Presenting data on the web – HTML & CSS

INFO20002: Foundations of Informatics
05/04/2016

Outcomes

- Learn the format, relation and function of HTML and CSS
- Use FLASK framework to build dynamic web page

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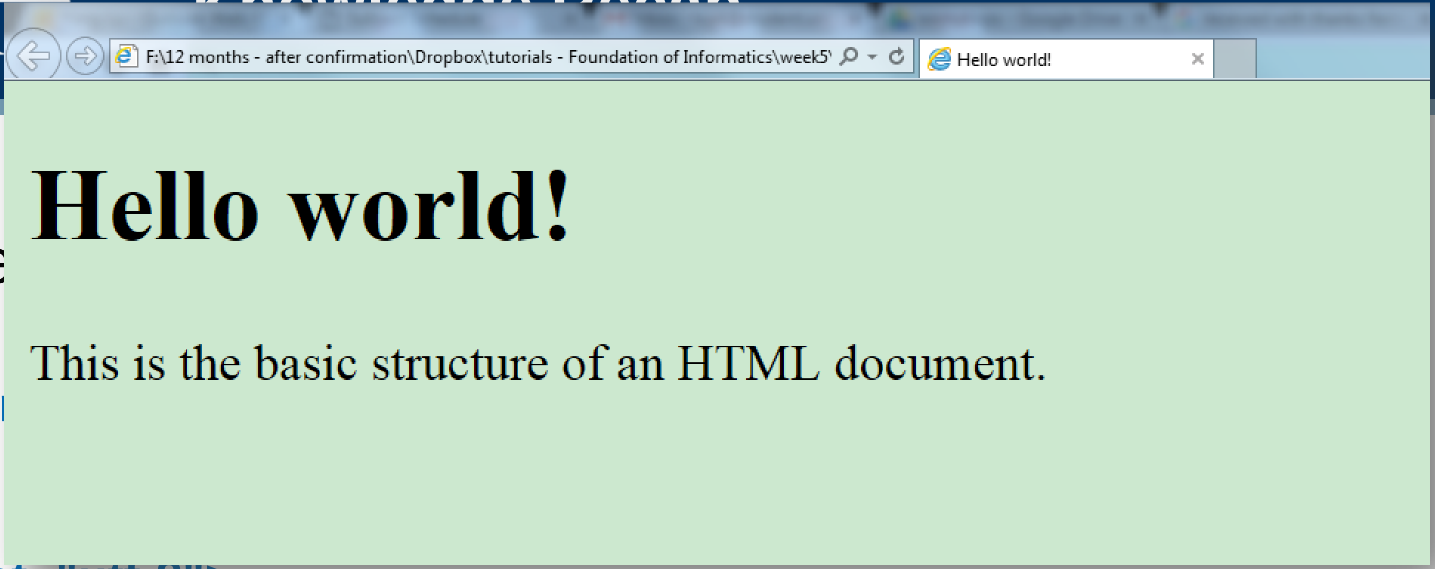
Knowledge Recap

HTML (hype

```
<!DOCTYPE ht
<html>
 <head>
   <meta charset="utf-8">
   <title>Hello world!</title>
 </head>
 <body>
   <h1>Hello world!</h1>
   <p>This is the basic structure of an HTML document.</p>
 </body>
</html>
```


F:\12 months - after confirmation\Dropbox\tutorials - Foundation of Informatics\week5'
Hello world!

Hello world!

This is the basic structure of an HTML document.

Knowledge Recap

HTML tags – markup the format/meaning of the web elements.

- Structural markup
    - Heading <h1>,<h2>,<h3>
    - Paragraphs: <p>
- Stylistic markup
    - Bold: <b>
    - Italic: <i>
- Semantic markup
    - Links: <a>
    - Tables: <table> (<tr/><th/><tb/>)
    - Forms: <form> (<input type="text"/>…)

http://www.w3schools.com/html/html_lists.asp

Difference between block and Inline elements

Block-level elements – represented from the newlines

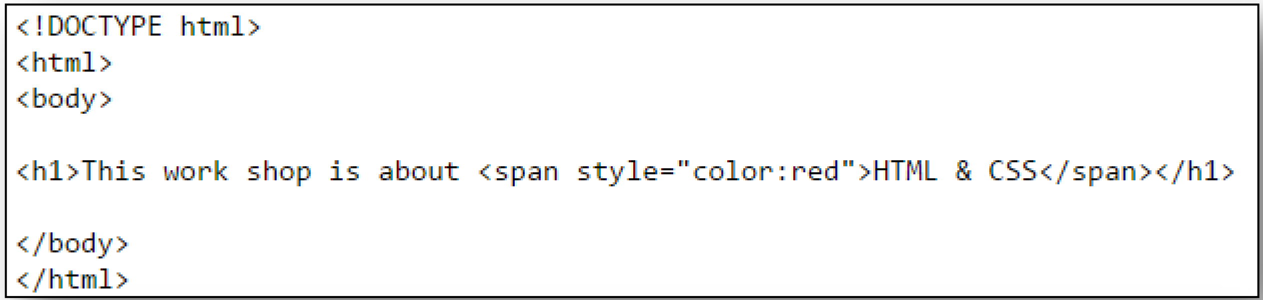
Examples :

- <div>
- <h1> - <h6>
- <p>

Inline elements – only takes up as much width as necessary

Examples:

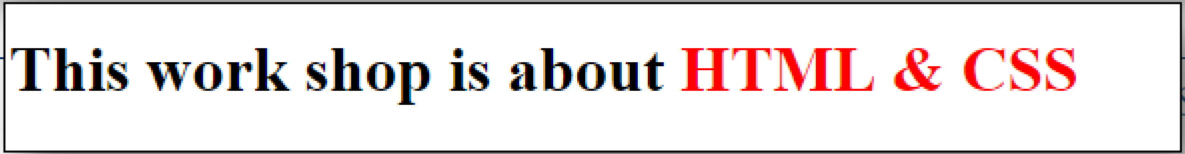
- <span>
- <a>
- <img>



```
<!DOCTYPE html>
<html>
<body>

<h1>This work shop is about <span style="color:red">HTML & CSS</span></h1>

</body>
</html>
```



