
```
1  """
2  Counts from 1 to 10.
3
4  Demonstrates a for loop.
5  """
6
7  for i in range(10):
8      print(i + 1)
```

```
1  """
2  Counts down to 1.
3
4  Demonstrates a while loop.
5  """
6
7  n = int(input("From: "))
8  while n > 0:
9      print(n)
10     n -= 1
11  print("Blast off!")
```

```
1  """
2  Says hello to the world.
3
4  Demonstrates a function with an argument.
5  """
6
7  print("hello, world")
```

```
1  """
2  Says hello to someone.
3
4  Demonstrates user input, a return value, a variable, and concatenation.
5  """
6
7  s = input()
8  print("hello, " + s)
```

```
1  """
2  Says hello to someone.
3
4  Demonstrates multiple arguments.
5  https://docs.python.org/3/library/functions.html#print
6  """
7
8  s = input()
9  print("hello,", s)
```

```
1  """
2  Says hello to someone.
3
4  Demonstrates string formatting.
5  """
6
7  s = input()
8  print("hello, {}".format(s))
```

```
1  """
2  Says hello to someone.
3
4  Demonstrates format strings (f-strings).
5  """
6
7  s = input()
8  print(f"hello, {s}")
```

```
1  """
2  Simulates taking inventory.
3
4  Demonstrates a sorted list (potentially with duplicates).
5  """
6
7  # Take inventory
8  inventory = []
9  while True:
10     item = input("Item: ")
11     if not item:
12         break
13     inventory.append(item)
14
15 # Report inventory
16 for item in sorted(inventory):
17     print(item)
```



```
1  """
2  Simulates taking inventory.
3
4  Demonstrates a set (without duplicates).
5  """
6
7  # Take inventory
8  inventory = set()
9  while True:
10     item = input("Item: ")
11     if not item:
12         break
13     inventory.add(item)
14
15 # Report inventory
16 for item in sorted(inventory):
17     print(item)
```

```
1  """
2  Simulates taking inventory.
3
4  Demonstrates a dictionary.
5  """
6
7  # Take inventory
8  inventory = {}
9  while True:
10     item = input("Item: ")
11     if not item:
12         break
13     if item in inventory:
14         inventory[item] += 1
15     else:
16         inventory[item] = 1
17
18 # Report inventory
19 for key, value in inventory.items():
20     print(f"{key}: {value}")
```

```
1  # Prints four question marks
2
3  print("????")
```

```
1  # Prints four question marks using a loop
2
3  for i in range(4):
4      print("?", end="")
5  print()
```

```
1  # Prints any number of question marks, as specified by user
2
3  n = int(input("Number: "))
4  for i in range(n):
5      print("?", end="")
6  print()
```

```
1  # Prints a positive number of question marks, as specified by user
2
3  # Prompt user for a positive number
4  while True:
5      n = int(input("Positive number: "))
6      if n > 0:
7          break
8
9  # Print out that many bricks
10 for i in range(n):
11     print("#")
```

```
1  # Prints a square of bricks, sized as specified by user
2
3  # Prompt user for a positive number
4  while True:
5      n = int(input("Positive number: "))
6      if n > 0:
7          break
8
9  # Print out this many rows
10 for i in range(n):
11
12     # Print out this many columns
13     for j in range(n):
14         print("#", end="")
15     print()
```

```
1  """
2  Gets a positive integer from a user.
3
4  Demonstrates main.
5  """
6
7
8  def main():
9      n = get_positive_integer()
10     print(n)
11
12
13  def get_positive_integer():
14     while True:
15         n = int(input("Positive integer: "))
16         if n > 0:
17             return n
18
19
20  if __name__ == "__main__":
21     main()
```

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

```
1 <!DOCTYPE html>
2
3 <!-- Demonstrates static files -->
4
5 <html lang="en">
6   <head>
7     <title>cat</title>
8   </head>
9   <body>
10    <!-- https://knowyourmeme.com/memes/grumpy-cat -->
11    
12  </body>
13 </html>
```

```
1  from flask import Flask, render_template, request
2
3  app = Flask(__name__)
4
5
6  @app.route("/")
7  def index():
8      return render_template("index.html")
9
10
11 @app.route("/register", methods=["POST"])
12 def register():
13     if not request.form.get("name") or not request.form.get("dorm"):
14         return render_template("failure.html")
15     return render_template("success.html")
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     You must provide your name and dorm!
