Name

Paper 1 Sample Questions

1a Each pixel on a computer screen has three colour values associated with it: red, green and blue.

The range for each of the three colour values is from $0_{(10)}$ to $255_{(10)}$.

Colour values can also be represented in hexadecimal. For example, the colour blue can be represented in hexadecimal as 0000FF.

State the binary representation of the colour blue. [1]

1b State the number of colours that can be represented in each pixel on the computer screen

[1]

2 Given the one-dimensional array `NAMES`:

[0]	Zixan
[1]	Murali
[2]	Eli
[3]	Kim

construct a trace table for the following algorithm:

```
K=3
loop while K>=0
    A = K mod 3
    output (NAMES[A])
    K=K-1
end while
```

[4]

3 Construct a truth table for the following expression:

(A XOR B) AND B

[3]

4 Define the Boolean operator XOR.

[2]

5 A teacher would like a simple program to store the names, marks and grades of students in a set of three parallel one-dimensional arrays called NAME[], MARK[] and GRADE[] .

The grade boundaries for the individual grades are shown below:

Mark	Grade
80 and above	Distinction
60 and above	Merit
40 and above	Pass
Below 40	Fail

The class has 30 students.

5a Identify two components in a conditional statement.

[2]

5b Construct an algorithm using pseudocode to take the marks that have been stored in MARK[], convert them into the appropriate grade and store the calculated grades in GRADE[].

[5]

5c Outline how the name, mark and grade in the three arrays correspond to the same student.

[2]

6 The following method, swap(A,B)is written to exchange the values of variables A and B.

```
swap(A,B)
  TEMP = A
  B = TEMP
  A = B
end swap
```

(a) (i) Assume A = 3 and B = 5.

State the values of A and B after execution of swap(A,B).

[1]

(ii) Suggest how the algorithm used in method swap() would need to be modified to successfully exchange the values of variables A and B.

[2]

Method `swapRows(MAT,K,L)` swaps the elements of two rows (row K and row L) in the two-dimensional array MAT, for example:

The initial contents of the two-dimensional array `MAT`

	[0]	[1]	[2]	[3]
[0]	7	1	2	3
[1]	**4**	**0**	**0**	**0**
[2]	6	0	–3	0
[3]	4	0	0	4
[4]	**5**	**0**	**–1**	**0**
[5]	5	–6	0	9

`swapRows(MAT,1,4)` →

The contents of the two-dimensional array `MAT` after execution of method `swapRows(MAT,1,4)`

	[0]	[1]	[2]	[3]
[0]	7	1	2	3
[1]	**5**	**0**	**–1**	**0**
[2]	6	0	–3	0
[3]	4	0	0	4
[4]	**4**	**0**	**0**	**0**
[5]	5	–6	0	9

(b) Use pseudocode to construct an algorithm for the method `swapRows()`.

[4]

(c) a method, generate `getTotals(MAT, TOTALS)`, takes a 2-dimensional array, MAT, sums all values in each row, and stores the result in a one-dimensional array, TOTALS.

For example:

	[0]	[1]	[2]	[3]
[0]	7	1	2	3
[1]	**4**	**0**	**0**	**0**
[2]	6	0	–3	0
[3]	4	0	0	4
[4]	**5**	**0**	**–1**	**0**
[5]	5	–6	0	9

MAT

13
4
3
8
4
8

TOTALS

(c) Construct an algorithm in pseudocode which will implement the method `getTotals`

[4]