This work shop is about HTML & CSS

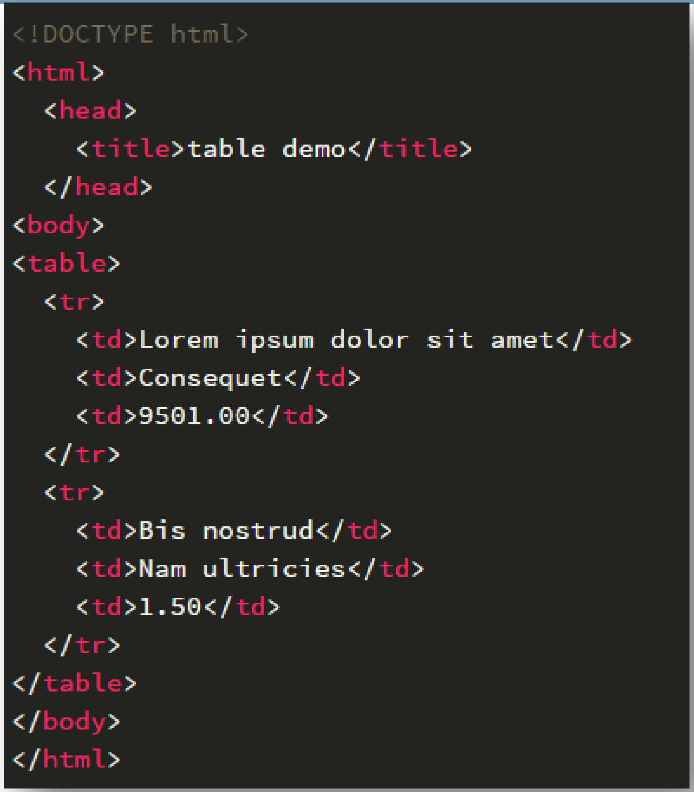
CSS

CSS – Cascading style sheets

- Separated contents from HTML
- Reduces the amount of effort required to stylise a document or web site

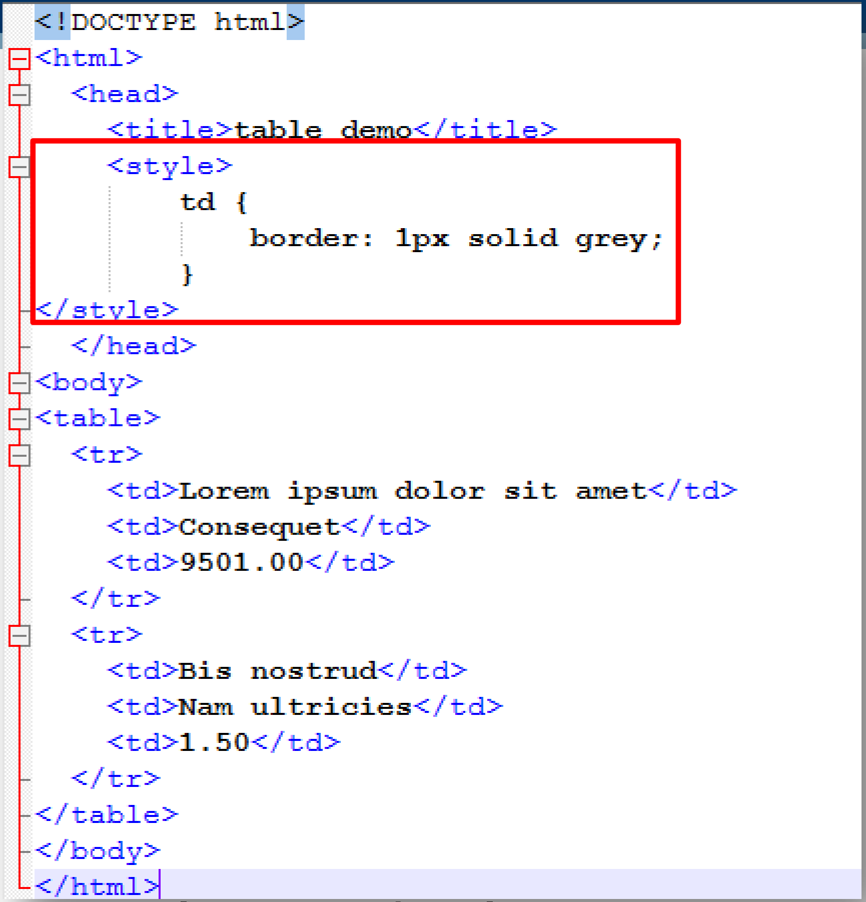
  - Embedded css: declared in a css style block inside the document head (<head>)
  - External css: using selector (e.g. h1{}, table{}, td{}) –to point the part to stylize

Exercise 1


```
<!DOCTYPE html>
<html>
  <head>
    <title>table demo</title>
  </head>
<body>
<table>
  <tr>
    <td>Lorem ipsum dolor sit amet</td>
    <td>Consequet</td>
    <td>9501.00</td>
  </tr>
  <tr>
    <td>Bis nostrud</td>
    <td>Nam ultricies</td>
    <td>1.50</td>
  </tr>
</table>
</body>
</html>
```

1. Save it as ***table.html*** and serve it in the browser. Observe the output
2. Embed the css rules to stylise the web. Observe the output