5 {% endblock %}
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     <h1>Register for Frosh IMs</h1>
5     <form action="/register" method="post">
6         <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
7         <select name="dorm">
8             <option disabled selected value="">Dorm</option>
9             <option value="Apley Court">Apley Court</option>
10            <option value="Canaday">Canaday</option>
11            <option value="Grays">Grays</option>
12            <option value="Greenough">Greenough</option>
13            <option value="Hollis">Hollis</option>
14            <option value="Holworthy">Holworthy</option>
15            <option value="Hurlbut">Hurlbut</option>
16            <option value="Lionel">Lionel</option>
17            <option value="Matthews">Matthews</option>
18            <option value="Mower">Mower</option>
19            <option value="Pennypacker">Pennypacker</option>
20            <option value="Stoughton">Stoughton</option>
21            <option value="Straus">Straus</option>
22            <option value="Thayer">Thayer</option>
23            <option value="Weld">Weld</option>
24            <option value="Wigglesworth">Wigglesworth</option>
25        </select>
26        <input type="submit" value="Register">
27    </form>
28 {% endblock %}
```

```
1 <!DOCTYPE html>
2
3 <html lang="en">
4   <head>
5     <meta name="viewport" content="initial-scale=1, width=device-width">
6     <title>froshims0</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! (Well, not really.)
5 {% endblock %}
```

```
1  from flask import Flask, redirect, render_template, request
2
3  # Configure app
4  app = Flask(__name__)
5
6  # Registered students
7  students = []
8
9
10 @app.route("/")
11 def index():
12     return render_template("index.html")
13
14
15 @app.route("/registrants")
16 def registrants():
17     return render_template("registered.html", students=students)
18
19
20 @app.route("/register", methods=["POST"])
21 def register():
22     name = request.form.get("name")
23     dorm = request.form.get("dorm")
24     if not name or not dorm:
25         return render_template("failure.html")
26     students.append(f"{name} from {dorm}")
27     return redirect("/registrants")
```



```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     You must provide your name and dorm!
5 {% endblock %}
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     <h1>Register for Frosh IMs</h1>
5     <form action="/register" method="post">
6         <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
7         <select name="dorm">
8             <option disabled selected value="">Dorm</option>
9             <option value="Apley Court">Apley Court</option>
10            <option value="Canaday">Canaday</option>
11            <option value="Grays">Grays</option>
12            <option value="Greenough">Greenough</option>
13            <option value="Hollis">Hollis</option>
14            <option value="Holworthy">Holworthy</option>
15            <option value="Hurlbut">Hurlbut</option>
16            <option value="Lionel">Lionel</option>
17            <option value="Matthews">Matthews</option>
18            <option value="Mower">Mower</option>
19            <option value="Pennypacker">Pennypacker</option>
20            <option value="Stoughton">Stoughton</option>
21            <option value="Straus">Straus</option>
22            <option value="Thayer">Thayer</option>
23            <option value="Weld">Weld</option>
24            <option value="Wigglesworth">Wigglesworth</option>
25        </select>
26        <input type="submit" value="Register">
27    </form>
28 {% endblock %}
```

```
1 <!DOCTYPE html>
2
3 <html lang="en">
4   <head>
5     <meta content="initial-scale=1, width=device-width" name="viewport">
6     <title>froshims1</title>
7   </head>
8   <body>
9     {% block body %}{% endblock %}
10  </body>
11 </html>
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     <ul>
5         {% for student in students %}
6             <li>{{ student }}</li>
7         {% endfor %}
8     </ul>
9 {% endblock %}
```

```
1 import os
2 import smtplib
3 from flask import Flask, render_template, request
4
5 # Configure app
6 app = Flask(__name__)
7
8
9 @app.route("/")
10 def index():
11     return render_template("index.html")
12
13
14 @app.route("/register", methods=["POST"])
15 def register():
16     name = request.form.get("name")
17     email = request.form.get("email")
18     dorm = request.form.get("dorm")
19     if not name or not email or not dorm:
20         return render_template("failure.html")
21     message = "You are registered!"
