

GCSE

Practical
programming
skills in Python

Fundamentals

Topic 1



PG ONLINE

1

Objectives

- Be able to identify and correct common errors in computer programs
- Be able to use inputs, outputs, arithmetic and string handling

Starter activity

- Find 8 errors in the following code:

```
age = input("Enter your age: ")

If age = 18:
    print("You are just an adult")
else if age < 18:
    print("You are an adult")
else
    print("You are not an adult")
```

Starter activity **Answers**

- Find 8 errors in the following code:

```
age = int(input("Enter your age: "))

if age == 18:
    print("You are just an adult")
elif age > 18:
    print("You are an adult")
else:
    print("You are not an adult")
```



Debugging

- **Debugging** is the process of removing bugs from your programs
- There are three main types of error:
 - Syntax error: e.g. `If age = 18`
 - Logic error, e.g. `if age < 18:`
`print("You are an adult")`
 - Runtime error:
e.g. `age = int(input("Enter your age: "))`
then entering text instead of an integer



Worksheet 1

- Complete **Question 1**



Inputs and outputs

- Printing a message to the screen in Python is pretty straightforward

```
print("Hello, world!")
```

- Quite often you will need to print a "string literal" and the value of a variable together

```
print("Hello" , name)  
print("Hello " + name)
```



Inputs and outputs

- If you use a comma then you don't need to worry about data types **BUT** you can't control the spacing

```
print(name, "owes £", amount)
>>> Dave owes £ 3.75
```

- If you use a plus sign then you **do** need to worry about data types **BUT** you **can** control the spacing

```
print(name + " owes £" + str(amount))
>>> Dave owes £3.75
```


Inputs and outputs

- You can't use commas in an input, so there are two possible solutions:

```
print("When did you turn", age)
date = input()
```

When did you turn 18

May

- *or*

```
date = input("When did you turn " +
str(age) + " ")
```

When did you turn 18 May



Inputs and outputs

- If your input is a number then you need to change the input statement to make the data type clear

```
name = input("Enter employee name: ")  
age = int(input("Enter their age: "))  
wage = float(input("Hourly wage: "))
```



Data Types and casting

- In Python you only need to know four data types:

String – A piece of text
or a mixture of letters and numbers
`str()`

Integer – A whole number
`int()`

Float – A number with a decimal point
known as Real in some languages
`float()`

Boolean – True or False
Note the capital letters
`bool()`

Worksheet 1

- Complete **Question 2**



Arithmetic

- The main arithmetic operators are straightforward

```
num1 = 9
num2 = 3
print(num1 + num2)      12
print(num1 - num2)      6
print(num1 * num2)      27
print(num1 / num2)      3.0
```

Dividing two numbers always gives a float

Arithmetic rules

- BIDMAS/BODMAS rules still apply

```
num1 = 9
```

```
num2 = 3
```

```
answer = num1 + num2 * num2
```

```
print(answer)          18
```

```
answer = (num1 + num2) * num2
```

```
print(answer)          36
```

Arithmetic functions

- There are several useful functions:

```
pi = 3.1415927
```

```
num1 = round(pi) 3
```

```
num2 = round(pi, 3) 3.142
```

```
# Given that 7 / 2 = 3.5
```

```
7 // 2 # floor division 3
```

```
7 % 2 # modulo (remainder) 1
```

Roots and powers

- Examples of roots and powers include:

Powers

```
5 ** 2 # 52 25
```

```
5 ** 3 # 53 125
```

Roots

```
25 ** (1/2) # square root 5
```

```
125 ** (1/3) # cube root 3√125 5
```


Worksheet 1

- Complete **Questions 3 and 4**



Plenary

- Find 8 errors in the following code:

```
max = 10
valid = True
mynum= input("Pick a number up to" max)
if mynum < Max:
    valid = False
if valid != "false":
    result = mynum * 3
    print(str(mynum)+" cubed = " + int(result))
else
    print("Error, too big")
```



Plenary **Answers**

- Find 8 errors in the following code:

```
max = 10
valid = True
mynum = int(input("Pick a number up to"
+ str(max) + ": "))
if mynum > max:
    valid = False
if valid != False:
    result = mynum ** 3
    print(str(mynum) + " cubed = " + str(result))
else:
    print("Error, too big")
```



Copyright

© 2017 PG Online Limited

The contents of this unit are protected by copyright.

This unit and all the worksheets, PowerPoint presentations, teaching guides and other associated files distributed with it are supplied to you by PG Online Limited under licence and may be used and copied by you only in accordance with the terms of the licence. Except as expressly permitted by the licence, no part of the materials distributed with this unit may be used, reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic or otherwise, without the prior written permission of PG Online Limited.

Licence agreement

This is a legal agreement between you, the end user, and PG Online Limited. This unit and all the worksheets, PowerPoint presentations, teaching guides and other associated files distributed with it is licensed, not sold, to you by PG Online Limited for use under the terms of the licence.

The materials distributed with this unit may be freely copied and used by members of a single institution on a single site only. You are not permitted to share in any way any of the materials or part of the materials with any third party, including users on another site or individuals who are members of a separate institution. You acknowledge that the materials must remain with you, the licencing institution, and no part of the materials may be transferred to another institution. You also agree not to procure, authorise, encourage, facilitate or enable any third party to reproduce these materials in whole or in part without the prior permission of PG Online Limited.