

1. The head office of a company collects sales figures from five of its branches. Data arrives at the head office and is stored in two integer arrays, `BRANCH` and `SALES`.

An example of part of a set of data is given below:

BRANCH		SALES
1	[1]	45
5	[2]	25
2	[3]	38
3	[4]	63
2	[5]	18
1	[6]	37
4	[7]	21
2	[8]	25
1	•	42
-1	•	-1

- (a) State the reason for having `-1` as the last entry. [1 mark]
- (b) After the data was stored in the arrays it was found that the sales figures in `SALES` for branch 2 were always 10 less than they should be. (For example the first sales figure for branch 2 should really be 48.)

Construct the algorithm that would correct the sales figures. The algorithm should also store the number of entries (excluding `-1`) in the arrays in a variable called `NUMENTRIES`. [7 marks]

- (c) The data must be sorted into ascending branch order using a bubble sort. Assuming that `NUMENTRIES` is known from (b), construct the algorithm to carry out this sort. [14 marks]

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*(Question 1 continued)*

(d) Study the following procedure, TRANSFER.

```
procedure TRANSFER

  declare LOC integer array [1..5]
  declare POS integer
  declare FINAL integer array [1..5,1..40]

  for POS ← 1 upto 5 do
    LOC[POS] ← 0
  endfor

  for POS ← 1 upto NUMENTRIES do
    LOC[BRANCH[POS]] ← LOC[BRANCH[POS]] + 1
    FINAL[BRANCH[POS], LOC[BRANCH[POS]] ] ← SALES[POS]
  endfor

endprocedure TRANSFER
```

(i) Using the initial data given in BRANCH and SALES, draw a diagram to show the contents of the arrays LOC and FINAL, if NUMENTRIES stores 8.

(You need only give the first 3 columns of FINAL in your answer.)

*[6 marks]*

(ii) Explain what FINAL stores.

*[2 marks]*

*This question requires the use of the Case Study.*

2. (a) (i) Identify **two** situations mentioned in the Case Study where analog-digital conversion is required. [2 marks]
- (ii) Explain why this conversion is required. [2 marks]
- (b) Outline **four** tasks that the systems analyst may have carried out whilst investigating the original system. [8 marks]
- (c) Outline how a patient's data record can be sent from one hospital to another. [2 marks]
- (d) (i) Outline what is meant by "a simple point-and-click interface based on graphical icons". [2 marks]
- (ii) Explain why this is a suitable interface. [2 marks]
- (e) Identify **three** security measures that are required to protect data records from physical hazards or unauthorised access. [3 marks]
- (f) The amount of money spent on the analysis and the new computer system would have been enough to extend facilities at one of the hospitals to allow 15 more beds. Discuss whether the money was well spent. [4 marks]

3. An advertisement for a new personal computer states that it has the following features:

- 128 MB RAM;
- 8 GB Hard disk;
- 256 kB Cache memory;
- 400 MHz Processor;
- 2 Serial and 2 Parallel Ports.

- (a) State the function or purpose of **each** of the above features (RAM, Hard disk *etc.*). [5 marks]
- (b) The values stated for each feature are higher than earlier machines. Explain why these higher values make this personal computer more useful than earlier machines. [10 marks]
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