

6.4 Functions and file processing

Name: _____ Class: _____ Date: _____

Total: 22 marks

KEY WORDS function • parameter • return • local variable
• global variable • mode

Objective

Build the skills to answer exam questions on **functions and file processing** – parameters, return values, local and global scope, and reading and writing text files.

You must be able to:

- write a **function** with **parameters** that **returns** a value
- tell a **local variable** from a **global variable**
- choose the file **mode** "r", "w" or "a", and say what each does to an existing file
- read a file line by line, split each line into fields and process them

1 Key knowledge and worked examples

Study these first. Each one shows the method for a question type used later.

■ Key knowledge: functions and scope

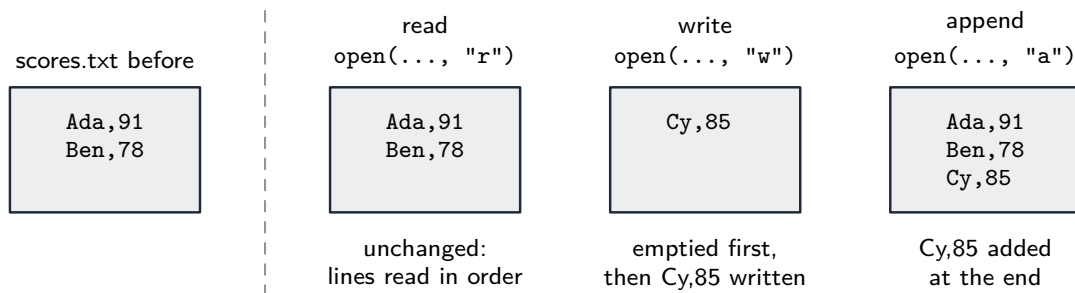
```
RATE = 0.1                                # global constant

def discount(price, qty):
    total = price * qty                    # local: exists only during the call
    if qty >= 10:
        total = total - total * RATE
    return total

print(discount(4.0, 12))                  # 43.2
```

- price and qty are parameters; 4.0 and 12 are the **arguments** passed in.
- return sends the result back to the caller; a function with no return gives None.
- total cannot be used outside discount: it is local. Splitting a program into functions is **modularity**.

■ Key knowledge: file modes



- with `open(name, mode) as f`: closes the file when the block ends, even after an exception.
- Reading a missing file raises `FileNotFoundError`.

■ Worked example: processing a file

`scores.txt` holds one `name,score` per line. Print the names with a score of at least 80, and the mean score.

```
count, total = 0, 0
with open("scores.txt", "r") as f:
    for line in f:
        name, score = line.strip().split(",")
        score = int(score)
        count = count + 1
        total = total + score
        if score >= 80:
            print(name)
print(total / count)
```

1. `for line in f` reads one line at a time, `"Ada,91\n"`.
2. `strip()` removes the `"\n"`; `split(",")` gives `["Ada", "91"]`.
3. `int(score)` casts the text to a number before comparing or adding.
4. For `Ada,91` and `Ben,78`: prints `Ada`, then $(91 + 78)/2 = 84.5$.

2 Practice

2.1 Write a function `area(w, h)` that returns the area of a rectangle, and a statement that prints the area of a 3 by 5 rectangle. [2]

2.2 In the `discount` code above, name (i) a parameter; (ii) a local variable; (iii) a global constant. [3]

2.3 State the mode to use for each, and why: (i) adding today's temperature to a log kept all year; (ii) loading saved settings; (iii) replacing last week's report with a new one. [3]

2.4 `line = "Lee,17,B\n"`. State the value of `line.strip().split(",")`. [1]

3 Exam-style questions

3.1 What does `open("data.txt", "w")` do to an existing `data.txt`? [1]

- ☐ **A** adds new lines to the end
B empties it before writing
C reads it from the start
D raises an error

3.2 `def f(x): y = x * 2`. What does `print(f(3))` print? [1]

- ☐ **A** 6
B 3
C None
D an error, as `y` is undefined

3.3 Which is the main advantage of using functions? [1]

- ☐ **A** the program uses no variables
B each part can be written, tested and reused separately
C the program runs without errors
D files are closed automatically

3.4 A club stores its members in `members.txt`, one line each, as `name,year` joined, for example `Mei,2019`.

(a) Write a function `joined_before(filename, year)` that returns how many members joined before `year`. [5]

(b) The file holds `Mei,2019`, `Tom,2023` and `Raj,2015`. State the value of `joined_before("members.txt", 2020)`. [1]

(c) Write a statement that adds the new member `Zoe,2026` to the file without losing the others. [2]

(d) Explain what happens if the file does not exist, and how the program could deal with it. [2]

Solutions

Each answer shows the steps, then the **result**.

2.1

- `def area(w, h): with return w * h`
- `print(area(3, 5))`

2.2

- (i) price or qty
- (ii) total
- (iii) RATE

2.3

- (i) "a": keeps the earlier readings
- (ii) "r": the file is only read
- (iii) "w": the old contents should go

2.4

- `["Lee", "17", "B"]`, all strings

3.1 B

- write mode empties an existing file first

3.2 C

- `f` has no `return`, so it returns `None`

3.3 B

- modularity

3.4

(a) One answer:

```
def joined_before(filename, year):
    count = 0
    with open(filename, "r") as f:
        for line in f:
            name, joined = line.strip().split(",")
            if int(joined) < year:
                count = count + 1
    return count
```

- opens the file in read mode
- loops over the lines
- strips and splits each line
- casts the year and compares with `<`

- counts and returns the count after the loop

(b)

- Mei and Raj: **2**

(c)

- `with open("members.txt", "a") as f:`
- `f.write("Zoe,2026\n")`, with the newline

(d)

- `open` raises a `FileNotFoundError` and the program stops
- put the code in `try ... except FileNotFoundError` and print a message or return 0