

THEME B: COMPUTATIONAL THINKING · B2.3

Programming constructs

Original practice questions · 34 marks · about 55 minutes · covers B2.3.1–B2.3.4

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: 5 marks**

A program calculates the average of a set of marks. The four statements it needs are listed below, but they are not in the right order. `count` already holds the number of marks.

Label	Statement
A	<code>average = total / count</code>
B	<code>total = 0</code>
C	<code>for each mark in marks: total = total + mark</code>
D	<code>print(average)</code>

(a) State the correct order of the four statements. **[3]**

(b) Outline the problem that would occur if statement B were placed after statement C. **[2]**

2

Total: 7 marks

A program converts a mark out of 100 into a grade. A mark of 70 or above is grade A, 60 or above is B, 50 or above is C, and anything else is D.

- (a)** Construct a program that prints the grade for a mark held in the variable mark. **[5]**

- (b)** State the grade printed when mark is 60. **[1]**

Explain why the order of the conditions matters in this program. **[1]**

- (c) Explain why the order of the conditions matters in this program. [1]

3

Total: 6 marks

A shop gives a discount if the customer is a member **and** spends more than 50, **or** if the purchase is made on a Tuesday. The variables are isMember (Boolean), spend (decimal) and day (string).

- (a)** Construct the selection statement that decides whether the discount applies. [4]

- (b) State whether the discount applies to a customer who is **not** a member, spends 80, and buys on a Tuesday. Justify your answer. [2]

Programs use different kinds of loop for different jobs.

- (a) Distinguish between a counted loop and a conditional loop. [2]

- (b) Construct a program that repeatedly asks the user for a number until they enter one between 1 and 10 inclusive. [4]

The loop below was written to count down from 10, but it does not behave as intended.

JAVA

```
int n = 10;
while (n > 0)
{
    System.out.println(n);
}
```

PYTHON

```
n = 10
while n > 0:
    print(n)
```

- (a) Identify the fault in this loop and state its effect when the program runs. [3]

- (b) State the single statement that must be added, and where it belongs, to correct the loop. [2]

The program is being restructured into functions.

- (a) Construct a function that takes two whole numbers as parameters and returns the larger of them. [3]

- (b) Outline **two** benefits of dividing a program into functions. [2]

END OF QUESTIONS