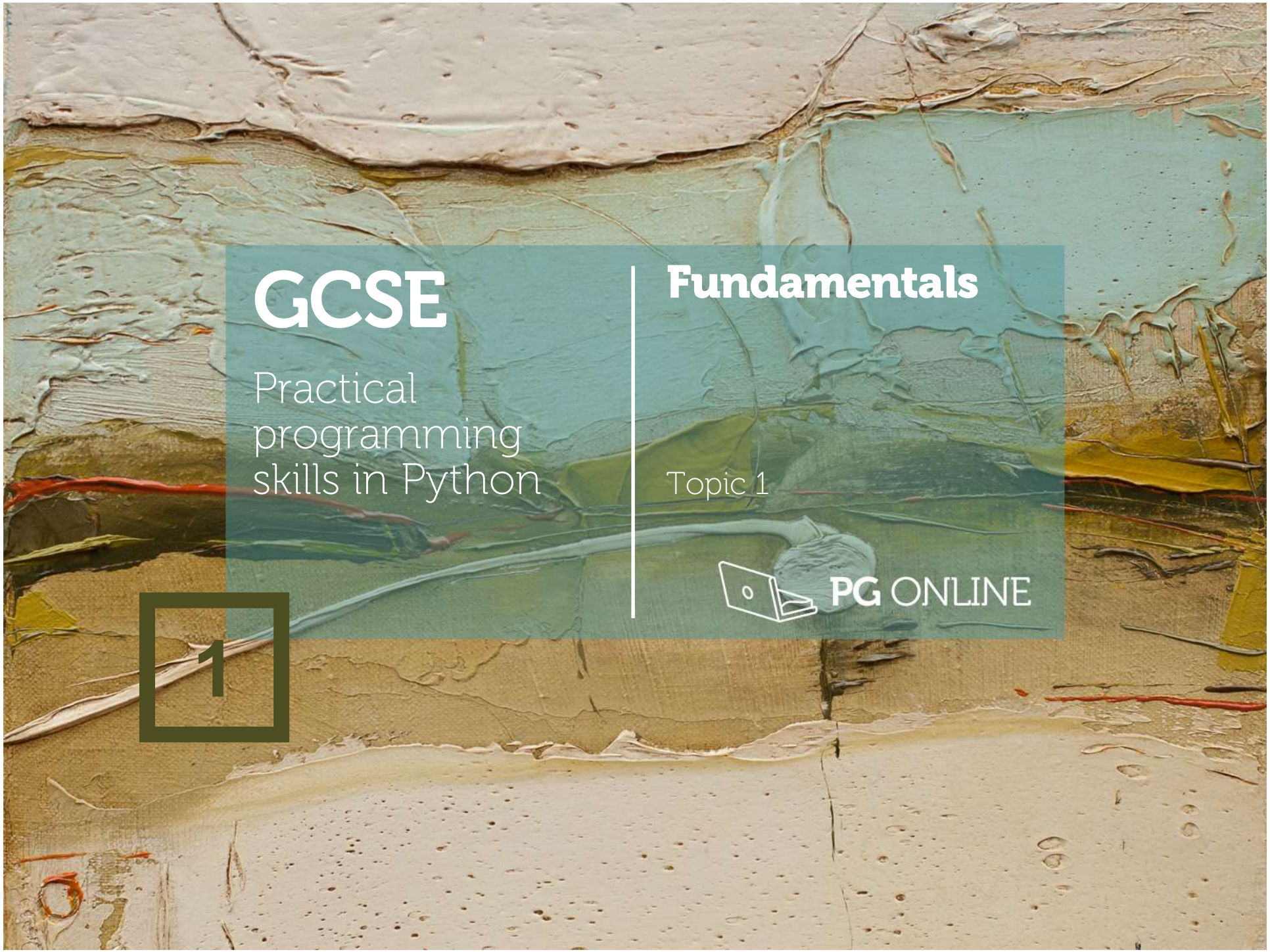
GCSE
Practical programming skills in Python
Fundamentals
Topic 1
PG ONLINE
1

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` `str()`	–	A piece of text *or a mixture of letters and numbers*
`Integer` `int()`	–	A whole number
`Float` `float()`	–	A number with a decimal point *known as Real in some languages*
`Boolean` `bool()`	–	True or False *Note the capital letters*

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")
```

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