1. A school wants to calculate the number of hours spent in school by a sample of students from time of arrival and departure data. Draw a structure diagram and a program flowchart for an algorithm with the following features:
   a. For each student, enter the student's name, the time of arrival and the time of departure.
   b. Calculate the length of time each student spends in school.
   c. Output the student's name and the time spent in school.

2. Consider the following algorithm.
a Complete the following trace table using the temperature values 14, 17, 23, 27, 29, 30, 32, 26, 18, 12.

<table>
<thead>
<tr>
<th>Temperature</th>
<th>LowCount</th>
<th>HighCount</th>
<th>Count</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

b What is the purpose of the algorithm?

What is the purpose of the following algorithm?

START

Count ← 0
Total ← 0

input Number

if Number < 0 then
  Total ← Total + Number
else
  Count ← Count + 1

output Count, Total, Total / Count

STOP

input Number
4 Read this algorithm.

```
START

input
a, b

a > b ?
yes

no

b ← b * 2

t ← a * 2

output
a, b, t

STOP
```

a Write down the output if the two numbers input are 4 and 3. (a = 4 and b = 3.)

b Explain why an algorithm is written as a subroutine (procedure) and stored in a program library.