22     server = smtplib.SMTP("smtp.gmail.com", 587)
23     server.starttls()
24     server.login("jharvard@cs50.net", os.getenv("PASSWORD"))
25     server.sendmail("jharvard@cs50.net", email, message)
26     return render_template("success.html")
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     You must provide your name and dorm!
5 {% endblock %}
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     <h1>Register for Frosh IMs</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         <select name="dorm">
9             <option disabled selected value="">Dorm</option>
10            <option value="Apley Court">Apley Court</option>
11            <option value="Canaday">Canaday</option>
12            <option value="Grays">Grays</option>
13            <option value="Greenough">Greenough</option>
14            <option value="Hollis">Hollis</option>
15            <option value="Holworthy">Holworthy</option>
16            <option value="Hurlbut">Hurlbut</option>
17            <option value="Lionel">Lionel</option>
18            <option value="Matthews">Matthews</option>
19            <option value="Mower">Mower</option>
20            <option value="Pennypacker">Pennypacker</option>
21            <option value="Stoughton">Stoughton</option>
22            <option value="Straus">Straus</option>
23            <option value="Thayer">Thayer</option>
24            <option value="Weld">Weld</option>
25            <option value="Wigglesworth">Wigglesworth</option>
26        </select>
27        <input type="submit" value="Register">
28    </form>
29 {% endblock %}
```

```
1  <!DOCTYPE html>
2
3  <html>
4    <head>
5      <meta content="initial-scale=1, width=device-width" name="viewport">
6      <title>froshims2</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! (Really.)
5 {% endblock %}
```

```
1  from flask import Flask, render_template, request
2  import csv
3
4  app = Flask(__name__)
5
6
7  @app.route("/")
8  def index():
9      return render_template("index.html")
10
11
12 @app.route("/register", methods=["POST"])
13 def register():
14     if not request.form.get("name") or not request.form.get("dorm"):
15         return render_template("failure.html")
16     file = open("registered.csv", "a")
17     writer = csv.writer(file)
18     writer.writerow((request.form.get("name"), request.form.get("dorm")))
19     file.close()
20     return render_template("success.html")
21
22
23 @app.route("/registered")
24 def registered():
25     file = open("registered.csv", "r")
26     reader = csv.reader(file)
27     students = list(reader)
28     file.close()
29     return render_template("registered.html", students=students)
```



```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     You must provide your name and dorm!
5 {% endblock %}
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     <h1>Register for Frosh IMs</h1>
5     <form action="/register" method="post">
6         <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
7         <select name="dorm">
8             <option disabled selected value="">Dorm</option>
9             <option value="Apley Court">Apley Court</option>
10            <option value="Canaday">Canaday</option>
11            <option value="Grays">Grays</option>
12            <option value="Greenough">Greenough</option>
13            <option value="Hollis">Hollis</option>
14            <option value="Holworthy">Holworthy</option>
15            <option value="Hurlbut">Hurlbut</option>
16            <option value="Lionel">Lionel</option>
17            <option value="Matthews">Matthews</option>
18            <option value="Mower">Mower</option>
19            <option value="Pennypacker">Pennypacker</option>
20            <option value="Stoughton">Stoughton</option>
21            <option value="Straus">Straus</option>
22            <option value="Thayer">Thayer</option>
23            <option value="Weld">Weld</option>
24            <option value="Wigglesworth">Wigglesworth</option>
25        </select>
26        <input type="submit" value="Register"> or see <a href="/registered">see who else is registered</a>
27    </form>
28 {% endblock %}
```

```
1  <!DOCTYPE html>
2
3  <html>
4    <head>
5      <meta name="viewport" content="initial-scale=1, width=device-width">
6      <title>froshims3</title>
7    </head>
8    <body>
9      {% block body %}{% endblock %}
10   </body>
11 </html>
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     <h1>Registered</h1>
5     <ul>
6         {% for student in students %}
7             <li>{{ student[0] }} from {{ student[1] }}</li>
8         {% endfor %}
9     </ul>
10 {% endblock %}
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     You are <a href="/registered">registered</a>! (Really.)
