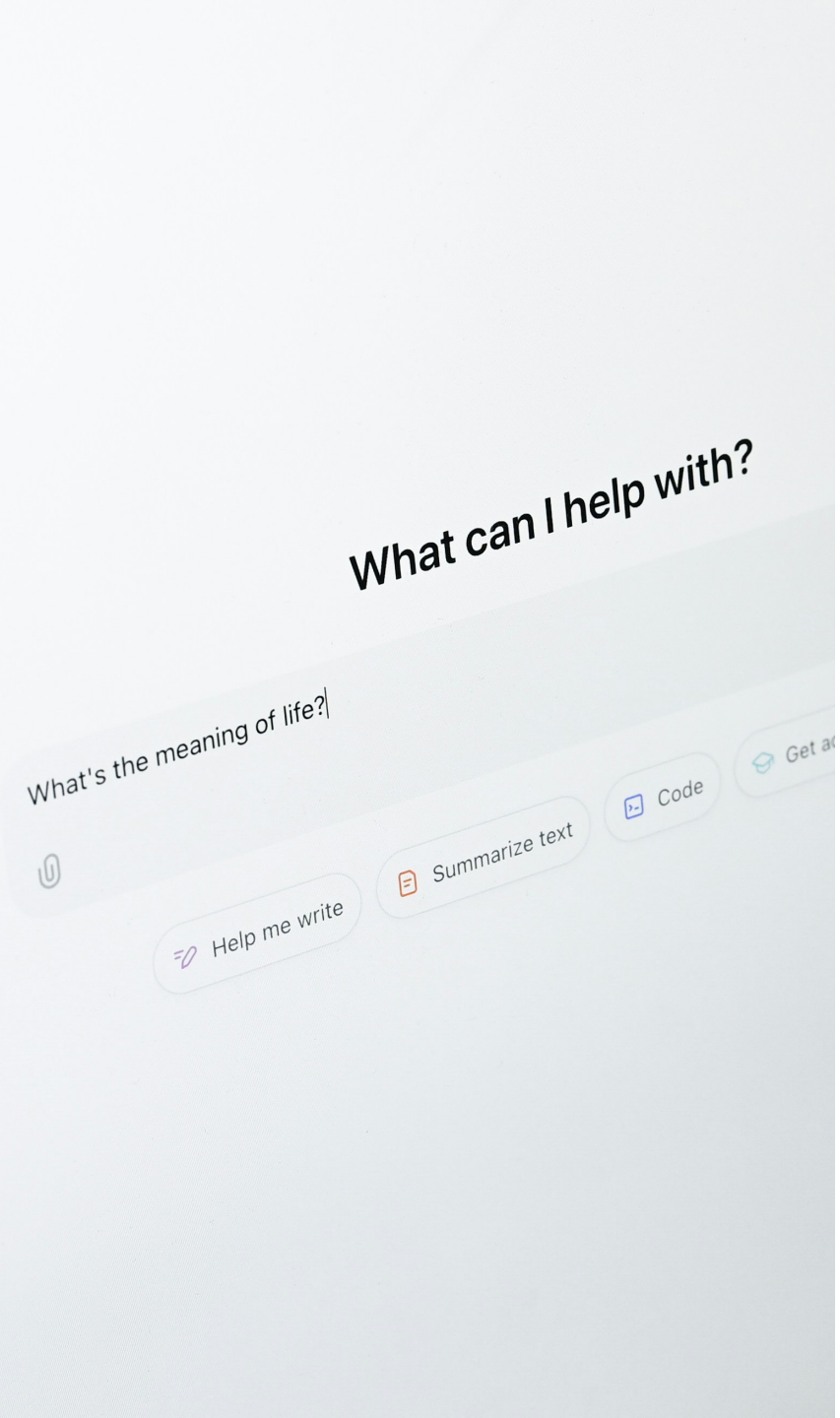


INTRO APP WEB

Politecnico di Torino

Introduzione alle Applicazioni Web

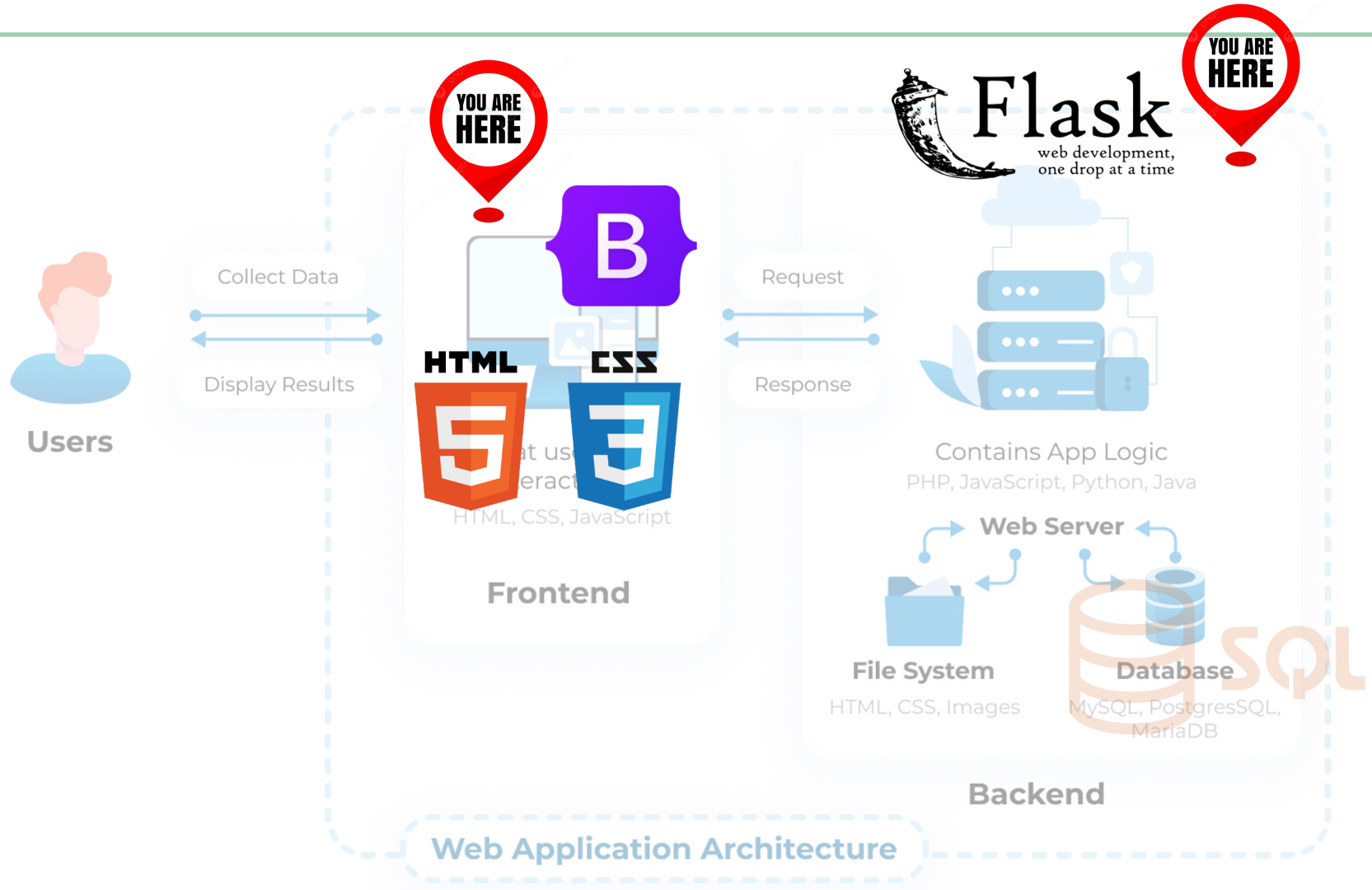
Forms

Juan Pablo Sáenz

