

THEME B: COMPUTATIONAL THINKING · B2.1

Programming fundamentals

Original practice questions · 34 marks · about 55 minutes · covers B2.1.1–B2.1.4

Instructions. Answer all questions. The maximum mark for this paper is [34 marks]. The marks available are shown in brackets. Parts badged **HL** assess higher level only content; standard level students may leave these out. Questions that ask you to construct code may be answered in **either Java or Python**. State which language you are using. Marks are for the logic, not for perfect syntax.

1**Total: 6 marks**

A program records information about students entering a coding competition.

- (a) State the most appropriate data type for storing each of the following: the student's name; [3]
whether their entry fee has been paid; their score, recorded to one decimal place.

- (b) Distinguish between a global variable and a local variable. [3]

The following program is written in Java and in Python. Both versions do the same thing.

JAVA

```
int x = 4;
int y = 0;
for (int i = 1; i <= 4; i++)
{
    if (i % 2 == 0)
        y = y + i;
    else
        y = y + x;
}
System.out.println(y);
```

PYTHON

```
x = 4
y = 0
for i in range(1, 5):
    if i % 2 == 0:
        y = y + i
    else:
        y = y + x
print(y)
```

(a) Copy and complete the trace table. The first row is done for you.

[4]

i	i is even?	y
		0

(b) State the value that the program outputs.

[2]

Each competition entry has a reference in the format shown below. The four digits give the year.

```
reference = "IB-CS-2027-HL"
```

- (a) Construct a program that extracts the year from reference and prints it. [4]

- (b) Construct a statement that stores a lower-case copy of reference in a new variable. [2]

Another part of the program asks the user to type their age, and then uses it as a whole number.

- (a) Identify **two** potential points of failure in this part of the program. [2]

- (b) Construct code that reads the age and deals with the case where the user types text instead of a number, without the program stopping. [4]

5

Total: 5 marks

The competition program also writes results to a file.

(a) Describe the purpose of the `finally` block. [2]

(b) Explain why handling an exception is better than allowing the program to stop with an error. [3]

6

Total: 5 marks

A student's program compiles and runs, but produces the wrong total score.

(a) Describe how setting a breakpoint would help the student find the fault. [2]

(b) Outline **one** advantage and **one** disadvantage of using print statements to debug this program. [3]

END OF QUESTIONS