

Advanced Programming with Python

Dash

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Plan for today

- Learn about dash
- Questions regarding assignment

Dash

<https://dash.plot.ly>



Dash is a library for creating data visualizations. A big difference with other libraries is that we'll be able to do everything in Python, we won't need any other language.

Dash. Layout

There are a couple of modules we'll need to import:

- `import dash_html_components as html`
- `import dash_core_components as dcc`

html is used to create all HTML tags we're already used to

dcc is used to create more interesting visual components, such as graphs, or selectors.

Dash. Layout

We can create HTML layouts directly in Python with Dash

```
import dash_core_components as dcc
import dash_html_components as html

html.Div(children = [
    html.H1("title"),
    dcc.Dropdown(
        id="district",
        options=districts,
        multi=True,
        value=["SALAMANCA", "ARGANZUELA"]
    )
])
```

It's important to add unique **id** attributes to all elements that will be used interactively

Dash. Graphs

```
import dash_core_components as dcc
import dash_html_components as html

dcc.Graph(
    id='first-graph',
    figure={
        'data': [
            {'x': [1, 2, 3], 'y': [4, 1, 2], 'type': 'bar', 'name': 'bar1'},
            {'x': [1, 2, 3], 'y': [2, 4, 5], 'type': 'bar', 'name': 'bar2'}
        ],
        'layout': {
            'title': 'Dash Data Visualization'
        }
    }
)
```

Practice

see **example1.py**

Dash. Callbacks

callbacks make our Dash applications interactive. They're functions that whenever an **input** component changes, will change an **output** component

```
@app.callback(  
    Output(component_id="accidents-graph", component_property="figure"),  
    [Input(component_id="district", component_property="value")]  
)  
def update(districts):  
    pass
```


Practice

let's see

example2.py

But, callbacks can do much more than that, they can modify graphs whenever some component value is changed by the user.

example3.py

Working with real data

For the following example we'll use the dataset that Madrid government provides about bike accidents.

You can find more interesting datasets here:

<https://datos.madrid.es/portal/site/egob/>

Working with real data

In the following example we'll visualize how the amount of bike accidents change by district.

example4.py

Exercise

Modify **example4.py** so that it filters by accident type (**TIPO ACCIDENTE**) too.

Example 5

It's also possible to update more than one graph at the same time, but we'll need to do that with different callbacks.

See **example5.py**

Materials

- <https://dash.plotly.com>
- <https://plotly.com/python/plotly-express/>