```python
# Says hello to world

from flask import Flask, render_template, request

app = Flask(__name__)


@app.route("/")
def index():
    return render_template("index.html")
```

```
1  Flask
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>hello</title>
    </head>
    <body>
        hello, world
    </body>
</html>
```

```python
# Says hello to request.args["name"]

from flask import Flask, render_template, request

app = Flask(__name__)


@app.route("/")
def index():
    if "name" in request.args:
        name = request.args["name"]
    else:
        name = "world"
    return render_template("index.html", placeholder=name)
```

```
1  Flask
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>hello</title>
    </head>
    <body>
        hello, {{ placeholder }}
    </body>
</html>
```

```python
# Uses parameter with same name as variable

from flask import Flask, render_template, request

app = Flask(__name__)


@app.route("/")
def index():
    if "name" in request.args:
        name = request.args["name"]
    else:
        name = "world"
    return render_template("index.html", name=name)
```

```
1  Flask
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>hello</title>
    </head>
    <body>
        hello, {{ name }}
    </body>
</html>
```

```python
# Uses request.args.get

from flask import Flask, render_template, request

app = Flask(__name__)


@app.route("/")
def index():
    name = request.args.get("name", "world")
    return render_template("index.html", name=name)
```

```
Flask
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>hello</title>
    </head>
    <body>
        hello, {{ name }}
    </body>
</html>
```

```python
# Adds a form, second route

from flask import Flask, render_template, request

app = Flask(__name__)


@app.route("/")
def index():
    return render_template("index.html")


@app.route("/greet")
def greet():
    return render_template("greet.html", name=request.args.get("name", "world"))
```

```
1  Flask
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>hello</title>
    </head>
    <body>
        hello, {{ name }}
    </body>
</html>
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>hello</title>
    </head>
    <body>
        <form action="/greet" method="get">
            <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
            <button type="submit">Greet</button>
        </form>
    </body>
</html>
```

```python
# Adds a layout

from flask import Flask, render_template, request

app = Flask(__name__)


@app.route("/")
def index():
    return render_template("index.html")


@app.route("/greet")
def greet():
    return render_template("greet.html", name=request.args.get("name", "world"))
```

```
1  Flask
```

```
{% extends "layout.html" %}

{% block body %}
    hello, {{ name }}
{% endblock %}
```

```
{% extends "layout.html" %}

{% block body %}

    <form action="/greet" method="get">
        <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
        <button type="submit">Greet</button>
    </form>

{% endblock %}
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>hello</title>
    </head>
    <body>
        {% block body %}{% endblock %}
    </body>
</html>
```

```python
# Switches to POST

from flask import Flask, render_template, request

app = Flask(__name__)


@app.route("/")
def index():
    return render_template("index.html")


@app.route("/greet", methods=["POST"])
def greet():
    return render_template("greet.html", name=request.form.get("name", "world"))
```

```
1  Flask
```

```
{% extends "layout.html" %}

{% block body %}
    hello, {{ name }}
{% endblock %}
```

```
{% extends "layout.html" %}

{% block body %}

    <form action="/greet" method="post">
        <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
        <button type="submit">Greet</button>
    </form>

{% endblock %}
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>hello</title>
    </head>
    <body>
        {% block body %}{% endblock %}
    </body>
</html>
```

```python
# Uses a single route

from flask import Flask, render_template, request

app = Flask(__name__)


@app.route("/", methods=["GET", "POST"])
def index():
    if request.method == "POST":
        return render_template("greet.html", name=request.form.get("name", "world"))
    return render_template("index.html")
```

```
Flask
```

```
{% extends "layout.html" %}

{% block body %}

    hello, {{ name }}

{% endblock %}
```

```
{% extends "layout.html" %}

{% block body %}

    <form action="/" method="post">
        <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
        <button type="submit">Greet</button>
    </form>

{% endblock %}
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>hello</title>
    </head>
    <body>
        {% block body %}{% endblock %}
    </body>
</html>
```

```python
# Implements a registration form using a select menu without validating sport server-side

from flask import Flask, render_template, request

app = Flask(__name__)


@app.route("/")
def index():
    return render_template("index.html")


@app.route("/register", methods=["POST"])
def register():

    # Validate submission
    if not request.form.get("name") or not request.form.get("sport"):
        return render_template("failure.html")

    # Confirm registration
    return render_template("success.html")
```

```
1  Flask
```

```
{% extends "layout.html" %}

{% block body %}
    You are not registered!
