

2. A program is used to process the details of 5000 marathon runners. Sample runner details are shown below.

runnerName	runnerNumber	timeMins
Ryan Smith	2461	242
Graham Philips	1892	233
Ruth Sturrock	3781	207
Elizabeth Ferry	196	275

This program processes the details using an array of records based on the following record structure and array declaration.

```
RECORD Runner IS {STRING runnerName, INTEGER runnerNumber,
INTEGER timeMins}
```

```
DECLARE athletes AS ARRAY OF Runner INITIALLY [{runnerName =
"name", runnerNumber = 0, timeMins = 0}] * 5000
```

The incomplete pseudocode below uses the bubble sort algorithm to sort the athletes array into ascending order of time.

1. set n = 4999
2. start conditional loop
3. set swapped = false
4. start fixed loop i = 0 to n-1
5. if \_\_\_\_\_ > \_\_\_\_\_ then
6. swap athlete details
7. set swapped = true
8. end if
9. end fixed loop
10. set n = n - 1
11. end conditional loop when swapped = false

(a) Write the condition needed at line 5 of the algorithm. 2

(b) Explain why the variable n has been used in this sort. 1

(c) An evaluation of the program would consider the efficiency of the code.

Comment on the efficiency of the bubble sort algorithm used to sort the athletes array into ascending order of time. 2