

Strings and variables

Introduction to Python

3rd Edition



PG ONLINE

Objectives

- Know what Python is and some of the applications it is used for
- Run a simple Python program in **Interactive mode** using the **input** and **print** functions
- Write, save and run a program in **Script mode**
- Understand what a **syntax error** is and how to interpret an error message
- Know the rules for **variable names** and use variables in a program
- Understand the use and value of using **comments**

Example code

```
File Edit Format Run Options Windows Help
#Password Checker

print("Welcome to PGO Security Systems")
print("*****")

password = input("Enter your password: ")

if password == "abcd1234":
    print("Access Granted")
else:
    print("Access Denied")

input("Press ENTER to exit the program")

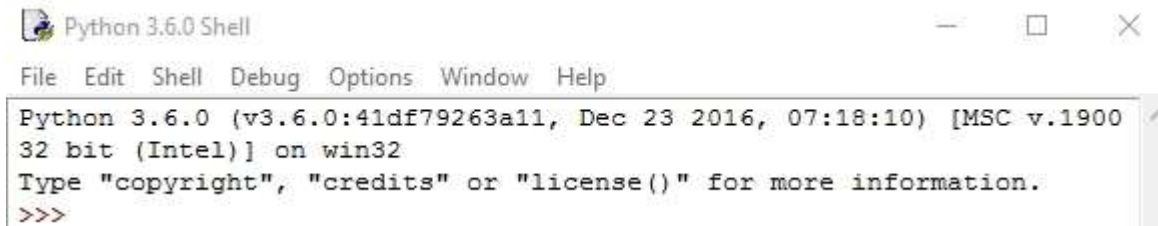
Ln: 1 Col: 0
```

Python language

- Simple to learn
- Used by:
 - NASA
 - Paint Shop Pro
 - Google's Search Engine
 - Civilisation 4 Computer Game
 - CERN Large Hadron Collider Research
 - Dropbox

Python's development environment

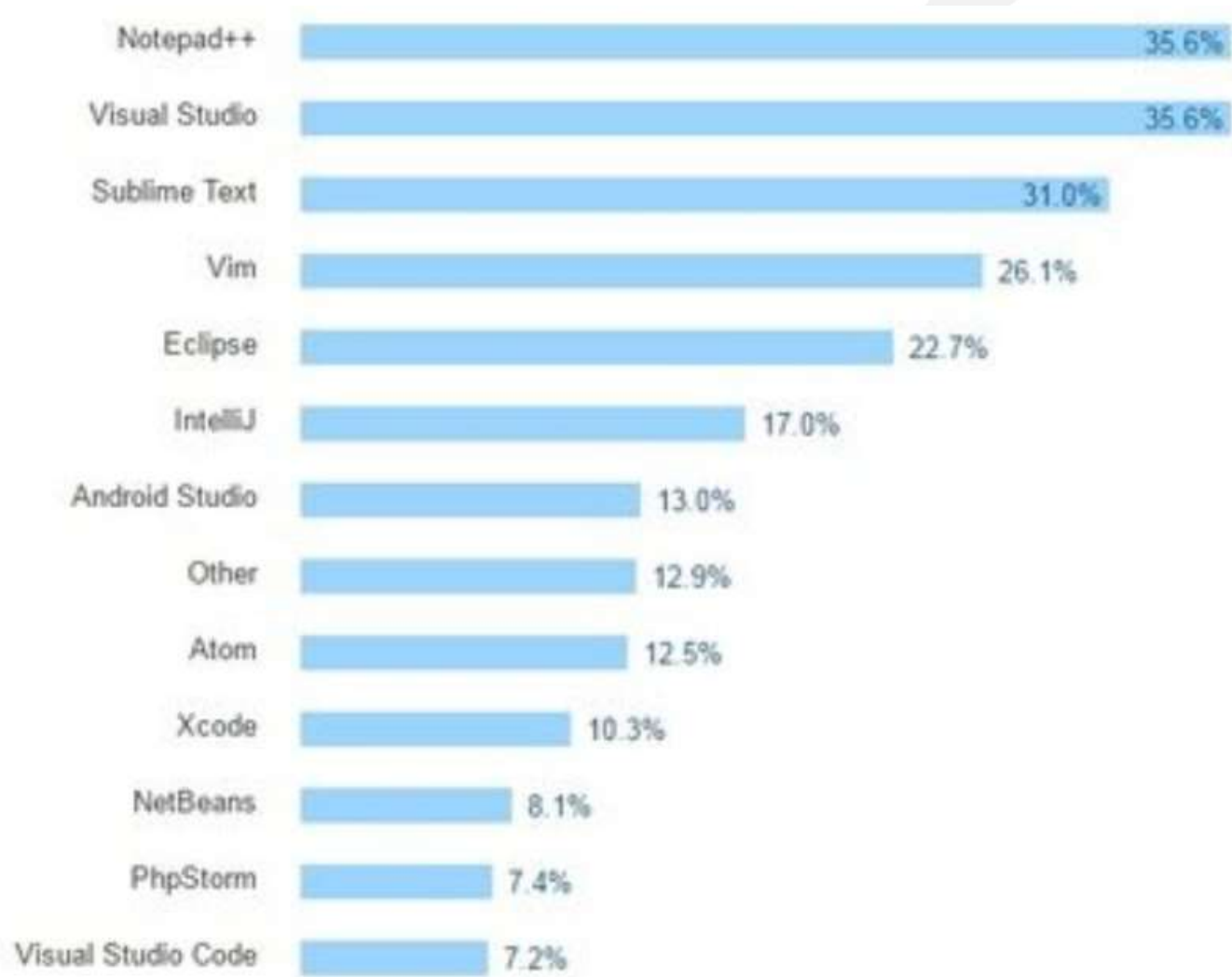
- Called **IDLE** – Integrated Development Environment
- Two Modes:
 - **Interactive Mode** let you see your results as you type them
 - This mode uses the **Shell window**



```
Python 3.6.0 Shell
File Edit Shell Debug Options Window Help
Python 3.6.0 (v3.6.0:41df79263a11, Dec 23 2016, 07:18:10) [MSC v.1900
32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
```