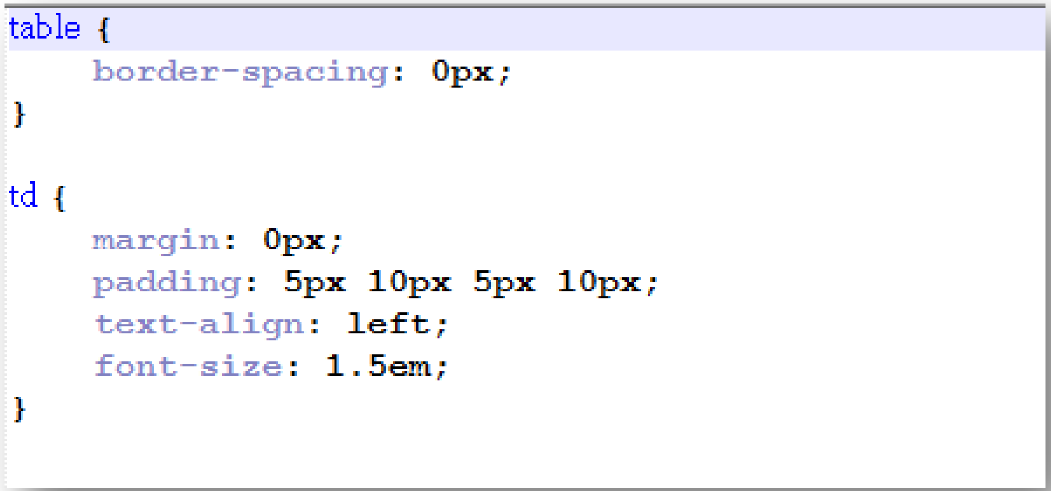
Exercise 2



```
<!DOCTYPE html>
<html>
  <head>
    <title>table demo</title>
    <style>
        td {
            border: 1px solid grey;
        }
</style>
  </head>
<body>
<table>
  <tr>
    <td>Lorem ipsum dolor sit amet</td>
    <td>Consequet</td>
    <td>9501.00</td>
  </tr>
  <tr>
    <td>Bis nostrud</td>
    <td>Nam ultricies</td>
    <td>1.50</td>
  </tr>
</table>
</body>
</html>
```

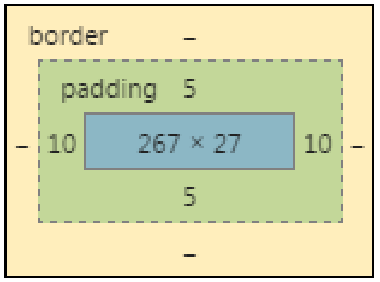
1. Remove the "<style>… </style>"
2. Create a separate ***table.css*** with the given rule.
3. Use **link** method to reference ***table.css*** file
4. Add more stylistic rules (as the hands-on required)

Try the inspector – F12



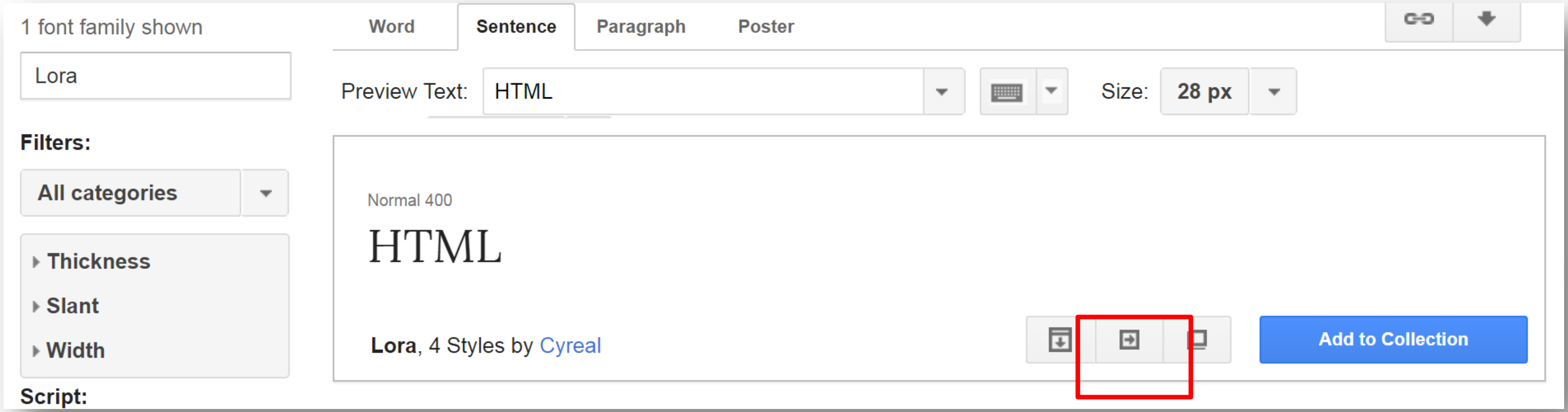
```
table {
    border-spacing: 0px;
}

td {
    margin: 0px;
    padding: 5px 10px 5px 10px;
    text-align: left;
    font-size: 1.5em;
}
```



Take a look at google fonts – Exercise 3

Google fonts is a set of online collection of typefaces


1 font family shown

Lora

Filters:

All categories

Thickness

Slant

Width

Script:

Lora, 4 Styles by Cyreal

```
@import url(http://fonts.googleapis.com/css?family=Lora);
```

```
font-family: "Lora", serif;
```

1. Use the ***Lora*** font by adding rules in ***table.css***
2. Stylize the contents of **table cells**

In case of the browser failure, you may have an alternative choice, e.g. *serif* – fallback system

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Exercise 4 – play with colour

Adobe color is a online palette with different colors…

1. Select one palette and choose three colors from it
2. Using CSS2's first-child pseudo and + (sibling operator) as the selector to achieve following effects:

Column 1 of the table

Font color: black
Background color: color-palette-1
Text align: left

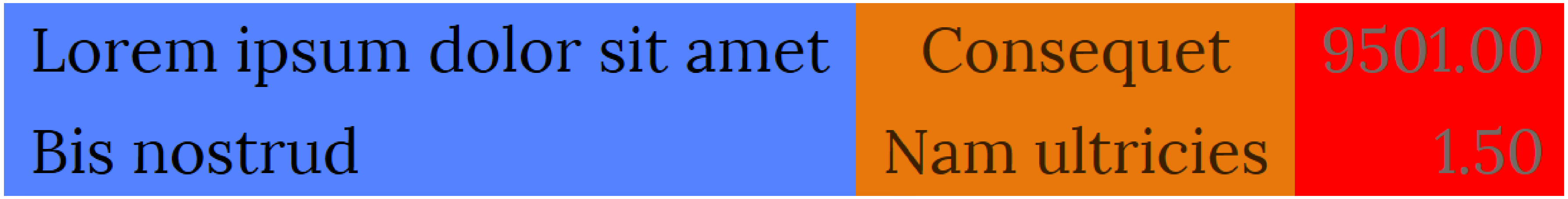
Column 2 of the table

Font color: rgb(60,30,0)
Background color: color-palette-2
Text align: center

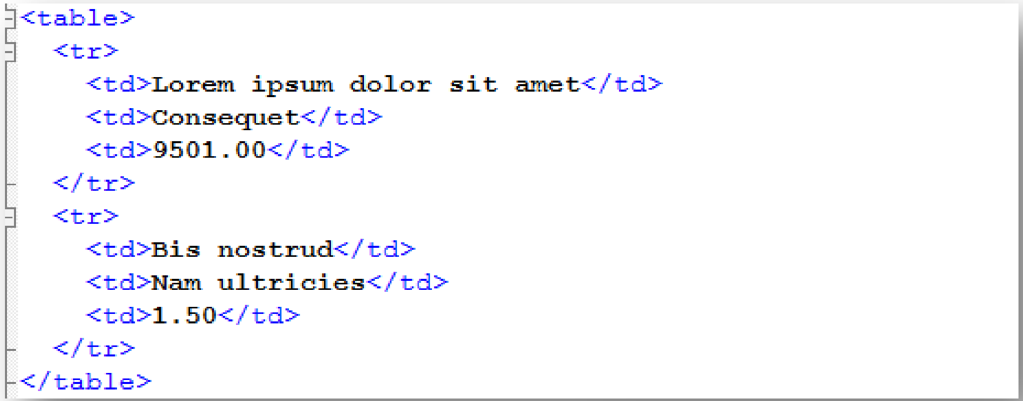
Column 3 of the table

Font color: #736A65
Background color: color-palette-3
Text align: right

3. Once you finish it, try the css3's pseudo class nth-child() to achieve the same effect



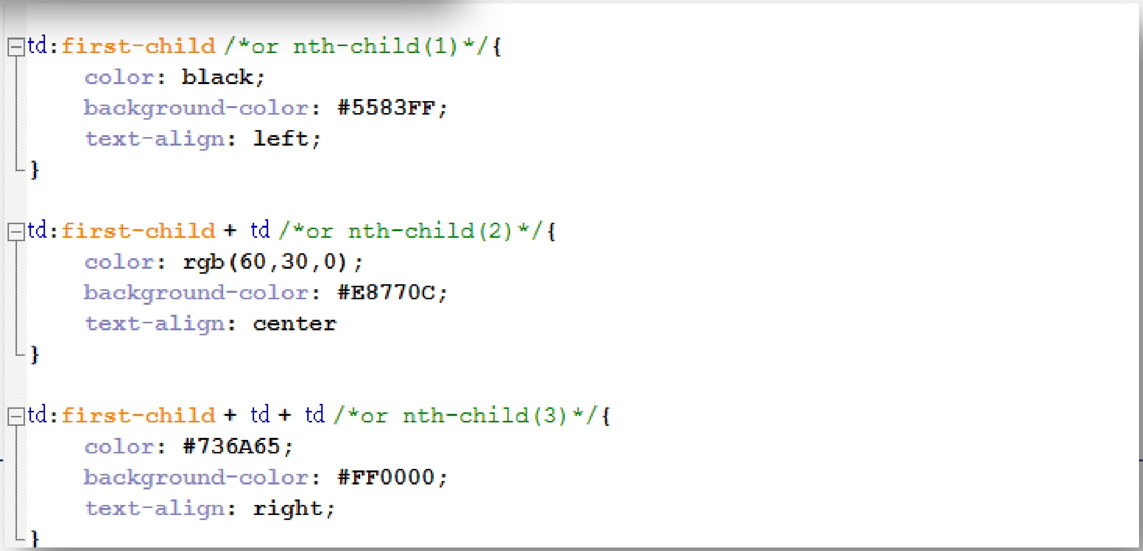
Lorem ipsum dolor sit amet	Consequet	9501.00
Bis nostrud	Nam ultricies	1.50



```
<table>
  <tr>
    <td>Lorem ipsum dolor sit amet</td>
    <td>Consequet</td>
    <td>9501.00</td>
  </tr>
  <tr>
    <td>Bis nostrud</td>
    <td>Nam ultricies</td>
    <td>1.50</td>
  </tr>
</table>
```

HTML

CSS

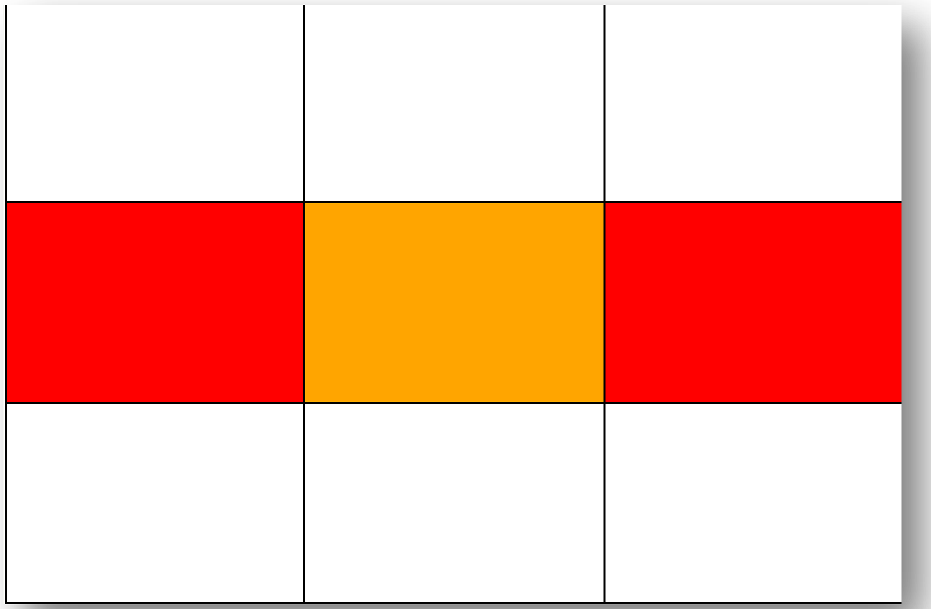


```
td:first-child /*or nth-child(1)*/{
    color: black;
    background-color: #5583FF;
    text-align: left;
}

td:first-child + td /*or nth-child(2)*/{
    color: rgb(60,30,0);
    background-color: #E8770C;
    text-align: center
}

td:first-child + td + td /*or nth-child(3)*/{
    color: #736A65;
    background-color: #FF0000;
    text-align: right;
}
```