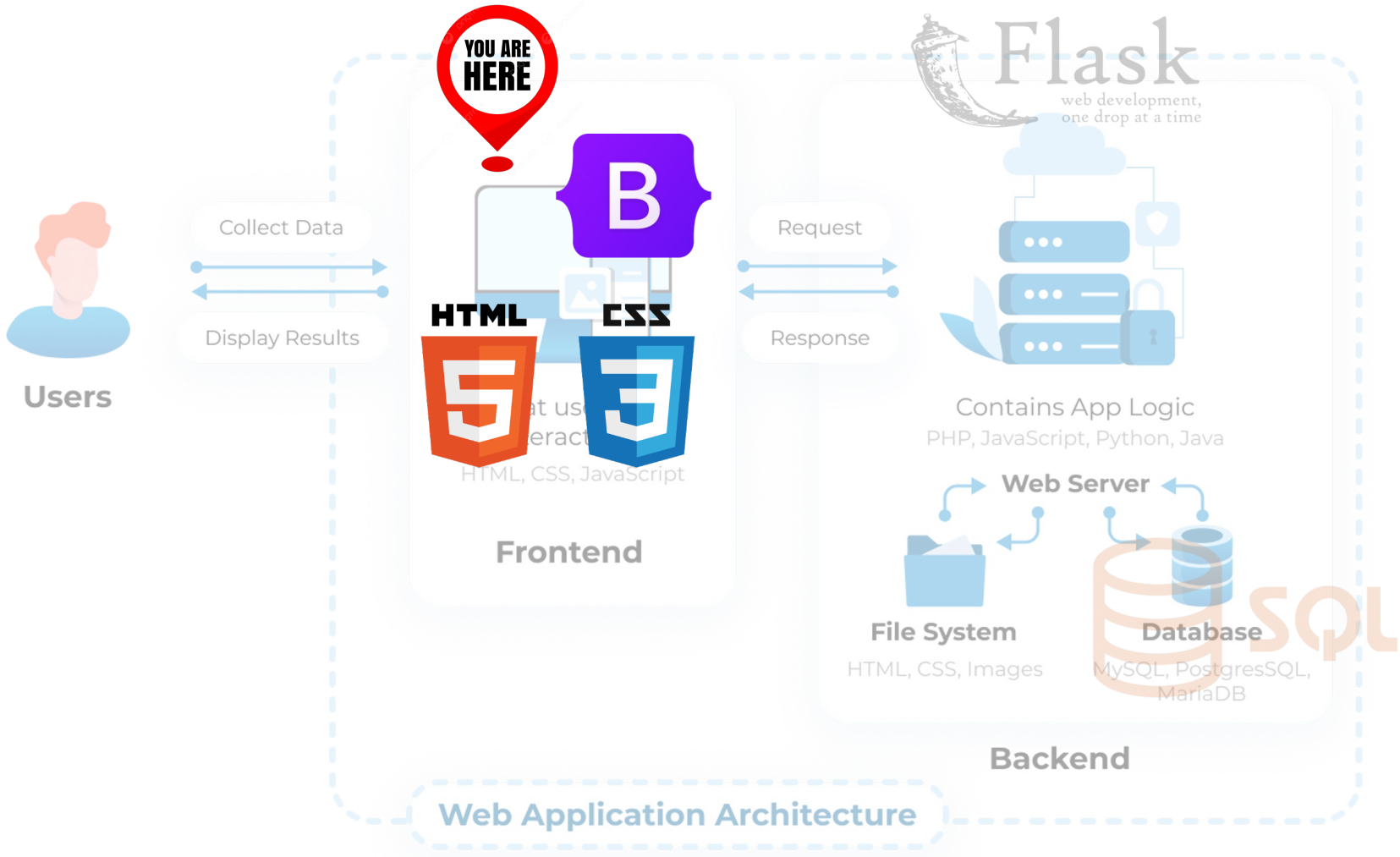
Goals

- Understand how to use **HTML5 tags for form inputs**
- Learn form **validation** techniques
- Implement form handling in **Flask**

Forms: where are we?