{% endblock %}
```

```
{% extends "layout.html" %}

{% block body %}
    <h1>Register</h1>
    <form action="/register" method="post">
        <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
        <select name="sport">
            <option disabled selected value="">Sport</option>
            <option value="Basketball">Basketball</option>
            <option value="Soccer">Soccer</option>
            <option value="Ultimate Frisbee">Ultimate Frisbee</option>
        </select>
        <button type="submit">Register</button>
    </form>
{% endblock %}
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>froshims</title>
    </head>
    <body>
        {% block body %}{% endblock %}
    </body>
</html>
```

```
{% extends "layout.html" %}

{% block body %}
    You are registered!
{% endblock %}
```

```python
# Implements a registration form using a select menu, validating sport server-side

from flask import Flask, render_template, request

app = Flask(__name__)

SPORTS = [
    "Basketball",
    "Soccer",
    "Ultimate Frisbee"
]


@app.route("/")
def index():
    return render_template("index.html", sports=SPORTS)


@app.route("/register", methods=["POST"])
def register():

    # Validate submission
    if not request.form.get("name") or request.form.get("sport") not in SPORTS:
        return render_template("failure.html")

    # Confirm registration
    return render_template("success.html")
```

```
1  Flask
```

```
{% extends "layout.html" %}

{% block body %}
    You are not registered!
{% endblock %}
```

```
{% extends "layout.html" %}

{% block body %}
    <h1>Register</h1>
    <form action="/register" method="post">
        <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
        <select name="sport">
            <option disabled selected value="">Sport</option>
            {% for sport in sports %}
                <option value="{{ sport }}">{{ sport }}</option>
            {% endfor %}
        </select>
        <button type="submit">Register</button>
    </form>
{% endblock %}
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>froshims</title>
    </head>
    <body>
        {% block body %}{% endblock %}
    </body>
</html>
```

```
{% extends "layout.html" %}

{% block body %}
    You are registered!
{% endblock %}
```

```python
# Implements a registration form using radio buttons

from flask import Flask, render_template, request

app = Flask(__name__)

SPORTS = [
    "Basketball",
    "Soccer",
    "Ultimate Frisbee"
]


@app.route("/")
def index():
    return render_template("index.html", sports=SPORTS)


@app.route("/register", methods=["POST"])
def register():

    # Validate submission
    if not request.form.get("name") or request.form.get("sport") not in SPORTS:
        return render_template("failure.html")

    # Confirm registration
    return render_template("success.html")
```

```
1  Flask
```

```
{% extends "layout.html" %}

{% block body %}
    You are not registered!
{% endblock %}
```

```
{% extends "layout.html" %}

{% block body %}
    <h1>Register</h1>
    <form action="/register" method="post">
        <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
        {% for sport in sports %}
            <input name="sport" type="radio" value="{{ sport }}"> {{ sport }}
        {% endfor %}
        <button type="submit">Register</button>
    </form>
{% endblock %}
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>froshims</title>
    </head>
    <body>
        {% block body %}{% endblock %}
    </body>
</html>
```

```
{% extends "layout.html" %}

{% block body %}
    You are registered!
{% endblock %}
```

```python
# Implements a registration form using checkboxes

from flask import Flask, render_template, request

app = Flask(__name__)

SPORTS = [
    "Basketball",
    "Soccer",
    "Ultimate Frisbee"
]


@app.route("/")
def index():
    return render_template("index.html", sports=SPORTS)


@app.route("/register", methods=["POST"])
def register():

    # Validate submission
    if not request.form.get("name"):
        return render_template("failure.html")
    for sport in request.form.getlist("sport"):
        if sport not in SPORTS:
            return render_template("failure.html")

    # Confirm registration
    return render_template("success.html")
```

```
1  Flask
```

```
{% extends "layout.html" %}

{% block body %}
    You are not registered!