Exercise 5: HTML & CSS table

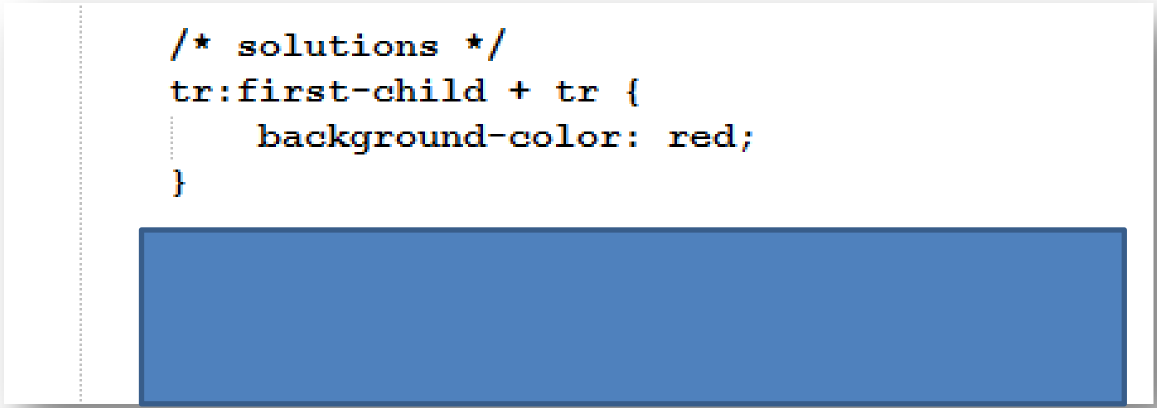
1. Save a new file as ***table2.html***
2. Achieve this effect by adding css rules (*embedded* css)

