2.1 COMPUTATIONAL THINKING · 2.1.4 & 2.1.5

Thinking logically & concurrently

Original practice questions · 30 marks · about 40 minutes · spec 2.1.4–2.1.5

Instructions. Answer all questions. The number of marks is shown in brackets [ ]. The extended question assesses quality of written communication.

1

Total: 6 marks

> A cash machine asks for a PIN, then checks the balance before allowing a withdrawal.

(a) State what is meant by a *decision point*. **[1]**

(b) Identify **two** decision points in this scenario and the logical condition tested at each. **[4]**

(c) State what is meant by a *logical condition*. **[1]**

2

Total: 6 marks

A shop applies a 10% discount to orders over £100.

```
01 spend = input("Total: ")
02 IF spend > 100 THEN
03   pay = spend * 0.9
04 ELSE
05   pay = spend
06 ENDIF
07 print(pay)
```

(a) Give the line number of the decision point. **[1]**

(b) State the logical condition that controls the decision. **[1]**

(c) Describe how the decision affects the flow when the condition is True and when it is False. **[2]**

(d) State the value of `pay` when `spend` is 120, and when `spend` is 80. **[2]**

3 **Total: 5 marks**

> A program generates a report by (i) downloading sales data from three regional servers, then (ii) adding up the grand total.

(a) State what is meant by *concurrent processing*. **[2]**

(b) Identify which part of this task could be done concurrently and which must be sequential, with a reason. **[2]**

(c) State one type of problem that benefits greatly from concurrent processing. **[1]**

4 **Total: 4 marks**

(a) Give **two** benefits of using concurrent processing. **[2]**

(b) Give **two** trade-offs (drawbacks) of using concurrent processing. **[2]**

5 **Total: 9 marks**

A weather-forecasting system divides the country into a grid and computes each cell. It runs on a multi-core processor.

Discuss the benefits and trade-offs of using concurrent processing to speed up a task like this. Reach a justified conclusion. **[9]**

END OF QUESTIONS