

---

```
1  # Greets user
2
3  from flask import Flask, render_template, request
4
5  app = Flask(__name__)
6
7
8  @app.route("/")
9  def index():
10     return render_template("index.html", name=request.args.get("name", "world"))
```

1 Flask

```
1 <!DOCTYPE html>
2
3 <html lang="en">
4   <head>
5     <meta name="viewport" content="initial-scale=1, width=device-width">
6     <title>hello</title>
7   </head>
8   <body>
9     hello, {{ name }}
10  </body>
11 </html>
```

---

```
1  # Greets user via a form using GET
2
3  from flask import Flask, render_template, request
4
5  app = Flask(__name__)
6
7
8  @app.route("/")
9  def index():
10     return render_template("index.html")
11
12
13 @app.route("/greet")
14 def greet():
15     return render_template("greet.html", name=request.args.get("name", "world"))
```

1 Flask

```
1 <!DOCTYPE html>
2
3 <html lang="en">
4   <head>
5     <meta name="viewport" content="initial-scale=1, width=device-width">
6     <title>hello</title>
7   </head>
8   <body>
9     hello, {{ name }}
10  </body>
11 </html>
```

```
1 <!DOCTYPE html>
2
3 <html lang="en">
4   <head>
5     <meta name="viewport" content="initial-scale=1, width=device-width">
6     <title>hello</title>
7   </head>
8   <body>
9     <form action="/greet" method="get">
10      <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
11      <input type="submit">
12    </form>
13  </body>
14 </html>
```

---

```
1  # Greets user via a form using GET and a layout
2
3  from flask import Flask, render_template, request
4
5  app = Flask(__name__)
6
7
8  @app.route("/")
9  def index():
10     return render_template("index.html")
11
12
13 @app.route("/greet")
14 def greet():
15     return render_template("greet.html", name=request.args.get("name", "world"))
```



1 Flask

---

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     hello, {{ name }}
5
6
7 {% endblock %}
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4
5     <form action="/greet" method="get">
6         <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
7         <input type="submit">
8     </form>
9
10 {% endblock %}
```

```
1 <!DOCTYPE html>
2
3 <html lang="en">
4   <head>
5     <meta name="viewport" content="initial-scale=1, width=device-width">
6     <title>hello</title>
7   </head>
8   <body>
9     {% block body %}{% endblock %}
10  </body>
11 </html>
```

---

```
1  # Greet user via a form using POST and a layout
2
3  from flask import Flask, render_template, request
4
5  app = Flask(__name__)
6
7
8  @app.route("/")
9  def index():
10     return render_template("index.html")
11
12
13 @app.route("/greet", methods=["POST"])
14 def greet():
15     return render_template("greet.html", name=request.form.get("name", "world"))
```

1 Flask

---

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     hello, {{ name }}
5
6
7 {% endblock %}
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4
5     <form action="/greet" method="post">
6         <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
7         <input type="submit">
8     </form>
9
10 {% endblock %}
```



```
1 <!DOCTYPE html>
2
3 <html lang="en">
4   <head>
5     <meta name="viewport" content="initial-scale=1, width=device-width">
6     <title>hello</title>
7   </head>
8   <body>
9     {% block body %}{% endblock %}
10  </body>
11 </html>
```

```
1  # Implements a registration form using a select menu
2
3  from flask import Flask, render_template, request
4
5  app = Flask(__name__)
6
7  SPORTS = [
8      "Basketball",
9      "Soccer",
10     "Ultimate Frisbee"
11 ]
12
13
14 @app.route("/")
15 def index():
16     return render_template("index.html", sports=SPORTS)
17
18
19 @app.route("/register", methods=["POST"])
20 def register():
21
22     # Validate submission
23     if not request.form.get("name") or request.form.get("sport") not in SPORTS:
24         return render_template("failure.html")
25
26     # Confirm registration
27     return render_template("success.html")
```

1 Flask

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     You are not registered!
5 {% endblock %}
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     <h1>Register</h1>
5     <form action="/register" method="post">
6         <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
7         <select name="sport">
8             <option disabled selected>Sport</option>
9             {% for sport in sports %}
10                <option value="{{ sport }}">{{ sport }}</option>
11            {% endfor %}
12        </select>
13        <input type="submit" value="Register">
14    </form>
15 {% endblock %}
```

```
1 <!DOCTYPE html>
2
3 <html lang="en">
4   <head>
5     <meta name="viewport" content="initial-scale=1, width=device-width">
6     <title>froshims</title>
7   </head>
8   <body>
9     {% block body %}{% endblock %}
10  </body>
11 </html>
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     You are registered!
5 {% endblock %}
```