Both css2 and css3 are good to use

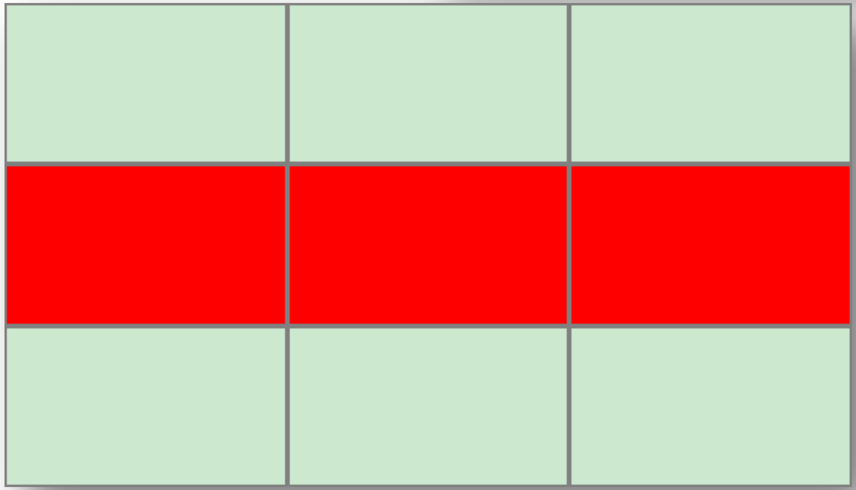


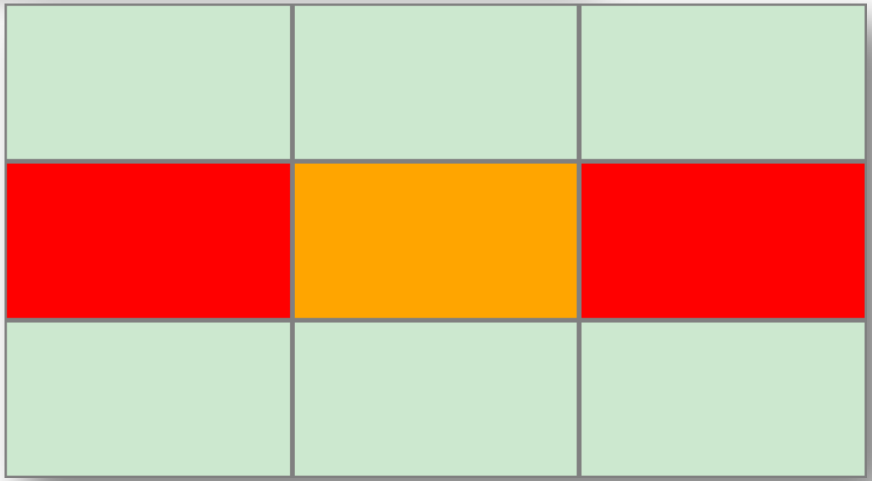
🟥	🟧	🟥

Solution



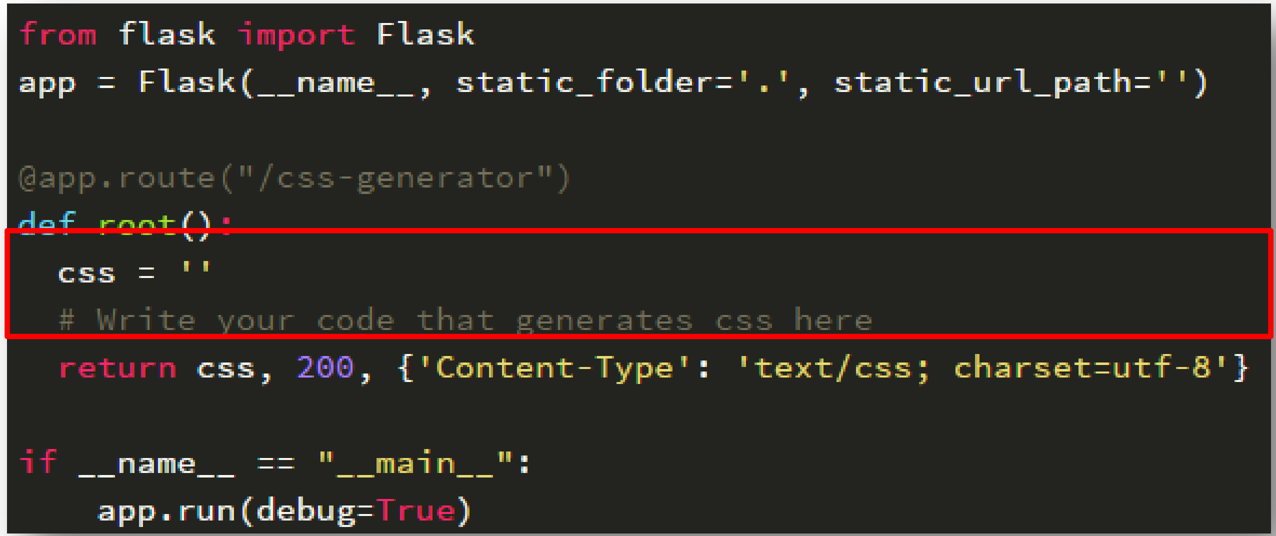
```
/* solutions */
tr:first-child + tr {
    background-color: red;
}
```





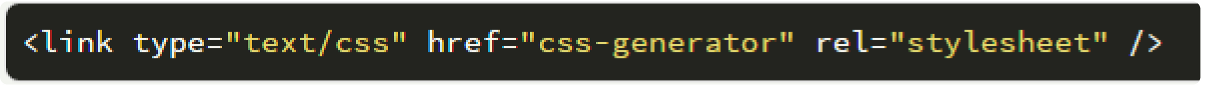
"Flask"

Recall how to set up web application by using Flask class



```python
from flask import Flask
app = Flask(__name__, static_folder='.', static_url_path='')

@app.route("/css-generator")
def root():
  css = ''
  # Write your code that generates css here
  return css, 200, {'Content-Type': 'text/css; charset=utf-8'}

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

1. In the same directory, create an empty Python file called **css.py**
2. Remove the embedded css and add the linking command:



```html
<link type="text/css" href="css-generator" rel="stylesheet" />
```

3. Run the app from **http://localhost/table2.html**

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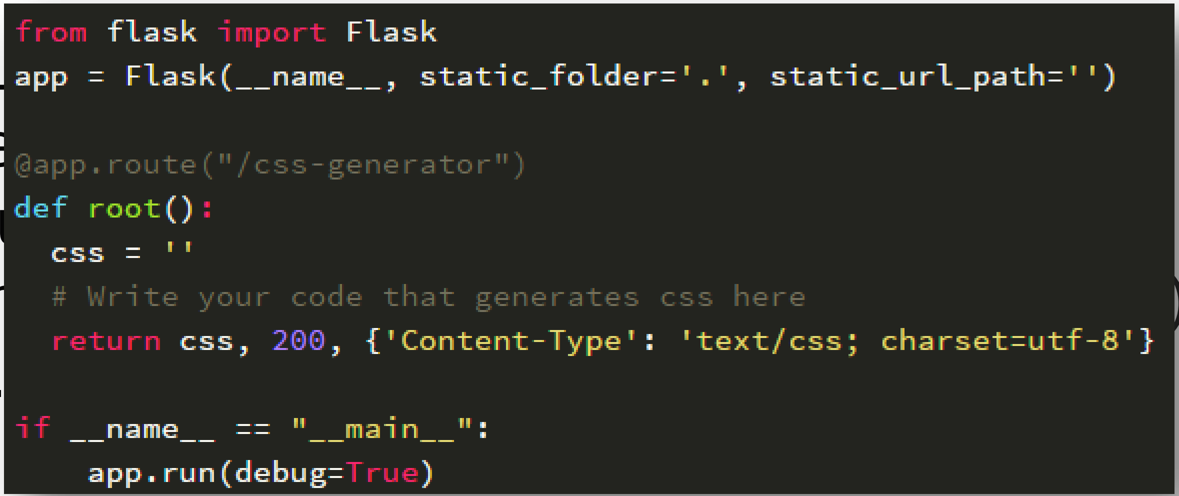
Exercise 6 – randomise colours

HSL
Hue
Sat
Ligh)
e.g.



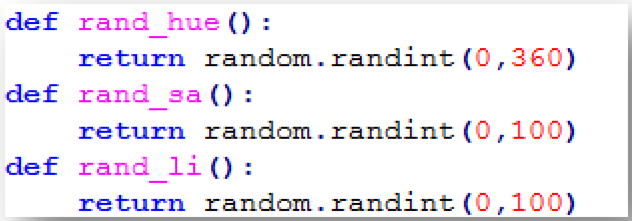
```python
from flask import Flask
app = Flask(__name__, static_folder='.', static_url_path='')

@app.route("/css-generator")
def root():
    css = ''
    # Write your code that generates css here
    return css, 200, {'Content-Type': 'text/css; charset=utf-8'}

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

Modify the ***css.py*** so that it can generate random colors to every cell once reloading the page

–Search the module “random” and function “random.randint”
–Concatenate the ‘css’ string