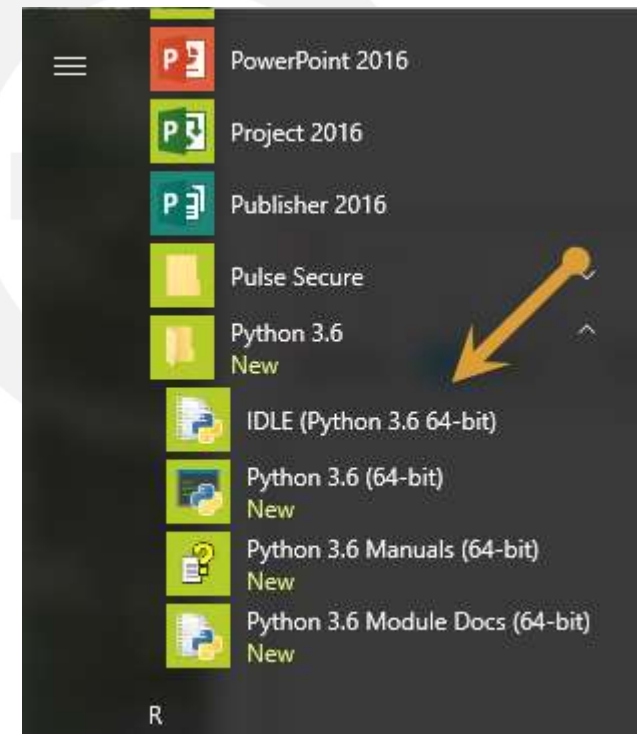
- **Script Mode** lets you save your program and run it again later
- This mode uses the **Editor window**

IDEs & Text Editors for Python



Interactive Mode

- “Hello”
- 123
- 1 + 2
- 2 * 3
- 2 + 3 * 10
- (2 + 3) * 10
- hello



“Hello World!”

- A programming tradition
- A simple program to display text on the screen
- In **IDLE’s Interactive Mode**, at the prompt, type:

```
print ("Hello World!")
```

- Press **Enter**, the result will be:

```
Hello World!
```

- Try again with some different text

Getting it wrong

- Syntax errors
- Experiment with errors
- In IDLE type the following erroneous lines:

```
print ("Hello World!")
```

```
Print ("Hello World!")
```

```
print (Hello World!)
```

```
print "Hello World!"
```

De-bugging

- Syntax errors
- Reading interpreter feedback

Traceback (most recent call last):

File "<pyshell#0>", line 1, in <module>

```
print ("Hello World!")
```

NameError: name 'print' is not defined

Computer bugs

- The name '**Bug**' refers to an error in a program
- Thought to come from a real bug that crawled into some cogs in an early machine and stopped it working



More on print function

- `print(33 * 44)`
 - `print("33 * 44 = ", 33 * 44)`
 - `print("33" + "44")`
-
- Strings: "Hello", "33", "22.4", "Derek"
 - Numbers: 33, 22.4, -0.004,



Using Script mode

- In the **Shell window**, select **File, New File** from the menu
- Type:

```
print ("What is your name?")  
first_name = input()  
print ("Hello, ",first_name)
```

Where are you going to save it?

