```python
"""
Counts from 1 to 10.

Demonstrates a for loop.
"""

for i in range(10):
    print(i + 1)
```

```python
"""
Counts down to 1.

Demonstrates a while loop.
"""

n = int(input("From: "))
while n > 0:
    print(n)
    n -= 1
print("Blast off!")
```

```python
"""
Says hello to the world.

Demonstrates a function with an argument.
"""

print("hello, world")
```

```
"""
Says hello to someone.

Demonstrates user input, a return value, a variable, and concatenation.
"""

s = input()
print("hello, " + s)
```

```python
"""
Says hello to someone.

Demonstrates multiple arguments.
https://docs.python.org/3/library/functions.html#print
"""

s = input()
print("hello,", s)
```

```
"""
Says hello to someone.

Demonstrates string formatting.
"""

s = input()
print("hello, {}".format(s))
```

```
"""
Says hello to someone.

Demonstrates format strings (f-strings).
"""

s = input()
print(f"hello, {s}")
```

```python
"""
Simulates taking inventory.

Demonstrates a sorted list (potentially with duplicates).
"""

# Take inventory
inventory = []
while True:
    item = input("Item: ")
    if not item:
        break
    inventory.append(item)

# Report inventory
for item in sorted(inventory):
    print(item)
```

```python
"""
Simulates taking inventory.

Demonstrates a set (without duplicates).
"""

# Take inventory
inventory = set()
while True:
    item = input("Item: ")
    if not item:
        break
    inventory.add(item)

# Report inventory
for item in sorted(inventory):
    print(item)
```

```python
"""
Simulates taking inventory.

Demonstrates a dictionary.
"""

# Take inventory
inventory = {}
while True:
    item = input("Item: ")
    if not item:
        break
    if item in inventory:
        inventory[item] += 1
    else:
        inventory[item] = 1

# Report inventory
for key, value in inventory.items():
    print(f"{key}: {value}")
```

```python
# Prints four question marks

print("????")
```

```python
# Prints four question marks using a loop

for i in range(4):
    print("?", end="")
print()
```

```python
# Prints any number of question marks, as specified by user

n = int(input("Number: "))
for i in range(n):
    print("?", end="")
print()
```

```python
# Prints a positive number of question marks, as specified by user

# Prompt user for a positive number
while True:
    n = int(input("Positive number: "))
    if n > 0:
        break

# Print out that many bricks
for i in range(n):
    print("#")
```

```python
# Prints a square of bricks, sized as specified by user

# Prompt user for a positive number
while True:
    n = int(input("Positive number: "))
    if n > 0:
        break

# Print out this many rows
for i in range(n):

    # Print out this many columns
    for j in range(n):
        print("#", end="")
    print()
```

```
"""
Gets a positive integer from a user.

Demonstrates main.
"""


def main():
    n = get_positive_integer()
    print(n)


def get_positive_integer():
    while True:
        n = int(input("Positve integer: "))
        if n > 0:
            return n


if __name__ == "__main__":
    main()
```

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

app = Flask(__name__)


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

```
<!DOCTYPE html>

<!-- Demonstrates static files -->

<html lang="en">
    <head>
        <title>cat</title>
    </head>
    <body>
        <!-- https://knowyourmeme.com/memes/grumpy-cat -->
        <img alt="Grumpy Cat" src="/static/cat.jpg">
    </body>
</html>
```

```python
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():
    if not request.form.get("name") or not request.form.get("dorm"):
        return render_template("failure.html")
    return render_template("success.html")
```

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

{% block body %}
    You must provide your name and dorm!
{% endblock %}
```

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

{% block body %}
    <h1>Register for Frosh IMs</h1>
    <form action="/register" method="post">
        <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
        <select name="dorm">
            <option disabled selected value="">Dorm</option>
            <option value="Apley Court">Apley Court</option>
            <option value="Canaday">Canaday</option>
            <option value="Grays">Grays</option>
            <option value="Greenough">Greenough</option>
            <option value="Hollis">Hollis</option>
            <option value="Holworthy">Holworthy</option>
            <option value="Hurlbut">Hurlbut</option>
            <option value="Lionel">Lionel</option>
            <option value="Matthews">Matthews</option>
            <option value="Mower">Mower</option>
            <option value="Pennypacker">Pennypacker</option>
            <option value="Stoughton">Stoughton</option>
            <option value="Straus">Straus</option>
            <option value="Thayer">Thayer</option>
            <option value="Weld">Weld</option>
            <option value="Wigglesworth">Wigglesworth</option>
        </select>
        <input type="submit" value="Register">
    </form>
{% endblock %}
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>froshims0</title>
    </head>
    <body>
        {% block body %}{% endblock %}
    </body>
</html>
```