{% endblock %}
```

```
{% extends "layout.html" %}

{% block body %}
    <h1>Register</h1>
    <form action="/register" method="post">
        <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
        {% for sport in sports %}
            <input name="sport" type="checkbox" value="{{ sport }}"> {{ sport }}
        {% endfor %}
        <button type="submit">Register</button>
    </form>
{% endblock %}
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>froshims</title>
    </head>
    <body>
        {% block body %}{% endblock %}
    </body>
</html>
```

```
{% extends "layout.html" %}

{% block body %}
    You are registered!
{% endblock %}
```

```python
# Implements a registration form, storing registrants in a dictionary, with error messages

from flask import Flask, redirect, render_template, request

app = Flask(__name__)

REGISTRANTS = {}

SPORTS = [
    "Basketball",
    "Soccer",
    "Ultimate Frisbee"
]


@app.route("/")
def index():
    return render_template("index.html", sports=SPORTS)


@app.route("/register", methods=["POST"])
def register():

    # Validate name
    name = request.form.get("name")
    if not name:
        return render_template("error.html", message="Missing name")

    # Validate sport
    sport = request.form.get("sport")
    if not sport:
        return render_template("error.html", message="Missing sport")
    if sport not in SPORTS:
        return render_template("error.html", message="Invalid sport")

    # Remember registrant
    REGISTRANTS[name] = sport

    # Confirm registration
    return redirect("/registrants")


```

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

```
Flask
```

```
{% extends "layout.html" %}

{% block body %}
    <h1>Error</h1>
    <p>{{ message }}</p>
    <img alt="Grumpy Cat" src="/static/cat.jpg">
{% endblock %}
```

```
{% extends "layout.html" %}

{% block body %}
    <h1>Register</h1>
    <form action="/register" method="post">
        <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
        {% for sport in sports %}
            <input name="sport" type="radio" value="{{ sport }}"> {{ sport }}
        {% endfor %}
        <button type="submit">Register</button>
    </form>
{% endblock %}
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>froshims</title>
    </head>
    <body>
        {% block body %}{% endblock %}
    </body>
</html>
```

```
{% extends "layout.html" %}

{% block body %}
    <h1>Registrants</h1>
    <table>
        <thead>
            <tr>
                <th>Name</th>
                <th>Sport</th>
            </tr>
        </thead>
        <tbody>
            {% for name in registrants %}
                <tr>
                    <td>{{ name }}</td>
                    <td>{{ registrants[name] }}</td>
                </tr>
            {% endfor %}
        </tbody>
    </table>
{% endblock %}
```

```python
# Implements a registration form, storing registrants in a SQLite database, with support for deregistration

from cs50 import SQL
from flask import Flask, redirect, render_template, request

app = Flask(__name__)

db = SQL("sqlite:///froshims.db")

SPORTS = [
    "Basketball",
    "Soccer",
    "Ultimate Frisbee"
]


@app.route("/")
def index():
    return render_template("index.html", sports=SPORTS)


@app.route("/deregister", methods=["POST"])
def deregister():

    # Forget registrant
    id = request.form.get("id")
    if id:
        db.execute("DELETE FROM registrants WHERE id = ?", id)
    return redirect("/registrants")


@app.route("/register", methods=["POST"])
def register():

    # Validate submission
    name = request.form.get("name")
    sport = request.form.get("sport")
    if not name or sport not in SPORTS:
        return render_template("failure.html")

    # Remember registrant
    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)
```

```
cs50
Flask
```

```
{% extends "layout.html" %}

{% block body %}
    You are not registered!