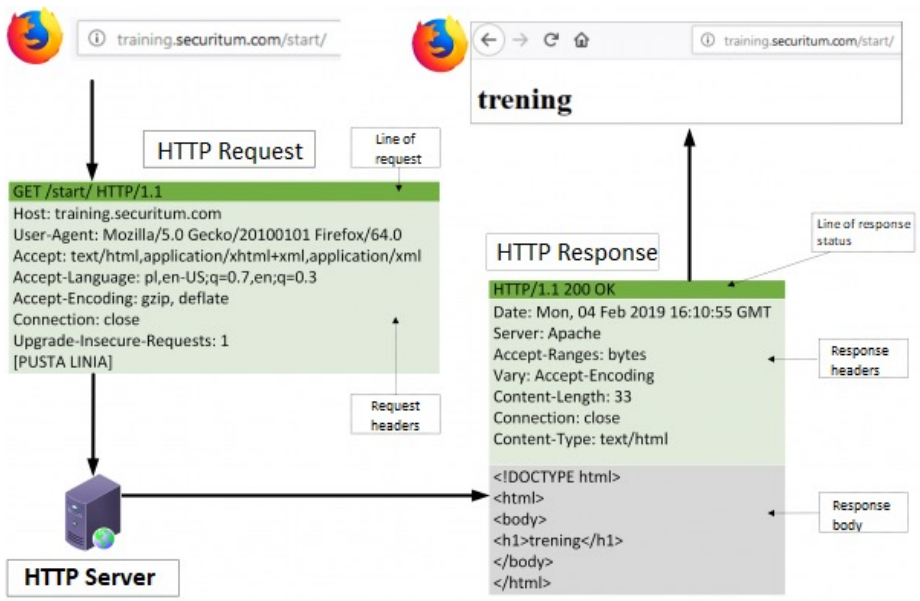


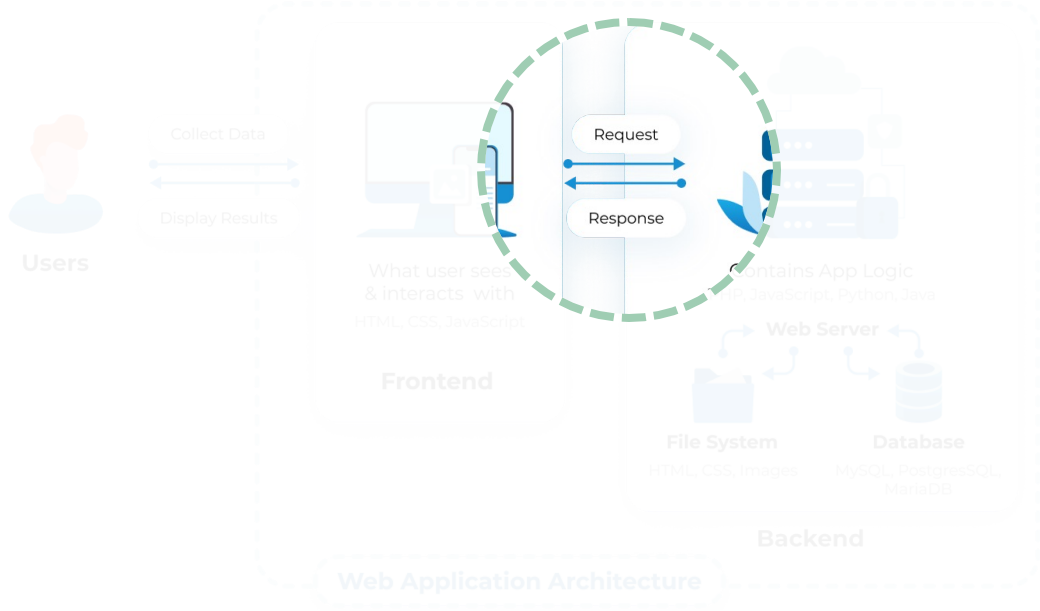
📍 Forms in HTML



Web architecture components: HTTP Protocol

HTTP Protocol: the protocol used for **transferring data over the web**, allowing communication between **clients** (like browsers) and **servers** by sending requests and receiving responses



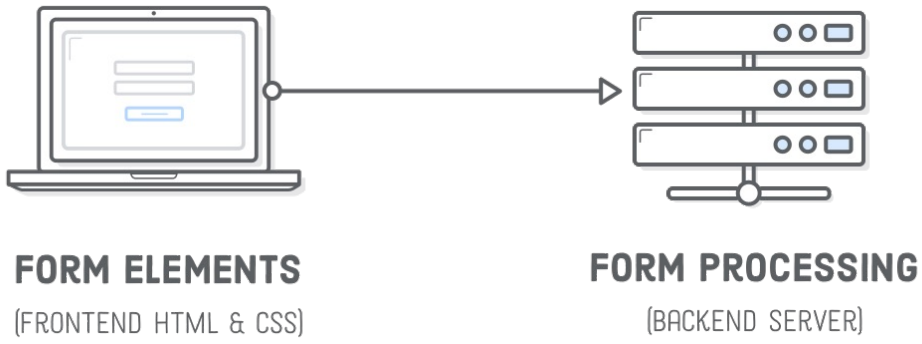


Forms

An **HTML element** that allows users to **input data**, which can be **sent to a server** for processing

- Data **collection**
- User **authentication** (login, signup)
- **Search** functionality

Forms consist of **input fields**, **labels**, **buttons**, and **validation mechanisms** to ensure correct data entry



Form declaration

`form`

- **Tag** that defines an **HTML form** for user input

`action`

- **Attribute** that specifies the **URL** where the form data should be submitted

`method`

- **Attribute** that defines the **HTTP method** for submission (default: **GET**)

```
<form action="/new-user"
method="POST" id="userdata">
