and `css` keys may be different depending on which component libraries you have included or which files might be in your assets folder.

Customizing `dash-renderer` with Request Hooks

To instantiate your own version of `dash-renderer`, you can override Dash's HTML Index Template and provide your own script that will be used instead of the standard script. This script should somewhere call `var renderer = new DashRenderer();`, which instantiates the `DashRenderer` class. You can add this script to your index HTML when you're setting `app.index_string`, or you can override `app.renderer` like so:

```
from dash import Dash, html

external_stylesheets = ['https://codepen.io/chriddyp/pen/bWLwgP.css']

app = Dash(__name__, external_stylesheets=external_stylesheets)

app.renderer = 'var renderer = new DashRenderer();'

app.layout = html.Div('Simple Dash App')

if __name__ == '__main__':
    app.run(debug=True)
```

When you provide your own DashRenderer, you can also pass in a `hooks` object that holds `request_pre` and `request_post` functions. These request hooks will be fired before and after Dash makes a request to its backend. Here's an example:

```
from dash import Dash, html

external_stylesheets = ['https://codepen.io/chriddyp/pen/bWLwgP.css']

app = Dash(__name__, external_stylesheets=external_stylesheets)

app.renderer = '''
var renderer = new DashRenderer({
    request_pre: (payload) => {
        // print out payload parameter
        console.log(payload);
    },
    request_post: (payload, response) => {
        // print out payload and response parameter
        console.log(payload);
        console.log(response);
    }
})
```

```
'''

app.layout = html.Div('Simple Dash App')

if __name__ == '__main__':
    app.run(debug=True)
```

Notice the `request_pre` function takes the payload of the request being sent as its argument, and the `request_post` function takes both the payload and the response of the server as arguments. These can be altered in our function, allowing you to modify the response and request objects that Dash sends to the server. In the example above, the `request_pre` function is fired before each server call, and in the case of this example, it will `console.log()` the request parameter. The `request_post` function will fire **after** each server call, and in our example will also print out the response parameter.

Customizing Meta Tags

> Not sure what meta tags are? **Check out this tutorial on meta tags and why you might want to use them**.

Dash adds some meta tags to your app by default:

- A tag to tell **Internet Explorer** to use the latest renderer available for that browser:

```
<meta http-equiv="X-UA-Compatible" content="IE=edge">
```

- A tag to set the **encoding** to UTF-8:

```
<meta charset="UTF-8">
```

- And in Dash 2.5 and later, a tag to control **page layouts on mobile browsers**:

```
<meta name="viewport" content="width=device-width, initial-scale=1">
```

Overriding Default Tags

To override or add custom meta tags to your app, you can always override Dash's HTML Index Template. Alternatively, Dash provides a shortcut— you can specify meta tags directly in the Dash constructor:

- To clear the `name="viewport" content="width=device-width, initial-scale=1"` tag (introduced in Dash 2.5), set an empty tag:

```
app = Dash(__name__, meta_tags=[{"viewport": ""}])
```

- To override the `http-equiv="X-UA-Compatible"` meta tag, set a new one:

```
app = Dash(__name__, meta_tags=[{'http-equiv': 'X-UA-Compatible', 'content': 'IE=9'}])
```

- To override the `charset` meta tag, set a new one:

```
app = Dash(__name__, meta_tags=[{'charset': 'iso-8859-1'}])
```

Adding Additional Tags

You can also add additional tags. Here's an example of adding `description` and `robots` meta tags.

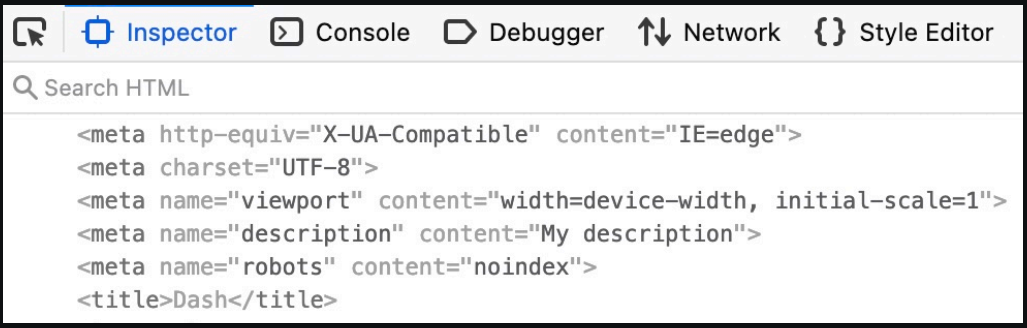
```
from dash import Dash, html
```

```
app = Dash(meta_tags=[
    # A description of the app, used by e.g.
    # search engines when displaying search results.
    {
        'name': 'description',
        'content': 'My description'
    },
    # To request that crawlers not index a page
    {
        'name': 'robots',
        'content': 'noindex'
    }
])

app.layout = html.Div('Simple Dash App')

if __name__ == '__main__':
    app.run(debug=True)
```

If you inspect the source of your app, you'll see the meta tags. In this example, there are the two custom tags we added, along with the three default meta tags.



```
<meta http-equiv="X-UA-Compatible" content="IE=edge">
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<meta name="description" content="My description">
<meta name="robots" content="noindex">
<title>Dash</title>
```

Serving Dash's Component Libraries Locally or from a CDN

Changed in Dash 1.0.0 - now `serve_locally` defaults to `True`, previously it defaulted to `False`

Dash's component libraries, like `dash_core_components` and `dash_html_components`, are bundled with JavaScript and CSS files. Dash automatically checks with component libraries are being used in your app and will automatically serve these files in order to render the app.