{% endblock %}
```

```
{% extends "layout.html" %}

{% block body %}
    <h1>Register</h1>
    <form action="/register" method="post">
        <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
        {% for sport in sports %}
            <input name="sport" type="radio" value="{{ sport }}"> {{ sport }}
        {% endfor %}
        <button type="submit">Register</button>
    </form>
{% endblock %}
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>froshims</title>
    </head>
    <body>
        {% block body %}{% endblock %}
    </body>
</html>
```

```
{% extends "layout.html" %}

{% block body %}
    <h1>Registrants</h1>
    <table>
        <thead>
            <tr>
                <th>Name</th>
                <th>Sport</th>
                <th></th>
            </tr>
        </thead>
        <tbody>
            {% for registrant in registrants %}
                <tr>
                    <td>{{ registrant.name }}</td>
                    <td>{{ registrant.sport }}</td>
                    <td>
                        <form action="/deregister" method="post">
                            <input name="id" type="hidden" value="{{ registrant.id }}">
                            <button type="submit">Deregister</button>
                        </form>
                    </td>
                </tr>
            {% endfor %}
        </tbody>
    </table>
{% endblock %}
```

```python
from flask import Flask, redirect, render_template, request, session
from flask_session import Session

# Configure app
app = Flask(__name__)

# Configure session
app.config["SESSION_PERMANENT"] = False
app.config["SESSION_TYPE"] = "filesystem"
Session(app)


@app.route("/")
def index():
    return render_template("index.html", name=session.get("name"))


@app.route("/login", methods=["GET", "POST"])
def login():
    if request.method == "POST":
        session["name"] = request.form.get("name")
        return redirect("/")
    return render_template("login.html")


@app.route("/logout")
def logout():
    session.clear()
    return redirect("/")
```

```
Flask
Flask-Session
```

```
{% extends "layout.html" %}

{% block body %}

    {% if name %}
        You are logged in as {{ name }}. <a href="/logout">Log out</a>.
    {% else %}
        You are not logged in. <a href="/login">Log in</a>.
    {% endif %}

{% endblock %}
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>login</title>
    </head>
    <body>
        {% block body %}{% endblock %}
    </body>
</html>
```

```
{% extends "layout.html" %}

{% block body %}

    <form action="/login" method="post">
        <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
        <button type="submit">Log In</button>
    </form>

{% endblock %}
```

```python
from cs50 import SQL
from flask import Flask, redirect, render_template, request, session
from flask_session import Session

# Configure app
app = Flask(__name__)

# Connect to database
db = SQL("sqlite:///store.db")

# Configure session
app.config["SESSION_PERMANENT"] = False
app.config["SESSION_TYPE"] = "filesystem"
Session(app)


@app.route("/")
def index():
    books = db.execute("SELECT * FROM books")
    return render_template("books.html", books=books)


@app.route("/cart", methods=["GET", "POST"])
def cart():

    # Ensure cart exists
    if "cart" not in session:
        session["cart"] = []

    # POST
    if request.method == "POST":
        book_id = request.form.get("id")
        if book_id:
            session["cart"].append(book_id)
        return redirect("/cart")

    # GET
    books = db.execute("SELECT * FROM books WHERE id IN (?)", session["cart"])
    return render_template("cart.html", books=books)
```

```
cs50
Flask
Flask-Session
```

```
{% extends "layout.html" %}

{% block body %}

    <h1>Books</h1>
    {% for book in books %}
        <h2>{{ book["title"] }}</h2>
        <form action="/cart" method="post">
            <input name="id" type="hidden" value="{{ book['id'] }}">
            <button type="submit">Add to Cart</button>
        </form>
    {% endfor %}

{% endblock %}
```

```
{% extends "layout.html" %}

{% block body %}

    <h1>Cart</h1>
    <ol>
        {% for book in books %}
            <li>{{ book["title"] }}</li>
        {% endfor %}
    </ol>

{% endblock %}
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>store</title>
    </head>
    <body>
        {% block body %}{% endblock %}
    </body>
</html>
```

```python
# Searches for shows

from cs50 import SQL
from flask import Flask, render_template, request

app = Flask(__name__)