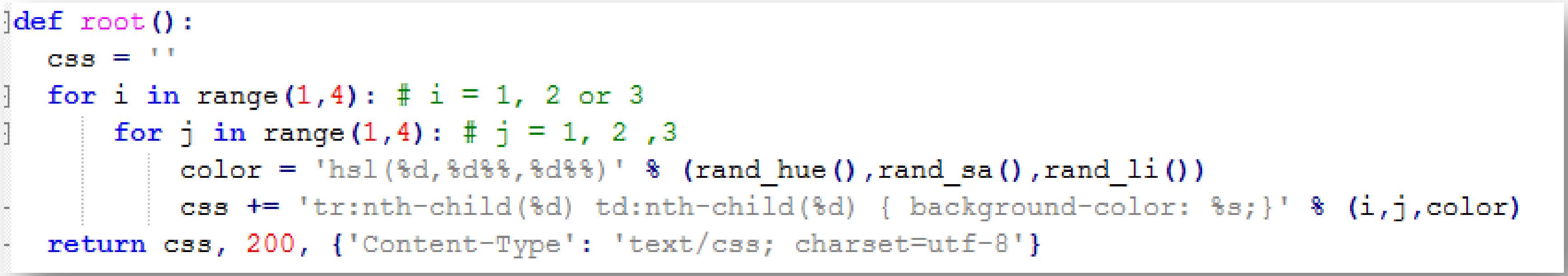
https://en.wikipedia.org/wiki/HSL_and_HSV

Answer: 1. define the function of generating random colours



```python
def rand_hue():
    return random.randint(0,360)
def rand_sa():
    return random.randint(0,100)
def rand_li():
    return random.randint(0,100)
```

2. Iterate on every cell of the 3*3 table (for-loop)



```python
def root():
  css = ''
  for i in range(1,4): # i = 1, 2 or 3
      for j in range(1,4): # j = 1, 2 ,3
          color = 'hsl(%d,%d%%,%d%%)' % (rand_hue(),rand_sa(),rand_li())
          css += 'tr:nth-child(%d) td:nth-child(%d) { background-color: %s;}' % (i,j,color)
  return css, 200, {'Content-Type': 'text/css; charset=utf-8'}
```

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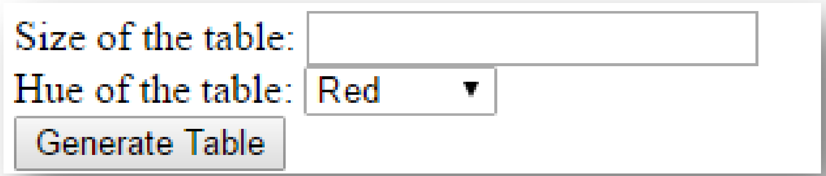
Exercise 7 – random table

- This time we need to generate html & css contents here



Size of the table:

Hue of the table: Red

- Try to add the following functions in the py file.
  - *Size* is specified by 'n' , i.e. n*n table
  - *Hue* is given by the 'drop-down' list (s and l are '100%' by default)
  - Hints:
    - Using embedded CSS
    - You need to "import request from flask" to get contents from 'request' – search 'how to use flask request')
    - You need to learn the "element name" in form.html to transmit the values given by users.

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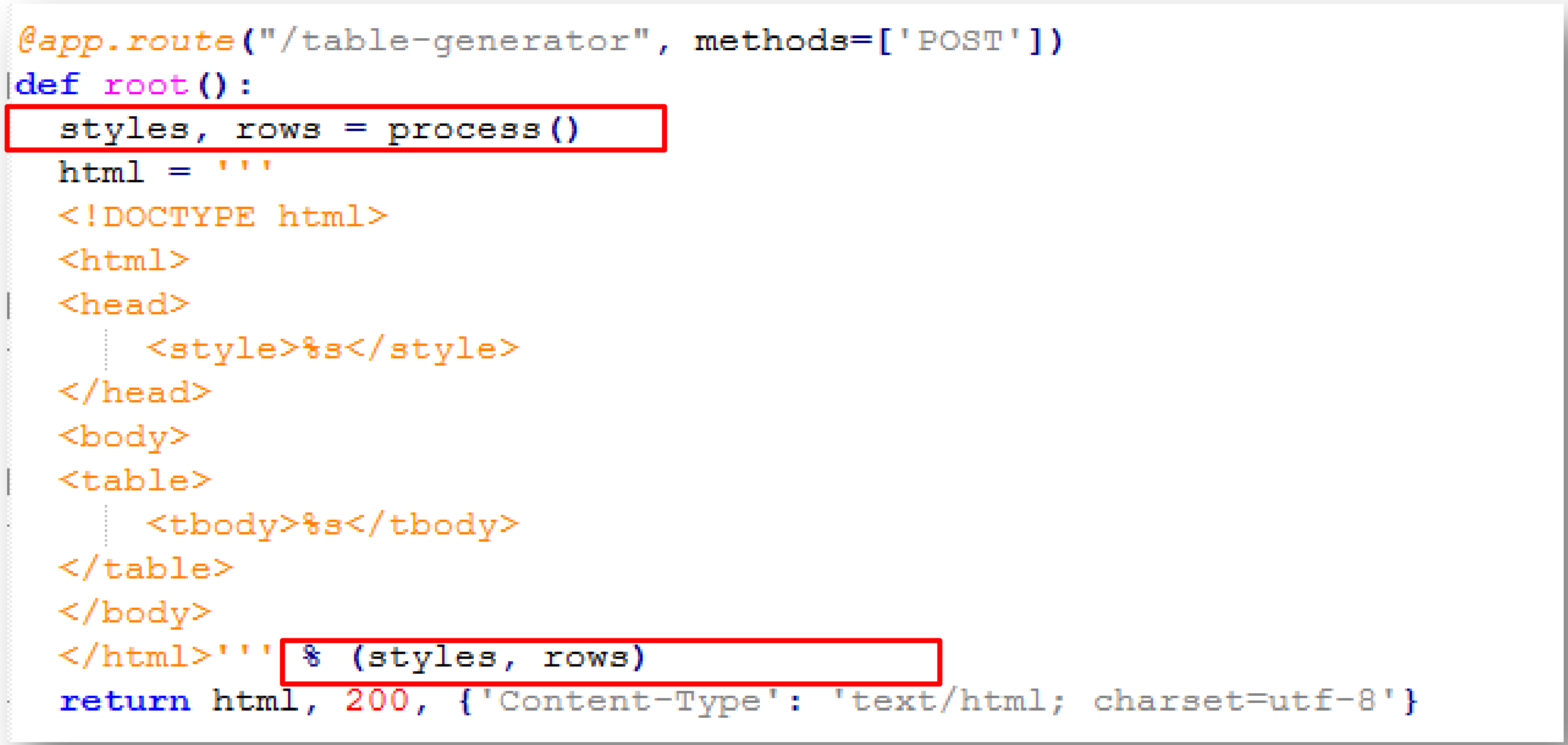
Tip