```
1  # Implements a registration form using checkboxes
2
3  from flask import Flask, render_template, request
4
5  app = Flask(__name__)
6
7  SPORTS = [
8      "Basketball",
9      "Soccer",
10     "Ultimate Frisbee"
11 ]
12
13
14 @app.route("/")
15 def index():
16     return render_template("index.html", sports=SPORTS)
17
18
19 @app.route("/register", methods=["POST"])
20 def register():
21
22     # Validate submission
23     if not request.form.get("name") or request.form.get("sport") not in SPORTS:
24         return render_template("failure.html")
25
26     # Confirm registration
27     return render_template("success.html")
```



1 Flask

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     You are not registered!
5 {% endblock %}
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     <h1>Register</h1>
5     <form action="/register" method="post">
6         <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
7         {% for sport in sports %}
8             <input name="sport" type="checkbox" value="{{ sport }}"> {{ sport }}
9         {% endfor %}
10        <input type="submit" value="Register">
11    </form>
12 {% endblock %}
```

```
1 <!DOCTYPE html>
2
3 <html lang="en">
4   <head>
5     <meta name="viewport" content="initial-scale=1, width=device-width">
6     <title>froshims</title>
7   </head>
8   <body>
9     {% block body %}{% endblock %}
10  </body>
11 </html>
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     You are registered!
5 {% endblock %}
```

```
1  # Implements a registration form using radio buttons
2
3  from flask import Flask, render_template, request
4
5  app = Flask(__name__)
6
7  SPORTS = [
8      "Basketball",
9      "Soccer",
10     "Ultimate Frisbee"
11 ]
12
13
14 @app.route("/")
15 def index():
16     return render_template("index.html", sports=SPORTS)
17
18
19 @app.route("/register", methods=["POST"])
20 def register():
21
22     # Validate submission
23     if not request.form.get("name") or request.form.get("sport") not in SPORTS:
24         return render_template("failure.html")
25
26     # Confirm registration
27     return render_template("success.html")
```

1 Flask

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     You are not registered!
5 {% endblock %}
```



```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     <h1>Register</h1>
5     <form action="/register" method="post">
6         <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
7         {% for sport in sports %}
8             <input name="sport" type="radio" value="{{ sport }}"> {{ sport }}
9         {% endfor %}
10        <input type="submit" value="Register">
11    </form>
12 {% endblock %}
```

```
1 <!DOCTYPE html>
2
3 <html lang="en">
4   <head>
5     <meta name="viewport" content="initial-scale=1, width=device-width">
6     <title>froshims</title>
7   </head>
8   <body>
9     {% block body %}{% endblock %}
10  </body>
11 </html>
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     You are registered!
5 {% endblock %}
```

```
1  # Implements a registration form, storing registrants in a dictionary, with error messages
2
3  from flask import Flask, redirect, render_template, request
4
5  app = Flask(__name__)
6
7  REGISTRANTS = {}
8
9  SPORTS = [
10     "Basketball",
11     "Soccer",
12     "Ultimate Frisbee"
13 ]
14
15
16 @app.route("/")
17 def index():
18     return render_template("index.html", sports=SPORTS)
19
20
21 @app.route("/register", methods=["POST"])
22 def register():
23
24     # Validate name
25     name = request.form.get("name")
26     if not name:
27         return render_template("error.html", message="Missing name")
28
29     # Validate sport
30     sport = request.form.get("sport")
31     if not sport:
32         return render_template("error.html", message="Missing sport")
33     if sport not in SPORTS:
34         return render_template("error.html", message="Invalid sport")
35
36     # Remember registrant
37     REGISTRANTS[name] = sport
38
39     # Confirm registration
40     return redirect("/registrants")
41
42
```

---