<!-- Regular HTML content -->
</form>
```

HTTP methods

Define the different **types of actions** that can be performed on a resource through HTTP

- **`GET`**: Retrieve data from the server (when **fetching data** without side effects)
- **`POST`**: Send data to the server to create a new resource (when **submitting data** that should cause a change on the server)
- **`PUT`**: Update an existing resource (when **updating** or **replacing** a resource)
- **`DELETE`**: Remove a resource (when **removing** a resource)

Resource: any entity or object that can be accessed or manipulated on a server, such as data and files

HTTP methods (less commonly used)

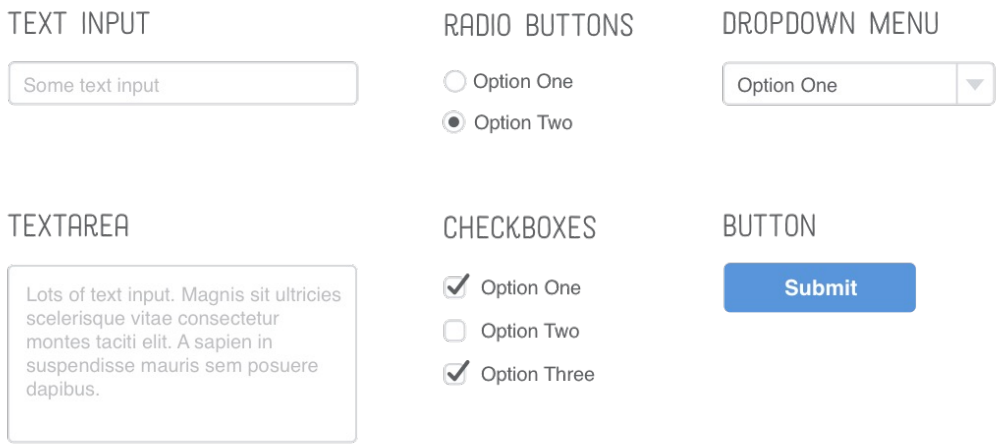
- **`PATCH`**: Apply partial modifications to a resource (when only **partial updates** are needed)
- **`OPTIONS`**: Retrieve allowed methods for a specific resource (when checking which **methods** are available for a resource)

Form controls

A form consists of various HTML elements that enable **user input** and **interaction**

Control categories:

- **Input** elements: collect user data (e.g., text, email, password)
- **Selection** elements: allow users to **choose** from **predefined options** (e.g., dropdowns, checkboxes, radio buttons)
- **Buttons**: submit or reset the form

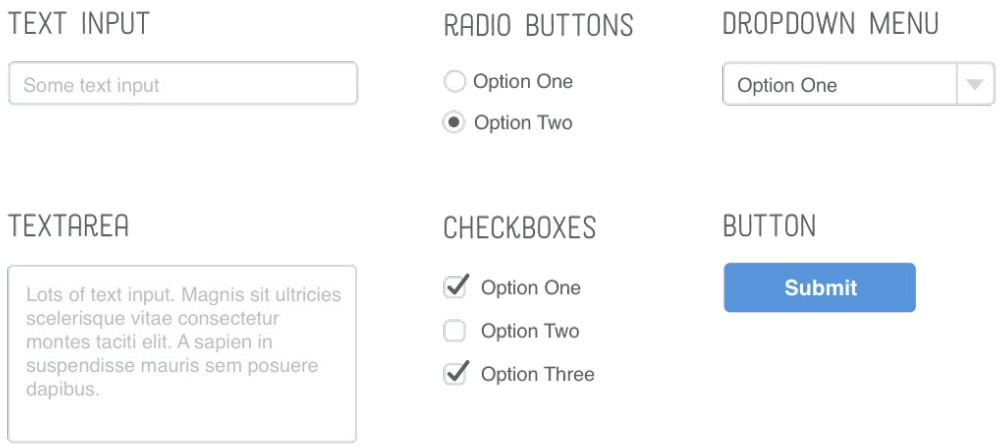


Form controls

A form consists of various HTML elements that enable **user input** and **interaction**

Support elements:

- **Labels**: describe input fields
- **Datalist**: offers predefined suggestions for input fields



Form controls: Input

Each element should have a **unique `name` attribute** for identification

The **`type` attribute** can be set to:

- `button`, `checkbox`, `password`, `email`, `date`, `color`, `number`, `month`, `file`, `hidden`, `radio`

The **`value` attribute** will hold user-provided text

```
<form action="/new-user"
method="POST" id="userdata">
<!-- Regular HTML content -->
<input type="text" name="firstname"
placeholder="Please insert your
first name"></input>
</form>
```

Common Attributes for Input Controls

checked: radio/checkbox is selected

disabled: control is disabled

readonly: value cannot be edited

size: size of the control (pixels or characters)

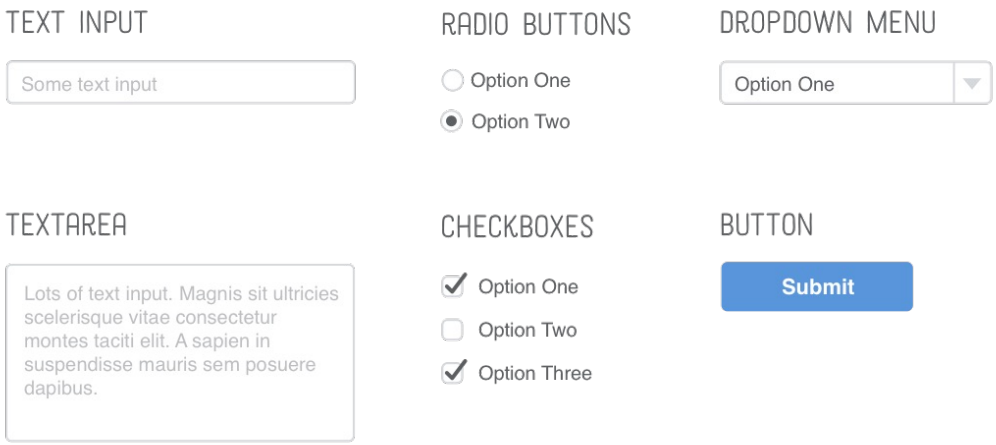
value: value entered by the user

autocomplete: hint for the browser's autofill feature

```
<input type="number" name="age"
placeholder="Your age" min="18"
max="110" />

<input type="text" name="username"
pattern="[a-zA-Z]{8}" />

<input type="file" name="docs"
accept=".jpg, .jpeg, .png" />
```

Other Form controls: Text area

<textarea>: a multi-line text field




```
<label for="story">Tell us your
story:</label>
<textarea id="story" name="story"
rows="5" cols="33"></textarea>
```

Other Form controls: Dropdown menu

<select>: Creates a **dropdown list** for selecting options

Contains multiple **<option>** elements as choices

The **value** attribute in **<option>** defines the data submitted when selected

```
<label for='t-shirt'>T-Shirt
Size</label>
<select id='t-shirt' name='t-
shirt’>
  <option value='xs'>Extra
Small</option>
  <option value='s'>Small</option>
  <option value='m'>Medium</option>
  <option value='l'>Large</option>
</select>
```

Button control

`<button>`: supports three types (**`type`** attribute) of buttons:

- **`submit`**: sends the form data to the server.
- **`reset`**: resets the form to its initial values.
- **`button`**: just a button, whose behavior needs to be specified by JavaScript

```
<button type="submit">Send</button>
<button type="reset">Clear</button>
```

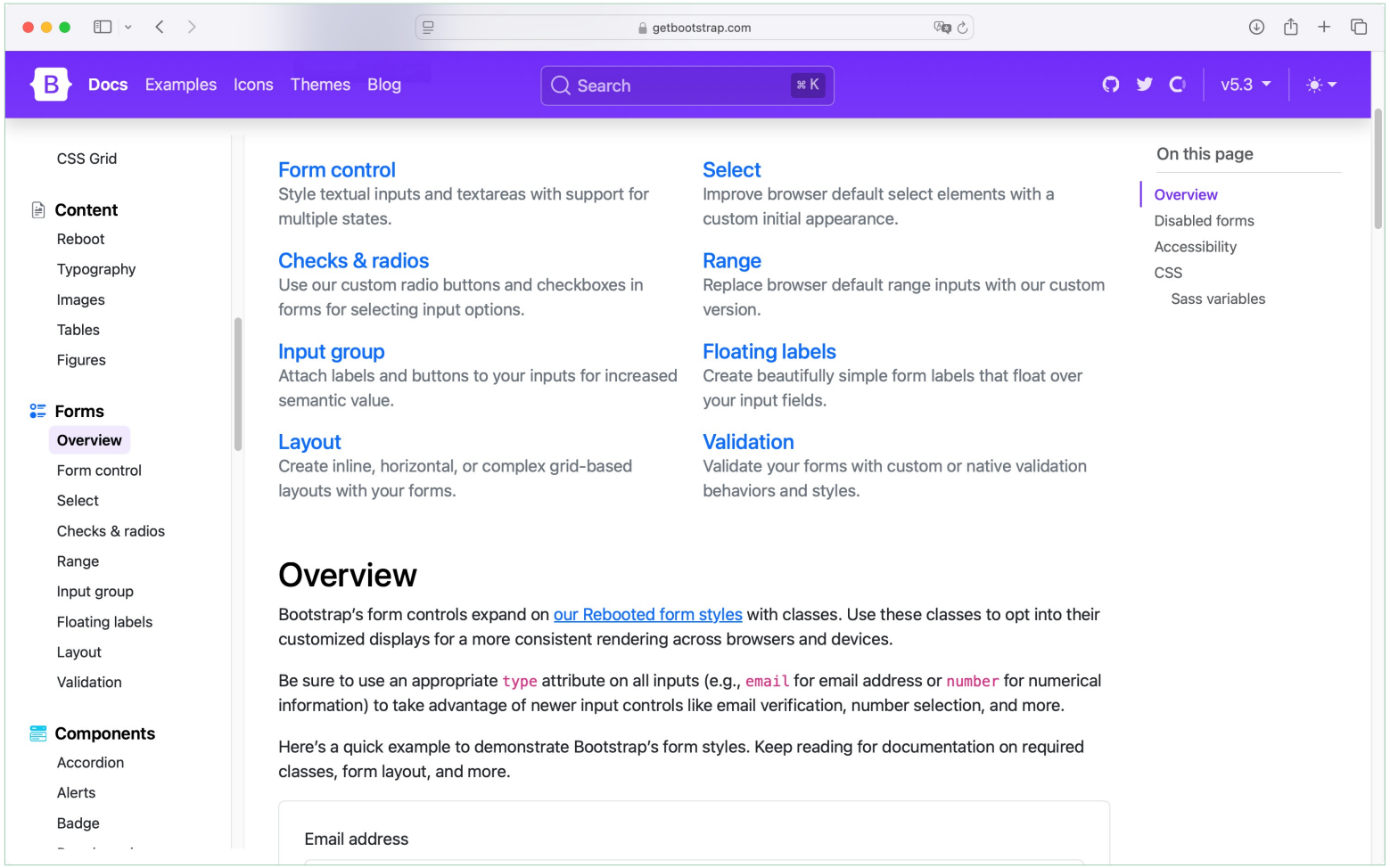
Support elements: Label tag

Represents a **caption** for a UI item

- Improves **usability**: clicking the label activates the input (useful for touch screens)
- Connects to an **`<input>`** by matching its **`id`** with the label's **`for`** attribute


```
<label for="cheese">Do you like
cheese?</label>
<input type="checkbox"
name="cheese" id="cheese">
<label for="peas">Do you like
peas?</label>
<input type="checkbox" name="peas"
id="peas">
```

Forms in Bootstrap



Let's see it in practice

Form validation

Ensures data is in the correct **format** and meets **application constraints**

Two types of validation:

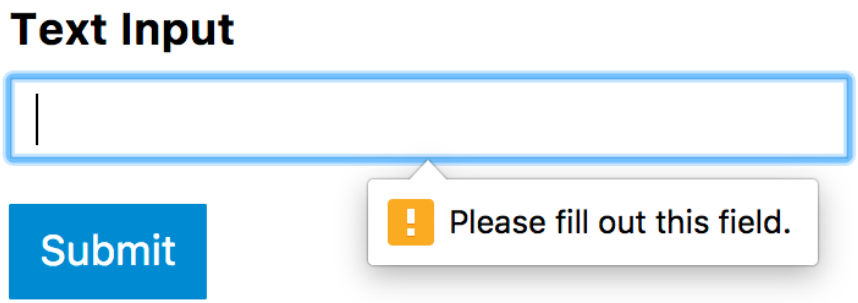
- **Client-side**: performed in the **browser** using HTML5 and JavaScript
- **Server-side**: handled by the **application server**

Client-side validation

Checks input **before submission**, and after passing, data is sent to the server for processing

- **Protects** user data (e.g., enforcing secure passwords)
- Improves user experience with **immediate feedback**

⚠ **NEVER** trust client-side validation on the server!



Client-side validation

Built-in HTML5 Form Validation

- **`type="email"`**: ensures the value follows email syntax
- **`type="url"`**: ensures the value is a properly formatted URL
- **`type="number"`**: restricts input to numeric values
- **`required`**: prevents form submission if the field is empty
- **`pattern="[A-Za-z]{3,}"`**: enforces a custom regex pattern (e.g., at least three letters)
- **`minlength`**/**`maxlength`**: sets the minimum and maximum length for text input
- **`min`**/**`max`**: defines the allowable numerical range for number inputs

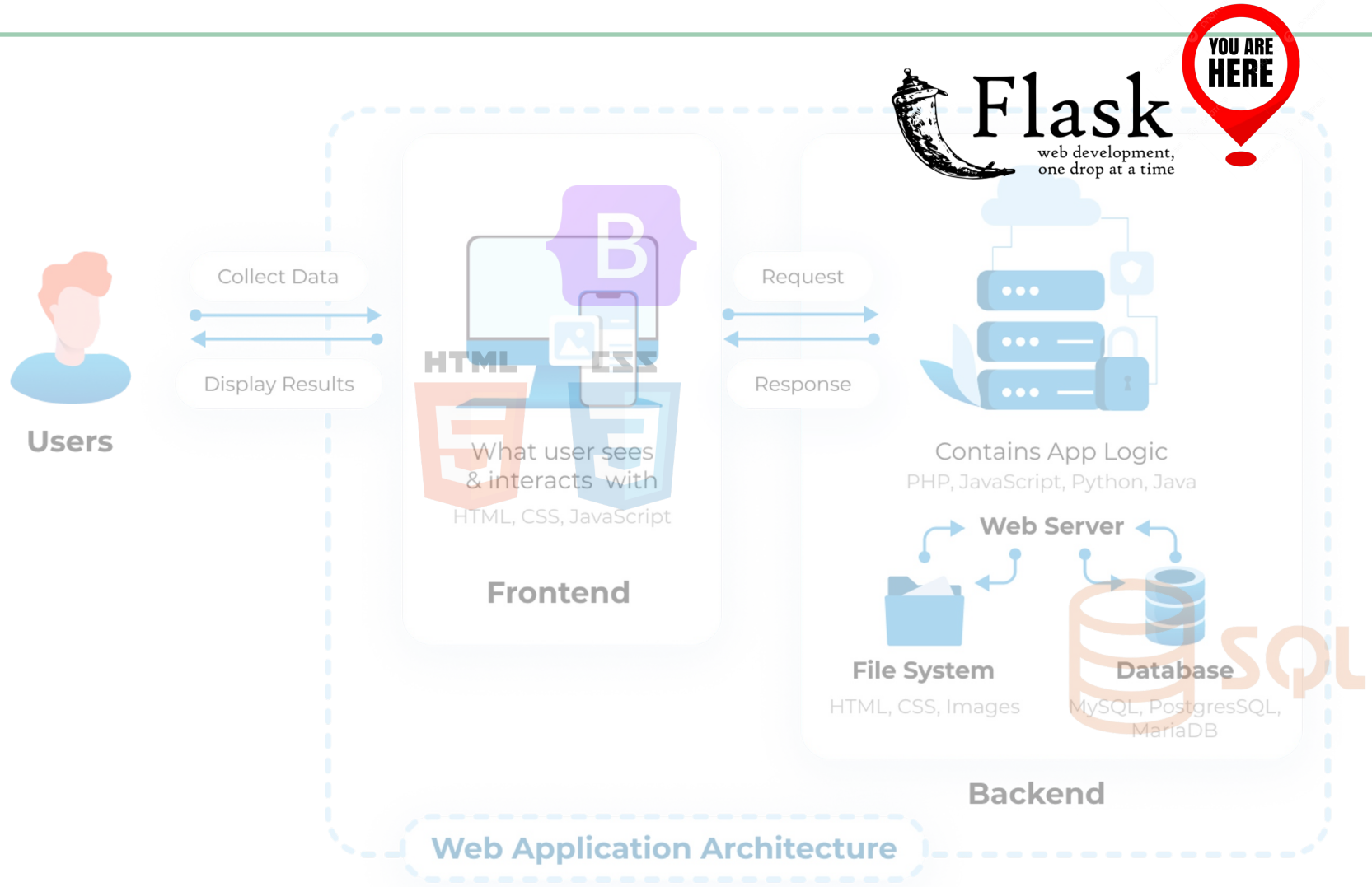
Client-side validation

```
<form>
  <label for="email">Email:</label>
  <input type="email" id="email" name="email" required>

  <label for="website">Website:</label>
  <input type="url" id="website" name="website" required>

  <label for="username">Username (3-10 letters):</label>
  <input type="text" id="username" name="username" pattern="[A-Za-z]{3,10}" minlength="3»
maxlength="10" required>

  <label for="age">Age (18-99):</label>
  <input type="number" id="age" name="age" min="18" max="99" required>

  <button type="submit">Submit</button>
</form>
```