db = SQL("sqlite:///shows.db")


@app.route("/")
def index():
    return render_template("index.html")


@app.route("/search")
def search():
    shows = db.execute("SELECT * FROM shows WHERE title = ?", request.args.get("q"))
    return render_template("search.html", shows=shows)
```

```
https://www.imdb.com/conditions
```

```
cs50
Flask
```

```
{% extends "layout.html" %}

{% block body %}

    <form action="/search" method="get">
        <input autocomplete="off" autofocus name="q" placeholder="Query" type="search">
        <button type="submit">Search</button>
    </form>

{% endblock %}
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>shows</title>
    </head>
    <body>
        {% block body %}{% endblock %}
    </body>
</html>
```

```
{% extends "layout.html" %}

{% block body %}

    <ul>
        {% for show in shows %}
            <li>{{ show["title"] }}</li>
        {% endfor %}
    </ul>

{% endblock %}
```

```python
# Searches for shows using LIKE

from cs50 import SQL
from flask import Flask, render_template, request

app = Flask(__name__)

db = SQL("sqlite:///shows.db")


@app.route("/")
def index():
    return render_template("index.html")


@app.route("/search")
def search():
    shows = db.execute("SELECT * FROM shows WHERE title LIKE ?", "%" + request.args.get("q") + "%")
    return render_template("search.html", shows=shows)
```

```
https://www.imdb.com/conditions
```

```
cs50
Flask
```

```
{% extends "layout.html" %}

{% block body %}

    <form action="/search" method="get">
        <input autocomplete="off" autofocus name="q" placeholder="Query" type="search">
        <button type="submit">Search</button>
    </form>

{% endblock %}
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>shows</title>
    </head>
    <body>
        {% block body %}{% endblock %}
    </body>
</html>
```

```
{% extends "layout.html" %}

{% block body %}

    <ul>
        {% for show in shows %}
            <li>{{ show["title"] }}</li>
        {% endfor %}
    </ul>

{% endblock %}
```

```python
# Searches for shows using Ajax

from cs50 import SQL
from flask import Flask, render_template, request

app = Flask(__name__)

db = SQL("sqlite:///shows.db")


@app.route("/")
def index():
    return render_template("index.html")


@app.route("/search")
def search():
    q = request.args.get("q")
    if q:
        shows = db.execute("SELECT * FROM shows WHERE title LIKE ? LIMIT 50", "%" + q + "%")
    else:
        shows = []
    return render_template("search.html", shows=shows)
```

```
https://www.imdb.com/conditions
```

```
cs50
Flask
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>shows</title>
    </head>
    <body>

        <input autocomplete="off" autofocus placeholder="Query" type="search">

        <ul></ul>

        <script>

            let input = document.querySelector('input');
            input.addEventListener('input', async function() {
                let response = await fetch('/search?q=' + input.value);
                let shows = await response.text();
                document.querySelector('ul').innerHTML = shows;
            });

        </script>

    </body>
</html>
```

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

```python
# Searches for shows using Ajax with JSON

from cs50 import SQL
from flask import Flask, jsonify, render_template, request

app = Flask(__name__)

db = SQL("sqlite:///shows.db")


@app.route("/")
def index():
    return render_template("index.html")


@app.route("/search")
def search():
    q = request.args.get("q")
    if q:
        shows = db.execute("SELECT * FROM shows WHERE title LIKE ? LIMIT 50", "%" + q + "%")
    else:
        shows = []
    return jsonify(shows)
```

```
https://www.imdb.com/conditions
```

```
cs50
Flask
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>shows</title>
    </head>
    <body>

        <input autocomplete="off" autofocus placeholder="Query" type="text">

        <ul></ul>

        <script>

            let input = document.querySelector('input');
            input.addEventListener('input', async function() {
                let response = await fetch('/search?q=' + input.value);
                let shows = await response.json();
                let html = '';
                for (let id in shows) {
                    let title = shows[id].title.replace('<', '&lt;').replace('&', '&amp;');
                    html += '<li>' + title + '</li>';
                }
                document.querySelector('ul').innerHTML = html;
            });

        </script>

    </body>
</html>
```