2.7 Programming Practice: Writing and Refining Programs: 10-minute Pack

OCR J277 · Calculators not allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Write an algorithm, using a count-controlled loop, that outputs the sum of the whole numbers from 1 to 20 inclusive.

(Total for Question 1 is 3 marks)

2 A simple program advises drivers based on a temperature reading (in degrees Celsius). Write an algorithm that inputs a temperature and outputs:
- "Ice warning" if the temperature is less than or equal to 0
- "Mild" if the temperature is greater than 0 and less than 20
- "Warm" if the temperature is 20 or greater

(Total for Question 2 is 4 marks)

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3 A student has written the following algorithm, which is intended to output the numbers 1 to 5, but it only outputs 1 to 4:

```
total = 0
FOR i = 1 TO 4
    OUTPUT i
NEXT i
```

(a) A student has written the following algorithm, which is intended to output the numbers 1 to 5, but it only outputs 1 to 4: **(1)**

```
total = 0
FOR i = 1 TO 4
    OUTPUT i
NEXT i
```

Identify the error in the algorithm.

(b) Write the corrected FOR loop line so that the algorithm outputs 1 to 5. **(2)**

(Total for Question 3 is 3 marks)

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Mark scheme · 2.7 Programming Practice: Writing and Refining Programs: 10-minute Pack

Question 1

a total (accumulator) variable initialised to 0 before the loop **B1**

correct FOR loop from 1 TO 20 that adds the loop counter to the total on each iteration **B1**

OUTPUT of the total placed after the loop has finished (oe) **B1**

Answer:

```
total = 0
FOR i = 1 TO 20
    total = total + i
NEXT i
OUTPUT total
```

Question 2

INPUT statement storing the temperature **B1**

correct condition and output for the "Ice warning" branch (temperature ≤ 0) **B1**

correct condition and output for the "Warm" branch (temperature ≥ 20), using a nested/ELSE IF selection structure **B1**

correct output for "Mild" as the remaining case, with all three outcomes mutually exclusive (oe; accept any correctly ordered nested selection) **B1**

Answer:

```
INPUT temperature
IF temperature <= 0 THEN
    OUTPUT "Ice warning"
ELSE
    IF temperature < 20 THEN
        OUTPUT "Mild"
    ELSE
        OUTPUT "Warm"
    ENDIF
ENDIF
```

Question 3

(a) identifies that the loop's upper bound is set to 4 instead of 5, so the loop only executes for i = 1, 2, 3, 4 and misses 5 (oe, must reference the incorrect bound value) **B1**

(a) Answer: The FOR loop's upper bound is set to 4 instead of 5, so it only outputs 1, 2, 3 and 4, and stops before it can output 5.

(b) correct corrected FOR loop line: FOR i = 1 TO 5 **B1**

(b) the rest of the algorithm (NEXT i and OUTPUT i) is left unchanged and still functionally correct **B1**

(b) Answer: FOR i = 1 TO 5

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