5 {% endblock %}
```



```
1 from flask import Flask, render_template, request
2 import csv
3
4 app = Flask(__name__)
5
6
7 @app.route("/")
8 def index():
9     return render_template("index.html")
10
11
12 @app.route("/register", methods=["POST"])
13 def register():
14     if not request.form.get("name") or not request.form.get("dorm"):
15         return render_template("failure.html")
16     with open("registered.csv", "a") as file:
17         writer = csv.DictWriter(file, fieldnames=["name", "dorm"])
18         writer.writerow({"name": request.form.get("name"), "dorm": request.form.get("dorm")})
19     return render_template("success.html")
20
21
22 @app.route("/registered")
23 def registered():
24     with open("registered.csv", "r") as file:
25         reader = csv.DictReader(file)
26         students = list(reader)
27     return render_template("registered.html", students=students)
```

1 name,dorm

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     You must provide your name and dorm!
5 {% endblock %}
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     <h1>Register for Frosh IMs</h1>
5     <form action="/register" method="post">
6         <input autocomplete="off" autofocus name="name" placeholder="Name" type="text">
7         <select name="dorm">
8             <option disabled selected value="">Dorm</option>
9             <option value="Apley Court">Apley Court</option>
10            <option value="Canaday">Canaday</option>
11            <option value="Grays">Grays</option>
12            <option value="Greenough">Greenough</option>
13            <option value="Hollis">Hollis</option>
14            <option value="Holworthy">Holworthy</option>
15            <option value="Hurlbut">Hurlbut</option>
16            <option value="Lionel">Lionel</option>
17            <option value="Matthews">Matthews</option>
18            <option value="Mower">Mower</option>
19            <option value="Pennypacker">Pennypacker</option>
20            <option value="Stoughton">Stoughton</option>
21            <option value="Straus">Straus</option>
22            <option value="Thayer">Thayer</option>
23            <option value="Weld">Weld</option>
24            <option value="Wigglesworth">Wigglesworth</option>
25        </select>
26        <input type="submit" value="Register"> or see <a href="/registered">see who else is registered</a>
27    </form>
28 {% endblock %}
```

```
1  <!DOCTYPE html>
2
3  <html>
4    <head>
5      <meta name="viewport" content="initial-scale=1, width=device-width">
6      <title>froshims4</title>
7    </head>
8    <body>
9      {% block body %}{% endblock %}
10   </body>
11 </html>
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     <h1>Registered</h1>
5     <ul>
6         {% for student in students %}
7             <li>{{ student["name"] }} from {{ student["dorm"] }}</li>
8         {% endfor %}
9     </ul>
10 {% endblock %}
```

```
1 {% extends "layout.html" %}
2
3 {% block body %}
4     You are <a href="/registered">registered</a>! (Really.)
5 {% endblock %}
```

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



```
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  # Implements a web server
2
3  from http.server import BaseHTTPRequestHandler, HTTPServer
4
5
6  # HTTPRequestHandler class
7  class HTTPServer_RequestHandler(BaseHTTPRequestHandler):
8
9      # GET
10     def do_GET(self):
11
12         # Send response status code
13         self.send_response(200)
14
15         # Send headers
16         self.send_header("Content-type", "text/html")
17         self.end_headers()
18
19         # Send body
20         self.wfile.write(b"<!DOCTYPE html>")
21         self.wfile.write(b"<html lang='en'>")
22         self.wfile.write(b"<head>")
23         self.wfile.write(b"<title>hello, title</title>")
24         self.wfile.write(b"</head>")
25         self.wfile.write(b"<body>")
26         self.wfile.write(b"hello, body")
27         self.wfile.write(b"</body>")
28         self.wfile.write(b"</html>")
29
30
31     # Configure server
32     port = 8080
33     server_address = ("0.0.0.0", port)
34     httpd = HTTPServer(server_address, HTTPServer_RequestHandler)
35
36     # Run server
37     httpd.serve_forever()
```