- Save the program as **Say_Hello.py**
- Select **Run, Run Module** or press **F5** to **execute** (run) the program

Adding comments

- Comments are useful to document your program and make it easier to understand your code
- They will not affect the way a program runs
- Comments start with a **#** symbol and appear in **red**

```
#Program name: Say_Hello.py
```

```
#This program says hello
```

Why is this not a good comment?

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

```
first_name = input()
```

```
print ("Hello,", first_name)
```

What is a variable?

- A variable is a **location in memory** in which you can **temporarily store data such as text or numbers.**
- It is a **reference** to a value.
- It is used like an empty box or the Memory function on a calculator
 - You can choose a name for the box (the “variable name”) and change its contents in your program



Rules for naming variables

- A variable name can contain only numbers, letters and underscores
- A variable name cannot start with a number
- You can't use a Python "reserved word" as a variable name – for example **class** is a reserved word so **class = input()** will result in a syntax error
- To make your programs easier to understand, use meaningful names for your variables, such as **'first_name'** rather than **'var_1'**

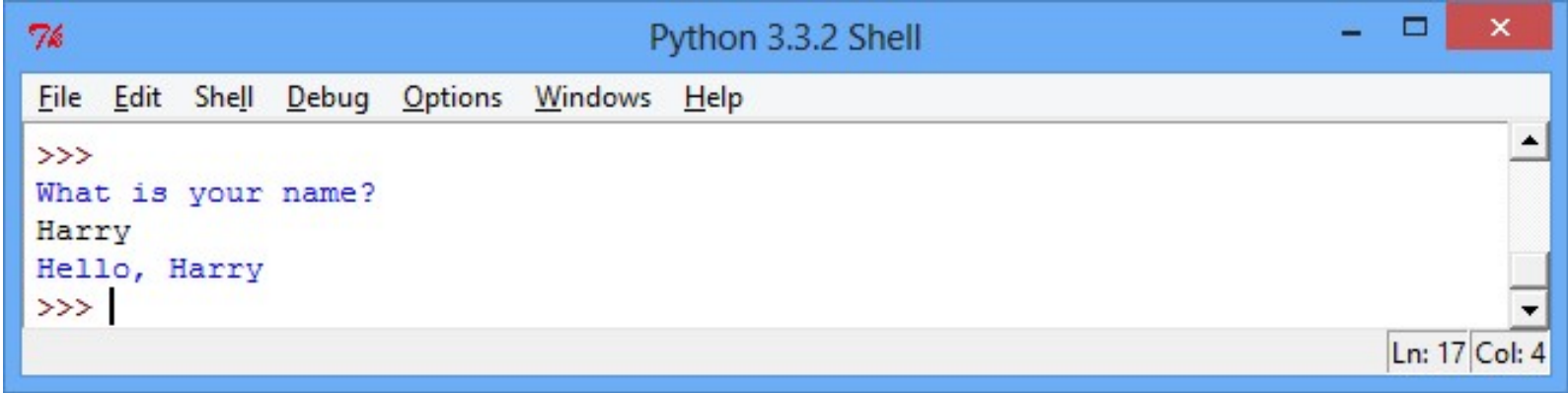
Good Variable Names??

1. pupil_name
2. pupil's_name
3. pupils name
4. number1
5. 1number
6. get_name



Using a variable

```
print ("What is your name?")  
  
first_name = input()  
  
print ("Hello,", first_name)
```



The screenshot shows a Python 3.3.2 Shell window with a menu bar (File, Edit, Shell, Debug, Options, Windows, Help). The shell displays the following interaction:

```
>>>  
What is your name?  
Harry  
Hello, Harry  
>>> |
```

The status bar at the bottom right indicates the cursor is at line 17, column 4.

Functions

- Functions are special built-in routines that do a specific job (or operation)
- Functions appear in purple
- `print()` and `input()` are examples of functions

Notice functions always have () after their name

```
first_name = input("What is your name?")  
print ("Hello,", first_name)
```

Parameters, data values or variables

Worksheet 1

- A program to print the sum of two numbers.
- A program to work out how much VAT to add to the total for an order (VAT rate is 20%)
- A program to calculate how many euros you would get for a given amount in British pounds (currently $\text{€}1 = \text{£}0.8838$)
- A program to calculate how much emulsion paint in litres you would need to paint the four walls and the ceiling of a room given the room's length, width and height in metres.

Plenary

- You have learned:
 - How to try out Python instructions in **Interactive mode**
 - how to code and run a Python program in **Script mode**
 - how to identify a **syntax error** and how to interpret the associated error message
 - the rules for **variable names** and use of variables in a program
 - the use and value of using **comments** in program code

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