

Beginning to Program Python

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Outcomes

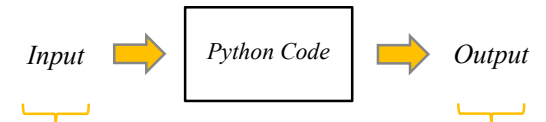
- After completing this presentation, you are expected to be able to:
 1. Use Python code to do simple text input and output
 2. Use variables to store things, such as text and numbers
 3. Demonstrate running Python code as a program

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Input and Output



- In this presentation we'll look at text input
- Later we will look at handling some other types of input such as mouse input
- In this presentation we'll look at text output
- Later we'll look at some other types of output such as graphics output

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Text Output

- Let's do some simple text output
- Here is a line of Python code which prints (i.e. output) a message:

```
print("It's a typhoon!")
```

- This is the print command that asks Python to show something on the screen
- You put the message you want to show inside a pair of parentheses, i.e. ()
- This is the message that we want to show on the screen
- When you use text in Python code, you need to enclose the text using a pair of double-quotes, i.e. ""

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Text Output

```
print("It's a typhoon!")
```

- If we type the code directly into the shell, it immediately gets executed and the result is shown:

```
Python 3.9.5 (tags/v3.9.5:0a7dcbbd v.1928 64 bit (AMD64)) on win32
Type "help", "copyright", "credit"
>>> print("It's a typhoon!")
It's a typhoon!
```

- You can tell Python to print anything you like

Text Input

- Let's do some text input
- Here is a line of Python code which shows a message and lets the user enter something:

```
input("What is your name?")
```

- This is the input command which:
 - asks Python to show something on the screen, and
 - returns whatever the user types
- This is the message that we want to show on the screen

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Remembering Things

- We need a way to remember what the user enters
- To do that we use a *variable*
- You can think of a variable as a box
- When you do `variable_name = input(...)` then whatever the user types is stored in the box

```
graph TD; Box[variable_name];
```

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Using a Variable

```
graph TD; Box["Dave"] -- name --> Name[name];
```

- Here is some code which stores whatever text the user enters in a variable:

```
name = input("What is your name?")
```

1. We give the Python interpreter this code
2. The Python interpreter executes the code, we see the message
3. The user types in some input
4. The Python interpreter stores the input in the variable called 'name'

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Accessing the Variable

- If we want to use whatever is in the variable, we simply use the name of the variable
- For example, let's use `print()` to show what's in the variable:

```
>>> print(name)
```

```
Dave
```

- We could mix it with some text, like this:

```
>>> print("Your name is", name)
Your name is Dave
```

or this:

```
>>> print("Your name is", name, "and that's a great name!")
Your name is Dave and that's a great name!
```

What About Entering Numbers?

- If we want to get a number from the user, we can use the same code `input()`
- However, `input()` always produces text
- The code will crash if you try to treat a variable which has text as if it has a number e.g.:

```
>>> money = input("How much money do you have in your pocket?")
How much money do you have in your pocket?100
>>> print(money)
100
>>> moremoney = money + 5
Traceback (most recent call last):
  File "<pyshell#14>", line 1, in <module>
    moremoney = money + 5
TypeError: can only concatenate str (not "int") to str
>>>
```

Converting Text into a Number

- What we can do is to take the input from the user, and then convert it to a number using `int()`
- `int()` means 'convert this into an integer'
- After it has been converted, you can add, subtract, multiply, etc, the number stored in the variable

```
>>> money = input("How much money do you have in your pocket?")
How much money do you have in your pocket?100
>>> print(money)
100
>>> money = int(money)
>>> print(money)
100
>>> moremoney = money + 5
>>> print(moremoney)
105
```

Convert the *text* "100" into an *integer* 100

Generating a (Random) Number

- Sometimes it is useful to ask Python to give you some random numbers
- There are several ways to do that in Python
- One of them is to use the `random.randint()` command

- First, we need to use this code:

```
import random
```

- This code tells Python to include a group of commands related to random numbers

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Generating a (Random) Number

- Then we can use `random.randint()` to generate a random number within a particular range, like this:

```
>>> import random
>>> random.randint(1, 10)
1
>>> random.randint(1, 10)
3
>>> random.randint(1, 10)
9
>>> random.randint(1, 10)
1
>>> random.randint(1, 10)
2
```

- We will use this technique to generate random numbers later

Putting Lines of Code Together

- Typing lines of code in the shell is OK but you may want to run the same lines of code many times
- You will go crazy if you have to keep typing them!
- It makes sense to put all the lines of code together into a single file of Python code
- That file, usually containing many lines of code, is called a *program*

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Making and Running a Program

