

Solutions

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

2.1

- Age is 12, and Price starts at 10
- $12 < 16$ is TRUE, so Price becomes $10 - 4 = 6$
- Price becomes $6 \times 2 = 12$, and **12** is output

Age	Price	OUTPUT
12	10	
	6	
	12	12

2.2

- B doubles on each pass until A reaches 5

A	B	OUTPUT
1	1	
2	2	
3	4	
4	8	
5	16	16

- stops when $A = 5$; OUTPUT **16**

2.3

(a) one mark for each correct row after the first:

Value	OUTPUT
1	
4	4
7	7
10	10

(b) $10 > 9$ is TRUE after the third pass, so the body runs **3** times

2.4

Outer	Inner	Total	OUTPUT
		0	
1	1	1	
2	1	2	
	2	4	
3	1	5	
	2	7	
	3	10	
			10

- **Outer** and **Inner** columns correct; **Total** column correct; output **10**

3.1

(a)

Value	Count	Total	OUTPUT
	0	0	
6	1	6	
-2			
9	2	15	
0			
999			7.5

- **Value** column; **Count** column; **Total** column; output **7.5**

(b) it outputs the mean (average) of the **positive** values input

- it stops at the rogue value 999, and outputs "No data" if there were no positive values

(c) the test comes at the end of the loop, so 999 is processed before the loop stops

- 999 is positive, so it is added to **Total** and counted, and the output is 999 instead of "No data"
- correct it by changing the condition to **Value > 0 AND Value <> 999**

3.2

(a) one mark for each correct row:

Index	Number	Largest	OUTPUT
		0	
1	-4		
2	-9		
3	-2		0

- no input is greater than 0, so **Largest** never changes

(b) **-2**

(c) **Largest** starts at 0, and 0 is greater than every number in this list, so no number ever replaces it

- the starting value must not be a fixed number: it must be the **first number** that is input
- for example: input the first number into **Largest** before the loop and run the loop for the other two numbers; or, inside the loop, **IF Index = 1 THEN Largest $\leftarrow$ Number**

3.3

(a) one mark for each correct row after the first, and one for the output:

Position	NewWord	OUTPUT
	" "	
3	"T"	
2	"TA"	
1	"TAC"	TAC

(b) it **reverses** the string

(c) **CAT** is output

- the characters are now taken from position 1 to position 3, so they are joined in their original order

3.4

(a) one mark for each correct row after the first:

Count	Price	Total	OUTPUT
0		0	
1	2	2	
2	4	6	
3	6	12	
4	8	20	
5	10	30	7.5

- when **Count** is 4, the test **4 $\leq$ 4** is still TRUE, so the body runs a fifth time

(b) **5**

(c) the line **WHILE Count $\leq$ 4**

- **WHILE Count < 4**

(d) a **count-controlled (FOR)** loop

- **FOR Count $\leftarrow$ 1 TO 4** states the number of passes directly, so the programmer does not have to write the test and the increase of the counter