```
43 @app.route("/registrants")
44 def registrants():
45     return render_template("registrants.html", registrants=REGISTRANTS)
```

1 Flask

---

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     <h1>Error</h1>
5     <p>{{ message }}</p>
6     
7 {% endblock %}
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     <h1>Register</h1>
5     <form action="/register" method="post">
6         <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
7         {% for sport in sports %}
8             <input name="sport" type="radio" value="{{ sport }}"> {{ sport }}
9         {% endfor %}
10        <input type="submit" value="Register">
11    </form>
12 {% endblock %}
```



```
1 <!DOCTYPE html>
2
3 <html lang="en">
4   <head>
5     <meta name="viewport" content="initial-scale=1, width=device-width">
6     <title>froshims</title>
7   </head>
8   <body>
9     {% block body %}{% endblock %}
10  </body>
11 </html>
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     <h1>Registrants</h1>
5     <table>
6         <thead>
7             <tr>
8                 <th>Name</th>
9                 <th>Sport</th>
10            </tr>
11        </thead>
12        <tbody>
13            {% for name in registrants %}
14                <tr>
15                    <td>{{ name }}</td>
16                    <td>{{ registrants[name] }}</td>
17                </tr>
18            {% endfor %}
19        </tbody>
20    </table>
21 {% endblock %}
```

```
1  # Implements a registration form, storing registrants in a SQLite database, with support for deregistration
2
3  from cs50 import SQL
4  from flask import Flask, redirect, render_template, request
5
6  app = Flask(__name__)
7
8  db = SQL("sqlite:///froshims.db")
9
10 SPORTS = [
11     "Basketball",
12     "Soccer",
13     "Ultimate Frisbee"
14 ]
15
16
17 @app.route("/")
18 def index():
19     return render_template("index.html", sports=SPORTS)
20
21
22 @app.route("/deregister", methods=["POST"])
23 def deregister():
24
25     # Forget registrant
26     id = request.form.get("id")
27     if id:
28         db.execute("DELETE FROM registrants WHERE id = ?", id)
29     return redirect("/registrants")
30
31
32 @app.route("/register", methods=["POST"])
33 def register():
34
35     # Validate submission
36     name = request.form.get("name")
37     sport = request.form.get("sport")
38     if not name or sport not in SPORTS:
39         return render_template("failure.html")
40
41     # Remember registrant
42     db.execute("INSERT INTO registrants (name, sport) VALUES(?, ?)", name, sport)
```

---

```
43
44     # Confirm registration
45     return redirect("/registrants")
46
47
48 @app.route("/registrants")
49 def registrants():
50     registrants = db.execute("SELECT * FROM registrants")
51     return render_template("registrants.html", registrants=registrants)
```

- 1 cs50
- 2 Flask

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     You are not registered!
5 {% endblock %}
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     <h1>Register</h1>
5     <form action="/register" method="post">
6         <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
7         {% for sport in sports %}
8             <input name="sport" type="radio" value="{{ sport }}"> {{ sport }}
9         {% endfor %}
10        <input type="submit" value="Register">
11    </form>
12 {% endblock %}
```

```
1 <!DOCTYPE html>
2
3 <html lang="en">
4   <head>
5     <meta name="viewport" content="initial-scale=1, width=device-width">
6     <title>froshims</title>
7   </head>
8   <body>
9     {% block body %}{% endblock %}
10  </body>
11 </html>
```



```
1 {% extends "layout.html" %}
2
3 {% block body %}
4   <h1>Registrants</h1>
5   <table>
6     <thead>
7       <tr>
8         <th>Name</th>
9         <th>Sport</th>
10        <th></th>
11      </tr>
12    </thead>
13    <tbody>
14      {% for registrant in registrants %}
15        <tr>
16          <td>{{ registrant.name }}</td>
17          <td>{{ registrant.sport }}</td>
18          <td>
19            <form action="/deregister" method="post">
20              <input name="id" type="hidden" value="{{ registrant.id }}">
21              <input type="submit" value="Deregister">
22            </form>
23          </td>
24        </tr>
25      {% endfor %}
26    </tbody>
27  </table>
28 {% endblock %}
```

```
1  # Implements a registration form, confirming registration via email
2
3  import os
4  import re
5
6  from flask import Flask, render_template, request
7  from flask_mail import Mail, Message
8
9  app = Flask(__name__)
10
11  # Requires that "Less secure app access" be on
12  # https://support.google.com/accounts/answer/6010255
13  app.config["MAIL_DEFAULT_SENDER"] = os.environ["MAIL_DEFAULT_SENDER"]
14  app.config["MAIL_PASSWORD"] = os.environ["MAIL_PASSWORD"]
15  app.config["MAIL_PORT"] = 587
16  app.config["MAIL_SERVER"] = "smtp.gmail.com"
17  app.config["MAIL_USE_TLS"] = True
18  app.config["MAIL_USERNAME"] = os.environ["MAIL_USERNAME"]
19  mail = Mail(app)
20
21  SPORTS = [
22      "Basketball",
23      "Soccer",
24      "Ultimate Frisbee"
25  ]
26
27
28  @app.route("/")
29  def index():
30      return render_template("index.html", sports=SPORTS)
31
32
33  @app.route("/register", methods=["POST"])
34  def register():
35
36      # Validate submission
37      name = request.form.get("name")
38      email = request.form.get("email")
39      sport = request.form.get("sport")
40      if not name or not email or sport not in SPORTS:
41          return render_template("failure.html")
42
```

---