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

{% block body %}
    You are registered! (Well, not really.)
{% endblock %}
```

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

# Configure app
app = Flask(__name__)

# Registered students
students = []


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


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


@app.route("/register", methods=["POST"])
def register():
    name = request.form.get("name")
    dorm = request.form.get("dorm")
    if not name or not dorm:
        return render_template("failure.html")
    students.append(f"{name} from {dorm}")
    return redirect("/registrants")
```

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

{% block body %}
    You must provide your name and dorm!
{% endblock %}
```

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

{% block body %}
    <h1>Register for Frosh IMs</h1>
    <form action="/register" method="post">
        <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
        <select name="dorm">
            <option disabled selected value="">Dorm</option>
            <option value="Apley Court">Apley Court</option>
            <option value="Canaday">Canaday</option>
            <option value="Grays">Grays</option>
            <option value="Greenough">Greenough</option>
            <option value="Hollis">Hollis</option>
            <option value="Holworthy">Holworthy</option>
            <option value="Hurlbut">Hurlbut</option>
            <option value="Lionel">Lionel</option>
            <option value="Matthews">Matthews</option>
            <option value="Mower">Mower</option>
            <option value="Pennypacker">Pennypacker</option>
            <option value="Stoughton">Stoughton</option>
            <option value="Straus">Straus</option>
            <option value="Thayer">Thayer</option>
            <option value="Weld">Weld</option>
            <option value="Wigglesworth">Wigglesworth</option>
        </select>
        <input type="submit" value="Register">
    </form>
{% endblock %}
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta content="initial-scale=1, width=device-width" name="viewport">
        <title>froshims1</title>
    </head>
    <body>
        {% block body %}{% endblock %}
    </body>
</html>
```

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

{% block body %}
    <ul>
        {% for student in students %}
            <li>{{ student }}</li>
        {% endfor %}
    </ul>
{% endblock %}
```

```python
import os
import smtplib
from flask import Flask, render_template, request

# Configure app
app = Flask(__name__)


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


@app.route("/register", methods=["POST"])
def register():
    name = request.form.get("name")
    email = request.form.get("email")
    dorm = request.form.get("dorm")
    if not name or not email or not dorm:
        return render_template("failure.html")
    message = "You are registered!"
    server = smtplib.SMTP("smtp.gmail.com", 587)
    server.starttls()
    server.login("jharvard@cs50.net", os.getenv("PASSWORD"))
    server.sendmail("jharvard@cs50.net", email, message)
    return render_template("success.html")
```

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

{% block body %}
    You must provide your name and dorm!
{% endblock %}
```

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

{% block body %}
    <h1>Register for Frosh IMs</h1>
    <form action="/register" method="post">
        <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
        <input autocomplete="off" name="email" placeholder="Email" type="email">
        <select name="dorm">
            <option disabled selected value="">Dorm</option>
            <option value="Apley Court">Apley Court</option>
            <option value="Canaday">Canaday</option>
            <option value="Grays">Grays</option>
            <option value="Greenough">Greenough</option>
            <option value="Hollis">Hollis</option>
            <option value="Holworthy">Holworthy</option>
            <option value="Hurlbut">Hurlbut</option>
            <option value="Lionel">Lionel</option>
            <option value="Matthews">Matthews</option>
            <option value="Mower">Mower</option>
            <option value="Pennypacker">Pennypacker</option>
            <option value="Stoughton">Stoughton</option>
            <option value="Straus">Straus</option>
            <option value="Thayer">Thayer</option>
            <option value="Weld">Weld</option>
            <option value="Wigglesworth">Wigglesworth</option>
        </select>
        <input type="submit" value="Register">
    </form>
{% endblock %}
```

```
<!DOCTYPE html>

<html>
    <head>
        <meta content="initial-scale=1, width=device-width" name="viewport">
        <title>froshims2</title>
    </head>
    <body>
        {% block body %}{% endblock %}
    </body>
</html>
```

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

{% block body %}
    You are registered! (Really.)
{% endblock %}
```

```python
from flask import Flask, render_template, request
import csv

app = Flask(__name__)


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


@app.route("/register", methods=["POST"])
def register():
    if not request.form.get("name") or not request.form.get("dorm"):
        return render_template("failure.html")
    file = open("registered.csv", "a")
    writer = csv.writer(file)
    writer.writerow((request.form.get("name"), request.form.get("dorm")))
    file.close()
    return render_template("success.html")


@app.route("/registered")
def registered():
    file = open("registered.csv", "r")
    reader = csv.reader(file)
    students = list(reader)
    file.close()
    return render_template("registered.html", students=students)
```

