COMP1021
Introduction to Computer Science

Beginning to Program Python

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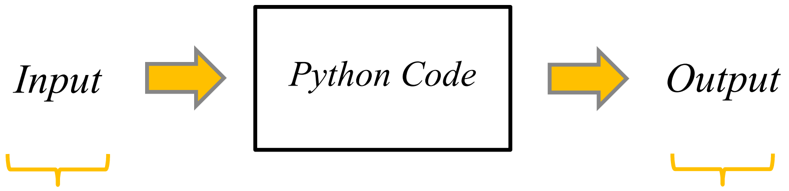
Outcomes

- 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

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

Text Output

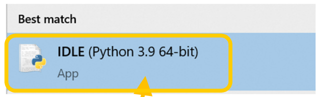
- Let's do some simple text output
- Here is a line of Python code which prints (i.e. output) a message:

```
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. `()`

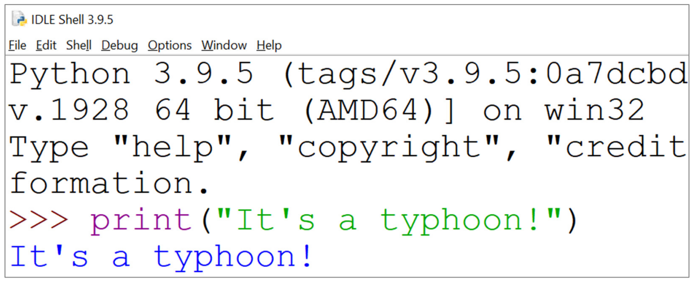
- This is the message that we want to show on the screen
- When you use text in Python code, you need to enclose the text using a pair of double-quotes, i.e. `""`

Text Output


Best match
IDLE (Python 3.9 64-bit)
App

```
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/v3.9.5:0a7dcbd
v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credit
formation.
>>> 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

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

variable_name

Using a Variable

name

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

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

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

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'*

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

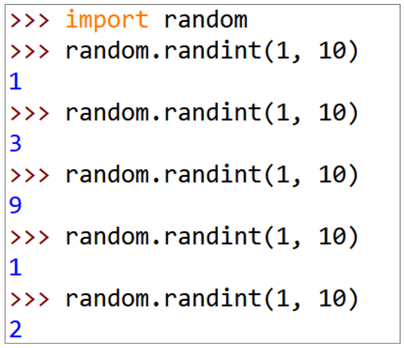
- Sometimes it is useful to ask Python to give you some random numbers
- There are several ways to do that in Python
- One of them is to use the `random.randint()` command
- First, we need to use this code:

```
import random
```

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

Generating a (Random) Number

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



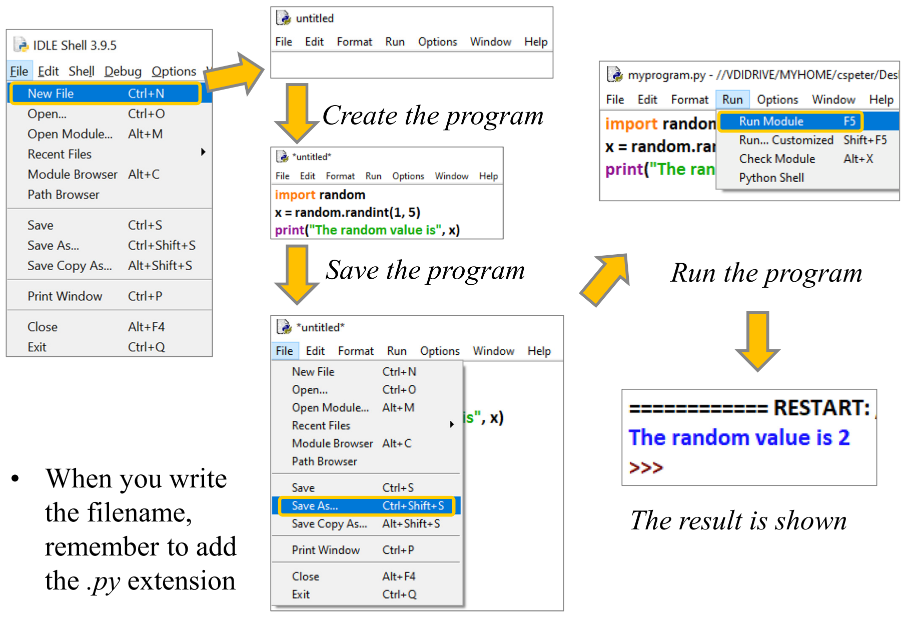
```
>>> import random
>>> random.randint(1, 10)
1
>>> random.randint(1, 10)
3
>>> random.randint(1, 10)
9
>>> random.randint(1, 10)
1
>>> random.randint(1, 10)
2
```

- 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*

Making and Running a Program



```
import random
x = random.randint(1, 5)
print("The random value is", x)
```

```
============ RESTART:
The random value is 2
>>>
```

- When you write the filename, remember to add the *.py* extension