```
43     # Send email
44     message = Message("You are registered!", recipients=[email])
45     mail.send(message)
46
47     # Confirm registration
48     return render_template("success.html")
```

- 1 Flask
- 2 Flask-Mail

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     You are not registered!
5 {% endblock %}
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     <h1>Register</h1>
5     <form action="/register" method="post">
6         <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
7         <input autocomplete="off" name="email" placeholder="Email" type="email">
8         {% for sport in sports %}
9             <input name="sport" type="radio" value="{{ sport }}"> {{ sport }}
10        {% endfor %}
11        <input type="submit" value="Register">
12    </form>
13 {% endblock %}
```

```
1 <!DOCTYPE html>
2
3 <html lang="en">
4   <head>
5     <meta name="viewport" content="initial-scale=1, width=device-width">
6     <title>froshims</title>
7   </head>
8   <body>
9     {% block body %}{% endblock %}
10  </body>
11 </html>
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     You are registered!
5 {% endblock %}
```



```
1 from flask import Flask, redirect, render_template, request, session
2 from flask_session import Session
3
4 # Configure app
5 app = Flask(__name__)
6
7 # Configure session
8 app.config["SESSION_PERMANENT"] = False
9 app.config["SESSION_TYPE"] = "filesystem"
10 Session(app)
11
12
13 @app.route("/")
14 def index():
15     if not session.get("name"):
16         return redirect("/login")
17     return render_template("index.html")
18
19
20 @app.route("/login", methods=["GET", "POST"])
21 def login():
22     if request.method == "POST":
23         session["name"] = request.form.get("name")
24         return redirect("/")
25     return render_template("login.html")
26
27
28 @app.route("/logout")
29 def logout():
30     session["name"] = None
31     return redirect("/")
```

- 1 Flask
- 2 Flask-Session

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4
5     {% if session["name"] %}
6         You are logged in as {{ session["name"] }}. <a href="/logout">Log out</a>.
7     {% else %}
8         You are not logged in. <a href="/login">Log in</a>.
9     {% endif %}
10
11 {% endblock %}
```

```
1 <!DOCTYPE html>
2
3 <html>
4   <head>
5     <meta name="viewport" content="initial-scale=1, width=device-width">
6     <title>store</title>
7   </head>
8   <body>
9     {% block body %}{% endblock %}
10  </body>
11 </html>
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4
5     <form action="/login" method="post">
6         <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
7         <input type="submit" value="Log In">
8     </form>
9
10 {% endblock %}
```

```
1 from cs50 import SQL
2 from flask import Flask, redirect, render_template, request, session
3 from flask_session import Session
4
5 # Configure app
6 app = Flask(__name__)
7
8 # Connect to database
9 db = SQL("sqlite:///store.db")
10
11 # Configure session
12 app.config["SESSION_PERMANENT"] = False
13 app.config["SESSION_TYPE"] = "filesystem"
14 Session(app)
15
16
17 @app.route("/")
18 def index():
19     books = db.execute("SELECT * FROM books")
20     return render_template("books.html", books=books)
21
22
23 @app.route("/cart", methods=["GET", "POST"])
24 def cart():
25
26     # Ensure cart exists
27     if "cart" not in session:
28         session["cart"] = []
29
30     # POST
31     if request.method == "POST":
32         id = request.form.get("id")
33         if id:
34             session["cart"].append(id)
35         return redirect("/cart")
36
37     # GET
38     books = db.execute("SELECT * FROM books WHERE id IN (?)", session["cart"])
39     return render_template("cart.html", books=books)
```

- 1 cs50
- 2 Flask
- 3 Flask-Session

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4
5     <h1>Books</h1>
6     {% for book in books %}
7         <h2>{{ book["title"] }}</h2>
8         <form action="/cart" method="post">
9             <input name="id" type="hidden" value="{{ book['id'] }}">
10            <input type="submit" value="Add to Cart">
11        </form>
12    {% endfor %}
13
14 {% endblock %}
```



```
1 {% extends "layout.html" %}
2
3 {% block body %}
4
5     <h1>Cart</h1>
6     <ol>
7         {% for book in books %}
8             <li>{{ book["title"] }}</li>
9         {% endfor %}
10    </ol>
11
12 {% endblock %}
```

```
1 <!DOCTYPE html>
2
3 <html>
4   <head>
5     <meta name="viewport" content="initial-scale=1, width=device-width">
6     <title>store</title>
7   </head>
8   <body>
9     {% block body %}{% endblock %}
10  </body>
11 </html>
```

```
1  # Searches for shows
2
3  from cs50 import SQL
4  from flask import Flask, render_template, request
5
6  app = Flask(__name__)
7
8  db = SQL("sqlite:///shows.db")
9
10
11 @app.route("/")
12 def index():
13     return render_template("index.html")
14
15
16 @app.route("/search")
17 def search():
18     shows = db.execute("SELECT * FROM shows WHERE title LIKE ?", "%" + request.args.get("q") + "%")
19     return render_template("search.html", shows=shows)
```

