Unit 4 · Programming in Python

ANSWER KEY · FOR TEACHERS

Full marks 34

Give the marks for the points in the marking scheme; an answer in other words that says the same is right.

1 Key words

1. def
2. parameters
3. arguments
4. return
5. local
6. module
7. exception
8. finally

Each carries 0.5 mark. **K · 4**

2 Label the diagram

1. keyword
2. parameters
3. function name
4. arguments

Each carries 0.5 mark. **K · 2**

3 Multiple choice

i. **c.** keyword arguments **K · 1**

Keyword arguments, such as `interest(time=2, prin=2000)`, are matched by name, so their order doesn't matter.

ii. **b.** void function **K · 1**

A void function returns no computed value (Python gives `None`). A recursive function is one that calls itself; an anonymous function is one without a name, made with `lambda`.

iii. **c.** logical error **U · 1**

The program runs to the end, so it is not a syntax error, a runtime error or an exception. The answer is wrong: that is a logical error, here a missing pair of brackets.

iv. **c.** It leaves the index column out of the CSV file. **U · 1**

Without it, the row numbers 0, 1, 2… are written as an extra first column. (The header is left out with `header=False`.)

v. **b.** They are wiped as soon as the file is opened. **A · 1**

`"w"` empties the file the moment it is opened, before anything is written. To keep the marks and add more, use `"a"`; to refuse to touch an existing file, use `"x"`.

4 What does it print?

a. **MARKING SCHEME** **U · 2**

- ✓ `4500` and `4000`: the default rate 1500 when none is given (3 × 1500), the given 2000 when it is (2 × 2000).
- ✓ `5500`: keyword arguments in any order, 4 × 1000 = 4000, plus 1 × 1500.

b. **MARKING SCHEME** **A · 3**

- ✓ `5` (100 // 20) for `"20"`.
- ✓ `zero` for `"0"`: `100 // 0` raises ZeroDivisionError; `"five"` gives `not a number` (ValueError from `int()`).
- ✓ `next` after every one of the three, since `finally` always runs.

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5 Short answers

MARKING SCHEME U · 2

- ✓ A local variable is made inside a function; a global variable is made outside every function, in the main program.
- ✓ A local variable can be used only inside its function and disappears when the function ends; a global variable can be read anywhere in the program and lasts while the program runs (or another correct difference).

6 Think

ANSWER HA · 2

Typing `0` raises a ZeroDivisionError (dividing by zero); typing something that isn't a whole number, such as `ten` or `12.5`, makes `int()` raise a ValueError. Put the input and the division in a `try` block, with `except ZeroDivisionError:` and `except ValueError:` blocks that print a helpful message (or ask again in a loop).

MARKING SCHEME

- ✓ Two inputs with their errors: `0` gives ZeroDivisionError; text such as `ten` gives ValueError.
- ✓ A `try` block with an `except` for each error, printing a message or asking again.

7 Activity: Try, except, else, finally

(not marked)

WHAT STUDENTS SHOULD FIND

4: lines 1, 2, 3, then the `else` block (8, 9) and `finally` (10, 11); it prints `100 / 4 = 25.0` and `Done.` 0: lines 1, 2, 3, where the division fails, then `except ZeroDivisionError` (6, 7) and `finally`; it prints `Can't divide by zero!` and `Done.` abc: lines 1, 2, where `int()` fails, then `except ValueError` (4, 5) and `finally`; it prints `Not a whole number.` and `Done.` Line 3 never runs for abc.

8 Trace the program

ANSWER A · 4

`n` (at the start of the round)	`d`	`rev`	Output
(before) 472		0	
472	2	2	
47	7	27	
4	4	274	
0: the loop stops			274

MARKING SCHEME

- ✓ `d` 2, 7, 4: `n % 10` is the last digit.
- ✓ `rev` 2, 27, 274: `rev * 10 + d` puts each digit on the right.
- ✓ `n` 472, 47, 4, then 0, when the loop stops: `n // 10` drops the last digit.
- ✓ Output 274, once, the value returned and printed.

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9 Find and fix the bug

ANSWER HA · 3

i. Line 6, with `TypeError: unsupported operand type(s) for *: 'NoneType' and 'int'` (after line 3 has printed `7.0`).
ii. The function prints the average but doesn't return it, so it returns `None`, and `result` is `None`, which can't be multiplied.
iii. Line 3 becomes `return avg`. The program then prints `Double: 14.0`.

MARKING SCHEME

✓ Line 6, a TypeError (`None` times 2).
✓ `average()` has no `return`, so it gives back `None`; printing a value is not returning it.
✓ `return avg` in place of `print(avg)` on line 3.

10 Pandas

MARKING SCHEME A · 3

✓ Only Sita's and Gita's rows, under the headings Name, Class, Marks (72 and 81 are 60 or more).
✓ Each row keeps its index from the whole table: 0 and 2.
✓ `4 81`: `len(df)` counts all four rows; `max()` is the highest mark.

11 Write a program

ANSWER A · 4

```
1  def area_rectangle(length, breadth):
2      return length * breadth
3
4  try:
5      l = float(input("Length: "))
6      b = float(input("Breadth: "))
7      print("Area:", area_rectangle(l, b))
8  except ValueError:
9      print("Please type a number.")
```

```
OUTPUT
Length: 12
Breadth: 7.5
Area: 90.0
```

Typing `ten` for the length prints `Please type a number.` Lines 1–2 define the function, which returns the product; line 7 calls it with the two numbers and prints what comes back; `float()` raises a ValueError for text that isn't a number, and the `except` block catches it.

MARKING SCHEME

✓ `def area_rectangle(length, breadth):` with `return length * breadth`.
✓ The two inputs read and changed to numbers with `float()` (or `int()`).
✓ The function called with them and the area printed.
✓ `try` round the input, with `except ValueError:` printing the message.

Marks by level	Knowledge	Understanding	Application	Higher ability	Total
Marks	8	6	15	5	**34**

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