

2 This pseudocode algorithm is intended to input a first name from a user and search for it in a two-dimensional (2D) array. If the name is found, the algorithm outputs all the remaining details for that name. The algorithm will continue to allow other names to be entered for searching, until the user input stops it.

```

01 DECLARE Contacts : ARRAY[1:500, 1:4] OF REAL
02 DECLARE Row : INTEGER
03 DECLARE Column : INTEGER
04 DECLARE Continue : BOOLEAN
05 DECLARE Stop : BOOLEAN
06 DECLARE FirstName : STRING
07 Continue ← TRUE
08 Stop ← FALSE
09 WHILE Continue
10     Row ← 1
11     OUTPUT "Enter a first name "
12     OUTPUT FirstName
13     REPEAT
14         IF Contacts[Row, 1] = FirstName
15             THEN
16                 FOR Column ← 1 TO 4
17                     OUTPUT Contacts[Row, 1]
18                 NEXT Column
19                 Stop ← TRUE
20             ELSE
21                 Row ← Row + 1
22             ENDIF
23     NEXT Stop OR Row > 500
24     OUTPUT "Search for another name? (Y or N)"
25     INPUT Answer
26     IF Answer = 'N' OR Answer = 'n'
27         THEN
28             Continue ← TRUE
29     ENDIF
30 ENDWHILE

```

(a) Identify the line numbers of **five** errors in the pseudocode and suggest a correction for each error.

Error 1 line number

Correction

Error 2 line number

Correction

Error 3 line number

Correction

Error 4 line number

Correction

Error 5 line number

Correction

[5]

(b) A procedure `NewData` allows data for new contacts to be entered and stored in the 2D array `Contacts[]`. A parameter, `Number`, is used to pass values from the main algorithm to the procedure for the number of new contacts. Next, four pieces of contact data for each new contact are entered and stored at the start of the array.

(i) Complete the pseudocode for PROCEDURE `NewData`

```

PROCEDURE NewData (.....)

    FOR Row ← 1 TO .....

        FOR Column ← 1 TO 4

            INPUT .....

            .....

        .....

    ENDPROCEDURE

```

[4]

(ii) Write the pseudocode to input the number of new contacts and to use procedure `NewData`. A variable declaration is **not** required.

.....

[2]

(c) A first name is used as the search key in the algorithm on page 2. If the name is found, all the data for that name is output and the algorithm stops searching.

(i) Explain why the given algorithm may **not** always give the expected results.

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[2]

(ii) Explain how you could improve the algorithm so that the search is more likely to find the required results.

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[2]