1 cs50  
2 Flask

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4
5     <form action="/search" method="get">
6         <input autocomplete="off" autofocus name="q" placeholder="Query" type="search">
7         <input type="submit" value="Search">
8     </form>
9
10 {% endblock %}
```

```
1 <!DOCTYPE html>
2
3 <html lang="en">
4   <head>
5     <meta name="viewport" content="initial-scale=1, width=device-width">
6     <title>shows</title>
7   </head>
8   <body>
9     {% block body %}{% endblock %}
10  </body>
11 </html>
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4
5     <ul>
6         {% for show in shows %}
7             <li>{{ show["title"] }}</li>
8         {% endfor %}
9     </ul>
10
11 {% endblock %}
```

```
1  # Searches for shows using Ajax
2
3  from cs50 import SQL
4  from flask import Flask, render_template, request
5
6  app = Flask(__name__)
7
8  db = SQL("sqlite:///shows.db")
9
10
11 @app.route("/")
12 def index():
13     return render_template("index.html")
14
15
16 @app.route("/search")
17 def search():
18     q = request.args.get("q")
19     if q:
20         shows = db.execute("SELECT * FROM shows WHERE title LIKE ? LIMIT 50", "%" + q + "%")
21     else:
22         shows = []
23     return render_template("search.html", shows=shows)
```



- 1 cs50
- 2 Flask

```
1 <!DOCTYPE html>
2
3 <html lang="en">
4   <head>
5     <meta name="viewport" content="initial-scale=1, width=device-width">
6     <title>shows</title>
7   </head>
8   <body>
9
10    <input autocomplete="off" autofocus placeholder="Query" type="search">
11
12    <ul></ul>
13
14    <script>
15
16      let input = document.querySelector('input');
17      input.addEventListener('input', async function() {
18        let response = await fetch('/search?q=' + input.value);
19        let shows = await response.text();
20        document.querySelector('ul').innerHTML = shows;
21      });
22
23    </script>
24
25  </body>
26 </html>
```

---

```
1 {% for show in shows %}
2   <li>{{ show["title"] }}</li>
3 {% endfor %}
```

```
1  # Searches for shows using Ajax with JSON
2
3  from cs50 import SQL
4  from flask import Flask, jsonify, render_template, request
5
6  app = Flask(__name__)
7
8  db = SQL("sqlite:///shows.db")
9
10
11 @app.route("/")
12 def index():
13     return render_template("index.html")
14
15
16 @app.route("/search")
17 def search():
18     q = request.args.get("q")
19     if q:
20         shows = db.execute("SELECT * FROM shows WHERE title LIKE ? LIMIT 50", "%" + q + "%")
21     else:
22         shows = []
23     return jsonify(shows)
```

- 1 cs50
- 2 Flask

```
1 <!DOCTYPE html>
2
3 <html lang="en">
4   <head>
5     <meta name="viewport" content="initial-scale=1, width=device-width">
6     <title>shows</title>
7   </head>
8   <body>
9
10    <input autocomplete="off" autofocus placeholder="Query" type="text">
11
12    <ul></ul>
13
14    <script>
15      let input = document.querySelector('input');
16      input.addEventListener('input', async function() {
17        let response = await fetch('/search?q=' + input.value);
18        let shows = await response.json();
19        let html = '';
20        for (let id in shows) {
21          let title = shows[id].title.replace('<', '&lt;').replace('&', '&amp;');
22          html += '<li>' + title + '</li>';
23        }
24        document.querySelector('ul').innerHTML = html;
25      });
26    </script>
27
28  </body>
29
30 </html>
```