UNIVERSITY OF KWAZULU-NATAL

COMP102: Compute Programming

Practical 4: 1D & 2D Arrays

Thursday, 1 September 2022

Question 1: 1D Array Calculations

Create an array that can store 100 integer values. Then populate the array with 100 randomly generated values between 100 and 300 inclusive. Use this array to write a program that will:

- Determine how many numbers are below 200
- How many times numbers that are multiple of 50 appear in the array
- Find the 3 largest numbers in the array

Your program should output something like this:

```
104 numbers are below 200
21 numbers are multiples of 50
The three largest numbers are: 300, 297 and 294
```

Question 2: Row Average

	0	1	2	3
0	3	10	15	0
1	3	10	20	2
2	5	7	5	10
3	2	1	5	5

Figure 1: 2D array

The *row average* is defined as the average of the values in a particular row of a two-dimensional array. For example, consider Figure 1 above, the average of row 1 is: 28 / 4 = 7.

Write a program that will generate a 4 x 4 array of random integers as the one shown in Figure 1 above. Then calculate the average of each row and display it on the console as shown below:

```
The average of Row 1 is: 28
The average of Row 2 is: 6,25
```

```
The average of Row 3 is: 6,75
The average of Row 4 is: 3,25
```

Question 3: Max-Min Values

Write a program that will find the maximum and minimum values for each row in a 2D array. For the array displayed in Figure 1, the program should output:

```
Row 1: Max value = 15 | Min value = 0
Row 2: Max value = 20 | Min value = 2
Row 3: Max value = 10 | Min value = 5
Row 4: Max value = 5 | Min value = 1
```

Question 4: Column Sum

The column sum is defined as the sum of the values in a particular column of a two-dimensional array. For example, consider Figure 1 in Question 2 above, the column sum of column 1 is: 10 + 10 + 7 + 1 = 28.

Write a program that will generate a 4 x 4 array of random integers as the one shown in Figure 1. Then calculate the column sum for each column and display it on the console as shown below:

```
The column sum for Column 1 is: 13
The column sum for Column 2 is: 28
The column sum for Column 3 is: 45
The column sum for Column 4 is: 17
```

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