1

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

{% block body %}
    You must provide your name and dorm!
{% endblock %}
```

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

{% block body %}
    <h1>Register for Frosh IMs</h1>
    <form action="/register" method="post">
        <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
        <select name="dorm">
            <option disabled selected value="">Dorm</option>
            <option value="Apley Court">Apley Court</option>
            <option value="Canaday">Canaday</option>
            <option value="Grays">Grays</option>
            <option value="Greenough">Greenough</option>
            <option value="Hollis">Hollis</option>
            <option value="Holworthy">Holworthy</option>
            <option value="Hurlbut">Hurlbut</option>
            <option value="Lionel">Lionel</option>
            <option value="Matthews">Matthews</option>
            <option value="Mower">Mower</option>
            <option value="Pennypacker">Pennypacker</option>
            <option value="Stoughton">Stoughton</option>
            <option value="Straus">Straus</option>
            <option value="Thayer">Thayer</option>
            <option value="Weld">Weld</option>
            <option value="Wigglesworth">Wigglesworth</option>
        </select>
        <input type="submit" value="Register"> or see <a href="/registered">see who else is registered</a>
    </form>
{% endblock %}
```

```
<!DOCTYPE html>

<html>
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>froshims3</title>
    </head>
    <body>
        {% block body %}{% endblock %}
    </body>
</html>
```

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

{% block body %}
    <h1>Registered</h1>
    <ul>
        {% for student in students %}
            <li>{{ student[0] }} from {{ student[1] }}</li>
        {% endfor %}
    </ul>
{% endblock %}
```

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

{% block body %}
    You are <a href="/registered">registered</a>! (Really.)
{% endblock %}
```

```python
from flask import Flask, render_template, request
import csv

app = Flask(__name__)


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


@app.route("/register", methods=["POST"])
def register():
    if not request.form.get("name") or not request.form.get("dorm"):
        return render_template("failure.html")
    with open("registered.csv", "a") as file:
        writer = csv.DictWriter(file, fieldnames=["name", "dorm"])
        writer.writerow({"name": request.form.get("name"), "dorm": request.form.get("dorm")})
    return render_template("success.html")


@app.route("/registered")
def registered():
    with open("registered.csv", "r") as file:
        reader = csv.DictReader(file)
        students = list(reader)
    return render_template("registered.html", students=students)
```

```
name,dorm
```

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

{% block body %}
    You must provide your name and dorm!
{% endblock %}
```

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

{% block body %}
    <h1>Register for Frosh IMs</h1>
    <form action="/register" method="post">
        <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
        <select name="dorm">
            <option disabled selected value="">Dorm</option>
            <option value="Apley Court">Apley Court</option>
            <option value="Canaday">Canaday</option>
            <option value="Grays">Grays</option>
            <option value="Greenough">Greenough</option>
            <option value="Hollis">Hollis</option>
            <option value="Holworthy">Holworthy</option>
            <option value="Hurlbut">Hurlbut</option>
            <option value="Lionel">Lionel</option>
            <option value="Matthews">Matthews</option>
            <option value="Mower">Mower</option>
            <option value="Pennypacker">Pennypacker</option>
            <option value="Stoughton">Stoughton</option>
            <option value="Straus">Straus</option>
            <option value="Thayer">Thayer</option>
            <option value="Weld">Weld</option>
            <option value="Wigglesworth">Wigglesworth</option>
        </select>
        <input type="submit" value="Register"> or see <a href="/registered">see who else is registered</a>
    </form>
{% endblock %}
```

```
<!DOCTYPE html>

<html>
    <head>
        <meta name="viewport" content="initial-scale=1, width=device-width">
        <title>froshims4</title>
    </head>
    <body>
        {% block body %}{% endblock %}
    </body>
</html>
```

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

{% block body %}
    <h1>Registered</h1>
    <ul>
        {% for student in students %}
            <li>{{ student["name"] }} from {{ student["dorm"] }}</li>
        {% endfor %}
    </ul>
{% endblock %}
```

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

{% block body %}
    You are <a href="/registered">registered</a>! (Really.)
{% endblock %}
```

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

app = Flask(__name__)


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

```
<!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
# Implements a web server

from http.server import BaseHTTPRequestHandler, HTTPServer


# HTTPRequestHandler class
class HTTPServer_RequestHandler(BaseHTTPRequestHandler):

    # GET
    def do_GET(self):

        # Send response status code
        self.send_response(200)

        # Send headers
        self.send_header("Content-type", "text/html")
        self.end_headers()

        # Send body
        self.wfile.write(b"<!DOCTYPE html>")
        self.wfile.write(b"<html lang='en'>")
        self.wfile.write(b"<head>")
        self.wfile.write(b"<title>hello, title</title>")
        self.wfile.write(b"</head>")
        self.wfile.write(b"<body>")
        self.wfile.write(b"hello, body")
        self.wfile.write(b"</body>")
        self.wfile.write(b"</html>")


# Configure server
port = 8080
server_address = ("0.0.0.0", port)
httpd = HTTPServer(server_address, HTTPServer_RequestHandler)

# Run server
httpd.serve_forever()
```