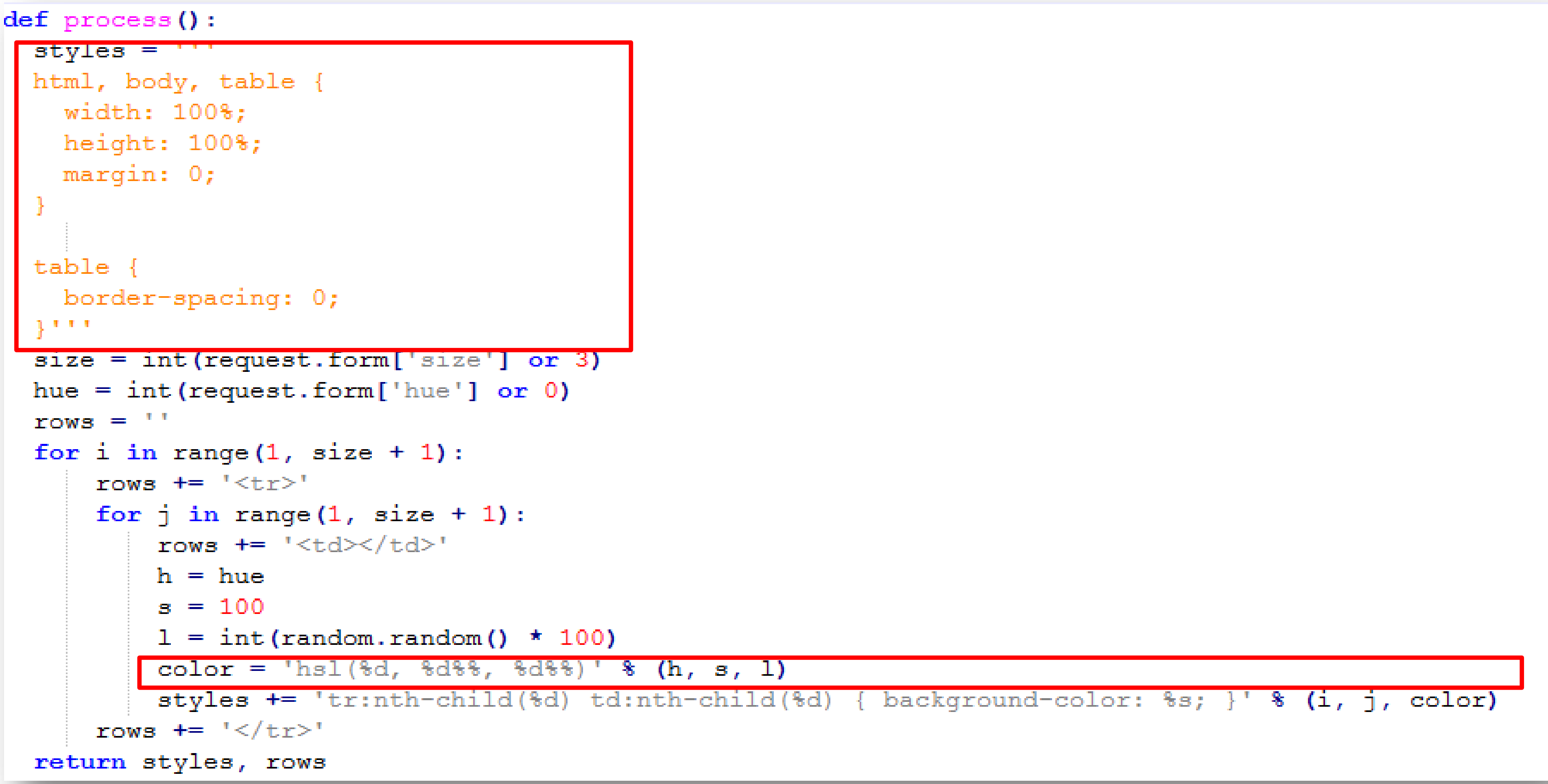
1. HTML skeleton (css and table body are dynamically specified)
2. How to design the process() to achieve the dynamic values?



```
@app.route("/table-generator", methods=['POST'])
def root():
    styles, rows = process()
    html = '''
    <!DOCTYPE html>
    <html>
    <head>
        <style>%s</style>
    </head>
    <body>
    <table>
        <tbody>%s</tbody>
    </table>
    </body>
    </html>''' % (styles, rows)
    return html, 200, {'Content-Type': 'text/html; charset=utf-8'}
```

Solution

Generate ‘rows’ and ‘styles’ for HTML and CSS parts (embedded)



```
def process():
    styles = '''
    html, body, table {
      width: 100%;
      height: 100%;
      margin: 0;
    }

    table {
      border-spacing: 0;
    }'''
    size = int(request.form['size'] or 3)
    hue = int(request.form['hue'] or 0)
    rows = ''
    for i in range(1, size + 1):
        rows += '<tr>'
        for j in range(1, size + 1):
            rows += '<td></td>'
            h = hue
            s = 100
            l = int(random.random() * 100)
            color = 'hsl(%d, %d%%, %d%%)' % (h, s, l)
            styles += 'tr:nth-child(%d) td:nth-child(%d) { background-color: %s; }' % (i, j, color)
        rows += '</tr>'
    return styles, rows
```