By default, Dash serves the JavaScript and CSS resources from the local files on the server where Dash is running. This is the more flexible and robust option: in some cases, such as firewalled or airgapped environments, it is the only option. It also avoids some hard-to-debug problems like packages that have not been published to NPM or CDN downtime, and the unlikely but possible scenario of the CDN being hacked. And of course, component developers will want the local version while changing the code, so when dev bundles are requested (such as with `debug=True`) we always serve locally.

However, for performance-critical apps served beyond an intranet, online CDNs can often deliver these files much faster than loading the resources from the file system, and will reduce the load on the Dash server.

```
from dash import Dash

app = Dash(__name__, serve_locally=False)
```

This will load the bundles from the **https://unpkg.com/** CDN, which is a community-maintained project that serves JavaScript bundles from NPM. We don't maintain it, so we cannot guarantee or attest to its uptime, performance, security, or long term availability.

Also note that we don't publish the dev bundles to `unpkg`, so when running the app locally with `python app.py`, the local JavaScript files will be served. When the app is deployed with `gunicorn`, it'll switch to the CDN.

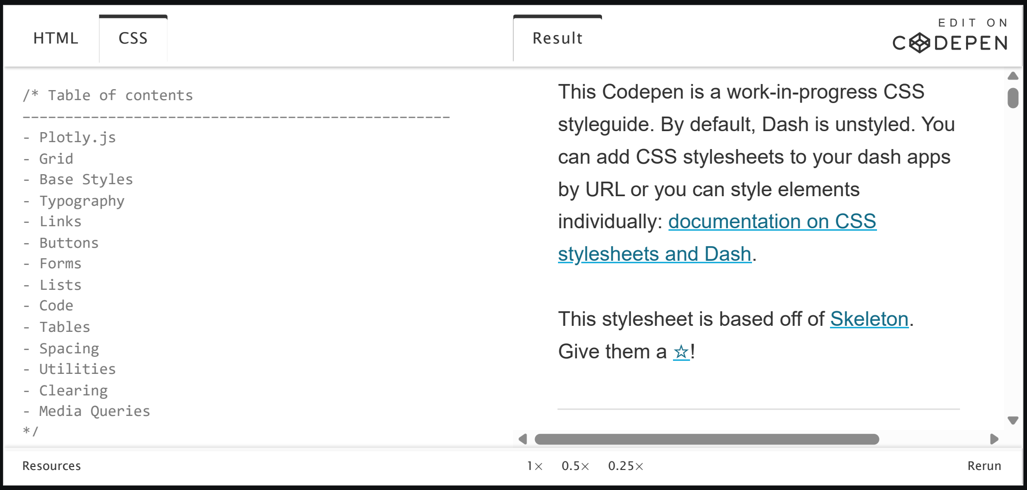
Sample Dash CSS Stylesheet

Currently, Dash does not include styles by default.

To get started with Dash styles, we recommend starting with this **CSS stylesheet** hosted on **Codepen**.

To include this stylesheet in your app, copy and paste it into a file in your `assets` folder. You can view the raw CSS source here: **https://codepen.io/chriddyp/pen/bWLwgP.css**.

Here is an embedded version of this stylesheet.



```
/* Table of contents
––––––––––––––––––––––––––––––––––––––––––––––––––
- Plotly.js
- Grid
- Base Styles
- Typography
- Links
- Buttons
- Forms
- Lists
- Code
- Tables
- Spacing
- Utilities
- Clearing
- Media Queries
*/
```

This Codepen is a work-in-progress CSS styleguide. By default, Dash is unstyled. You can add CSS stylesheets to your dash apps by URL or you can style elements individually: documentation on CSS stylesheets and Dash.

This stylesheet is based off of Skeleton. Give them a ☆!

Syntax Highlighting With Markdown

Both `dash-table` and `dash-core-components` support Markdown formatting, which you can use to specify syntax highlighting for inline code.

Highlighting is handled by `highlight.js`. By default, only certain languages are recognized, and there is only one color scheme available. However, you can override this by downloading a custom `highlight.js` package. To do this, visit **https://highlightjs.org/download/**, and in the **Custom package** section, select all the languages that you require, download your package, and place the resulting `highlight.min.js` file into the `assets` folder. The package should also come with a `styles/` directory; to use a different color scheme, copy the corresponding stylesheet into your app's `assets` folder.

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