

Multiple Modules

Python comes with an extensive library of built-in modules for accomplishing everyday tasks. With just a few lines of code, you can generate random numbers, draw graphics, send emails, access websites, and more!

Manager:

Recorder:

Presenter:

Reflector:

Content Learning Objectives

After completing this activity, students should be able to:

- Explain the purpose of the idiom `if __name__ == "__main__":`.
- Describe several built-in modules, such as `random` and `turtle`.
- Summarize course and school policies about academic honesty.

Process Skill Goals

During the activity, students should make progress toward:

- Navigating the Python standard library documentation. (Information Processing)



Model 1 Importing a Module

A. Create a new file `move.py`, and enter the code:

```
1 import random
2
3 def angle():
4     number = random.randint(-90, 90)
5     return number
6
7 print("in move: __name__ ==", __name__)
8 print("will always execute: angle ==", angle())
9
10 if __name__ == "__main__":
11     print("only if True: angle ==", angle())
```

Run `move.py`, and record the output below.

Output Line 1	
Output Line 2	
Output Line 3	

B. Create a new file `stop.py` (in the same folder), and enter the code:

```
1 import move
2
3 print("in stop: __name__ ==", __name__)
4 print("from module: angle ==", move.angle())
```

Run `stop.py`, and record the output below. Draw an arrow from each line of output to its corresponding print statement in the code.

Output Line 1	
Output Line 2	
Output Line 3	
Output Line 4	

Questions (15 min)

Start time:

1. Upon execution of `move.py`:

- a) what is the value of the variable `__name__`?
- b) does the output correspond solely to the print statements contained in this file?

2. Upon execution of `stop.py`:

- a) what is the value of the variable `__name__` from the print statement in `move`
- b) what is the value of the variable `__name__` from the print statement in `stop`
- c) does the output correspond solely to the print statements contained in this file?

3. What was the reason to include the `import move` statement in `stop.py`?

4. Based on the output of `stop.py`, describe what happens (as a side effect) when another module is imported.

5. What line in `move.py` did not print when `stop.py` was executed? Why?

6. In order for the output of `stop.py` to correspond solely to the print statements contained in `stop.py`, what modifications need to be made to `move.py`?

7. Describe what code in general to include inside `if __name__ == "__main__":`, and why.

Model 2 Turtle Graphics

The turtle module can be used to create graphics. Create a new file `draw.py` (in the same folder), and enter the following code. Run the program and see what happens.

```
1 import move
2 import turtle
3
4 def randomwalk(steps):
5     turtle.shape("turtle")
6     turtle.color("green")
7     for i in range(steps):
8         turtle.left(move.angle())
9         turtle.forward(10)
10    turtle.bye()
11
12 if __name__ == "__main__":
13    randomwalk(100)
```

Questions (15 min)

Start time:

8. For each outcome, describe the type of edit necessary to `draw.py` and `move.py`:
- a blue turtle
 - a longer simulation
 - a smaller range of angles (e.g., -45 to 45) that define the direction of the turtle
 - a random range of integers (e.g., 10 to 20) that define the length of a turtle move
9. Describe the type of edit necessary to produce the same outcome in Question #8d if the argument of `forward` is `move.length()` instead of 10:
10. Go to <https://docs.python.org> and click the modules link in the upper right corner. Find at least two built-in modules that interest you, and summarize what functions they provide.

Case Study: Oops!

Emily was working in the lab on her programming assignment. She finished the program, submitted it, and went on to do some other work. Shortly thereafter, she left the lab.

Another student, Kyle, was working nearby. He knew that Emily had successfully submitted the assignment, and he had not been able to get his to work properly. When Emily left, he noticed that she had not logged out of her computer. He moved to her workstation, found the work under her Documents directory, and copied it onto his flash drive. He then logged out, logged in as himself, and copied the code onto his Desktop where he modified the program a bit, then successfully submitted it.

Questions (7.5 min)

Start time:

15. Which, if any, of the students were at fault? Why?

16. Which specific Honor Code violations occurred?

17. What should Emily have done in this situation?

18. What options did Kyle have besides cheating?