Client-side validation

```
<form>
  <label for="email">Email:</label>
  <input type="email" id="email" name="email" required>

  <label for="website">Website:</label>
  <input type="url" id="website" name="website" required>

  <label for="username">Username (3-10 letters):</label>
  <input type="text" id="username" name="username" pattern="[A-Za-z]{3,10}" minlength="3»
maxlength="10" required>

  <label for="age">Age (18-99):</label>
  <input type="number" id="age" name="age" min="18" max="99" required>

  <button type="submit">Submit</button>
</form>
```

📍 Forms in Flask



Handling form data in Flask

Form submission

- The entire form content is sent via an HTTP request (**POST** or **PUT**) to the application server

Accessing Form Data in Flask

- Flask stores form data in **`request.form`**
- **`request.form`** behaves like a **dictionary**, where **keys** are input field **names**

```
from flask import Flask,
render_template, request

# Access a specific field
name = request.form['name']
# Safer method (avoids KeyError)
email = request.form.get('email')
```

Handling form data in Flask

This route handles POST requests at **/subscribe**

@app.route("/subscribe", methods=["POST"])

- Defines the route for handling POST requests

```python
# app.py
@app.route("/subscribe", methods=["POST"])
def add_to_mailing_list():
  name = request.form.get("name")
  email = request.form.get("email")
  return f"Added to mailing list: {name}, {email}"
```

```html
<!-- In the HTML file -->
<form action="/subscribe" method="post">
  <input type="text" id="name" name="name" required>
  <input type="email" id="email" name="email" required>
  <button type="submit">Subscribe</button>
</form>
```

Handling form data in Flask

`request.form.to_dict()`

- Converts the submitted form data into a standard Python dictionary (**optional**)

```
# Suppose the form sends
name="Alice" and
email=alice@example.com
recensione = request.form.to_dict()
print(recensione)
# Output: {'name': 'Alice',
'email': 'alice@example.com'}
```

Server-side validation

Checks for **empty names** or **emails**

Check if the **email** contains "**@**"

Flask provides pre-configured **logging facilities**, ready to use:

- **`app.logger.debug`**
- **`app.logger.warning`**
- **`app.logger.error`**

```
# Validation
if not name or not email:
  app.logger.warning("Form submitted
with missing fields.")
elif "@" not in email:
  app.logger.warning("Form submitted
with invalid email: %s", email)
else:
  app.logger.info("User subscribed
successfully: %s", email)
```

Redirect in Flask

Flask provides the **`redirect()`** function to redirect users to a **different URL**

Commonly used after **form submissions** or when **handling user authentication**

- ✅ **`redirect()`** changes the URL
- **`render_template()`** does not affect the URL; it just renders the content associated with a route

```
from flask import Flask, render_template,
request, redirect

# Validation
if not name or not email:
  app.logger.warning("Form submitted with missing
fields.")
  return redirect(url_for('show_error'))
elif "@" not in email:
  app.logger.warning("Form submitted with invalid
email: %s", email)
  return redirect(url_for('show_error'))
else:
  app.logger.info("User subscribed successfully:
%s", email)
  return redirect(url_for('home'))
```

File uploads

- Forms for uploading files must include the **`enctype="multipart/form-data"`** attribute
- The original filename (with extension) is available in the **filename** attribute

```
# app.py
uploaded_file = request.files['file']
# Save file
uploaded_file.save('uploads/' + uploaded_file.filename)
```

```
<!-- In the HTML file -->
<form action="/upload" method="POST"
enctype="multipart/form-data">
  <label for="file">Choose file to upload:</label>
  <input type="file" id="file" name="file">
  <button type="submit">Upload</button>
</form>
```

File Uploads: Renaming Files

Avoid filename collisions and enhance security

- Multiple users may upload files with the same name
- Uploaded filenames may contain malicious patterns or special characters
- **`secure_filename()`** to sanitize user-uploaded filenames before saving them on the server

```python
from werkzeug.utils import secure_filename
import time

original_filename =
secure_filename(uploaded_file.filename)
new_filename =
f"{int(time.time())}_{original_filename}"
uploaded_file.save(f"uploads/{new_filename}")
```

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