

# ESc101N: Fundamentals of computing(Lab Session 7)

September 15, 2009

## Instructions

1. Please read the question carefully and write the program accordingly
2. Make sure that the TA has graded you program
3. The marks are distributed as follows. You get 60% of the marks if the basic algorithm is current, 20% if you manage to compile and execute and 20% for writing the code cleanly, i.e. using proper variable names, intending and making the code more readable.

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**Question 1.** (10 marks) Given a sequence of integers  $\{a_1, \dots, a_n\}$ , positive or negative a *vertical bar graph* is a sequence of  $n$  lines containing the characters '\*' and '|' and spaces satisfying the following properties.

1. All the  $n$  lines have a '|' character in it.
2. All the '|' characters are aligned in the same column. This corresponds to the  $y$ -axis.
3. If  $a_i$  is negative then there are  $|a_i|$  many '\*'s to the left of the '|' character (i.e  $y$ -axis)
4. If  $a_i$  is positive then there are  $a_i$  many to the right of '|' characters.

Write a program that will read  $n$  numbers from the user and prints its vertical bar graph.

```

$ ./a.out
enter the sequence length: 10
enter a[0]: 4
enter a[1]: 5
enter a[2]: -8
enter a[3]: 9
enter a[4]: 6
enter a[5]: -3
enter a[6]: 1
enter a[7]: 7
enter a[8]: 3
enter a[9]: -6
the vertical bar graph is:
      |****
      |*****
*****|
      |*****
      |*****
      ***|
      |*
      |*****
      |***
*****|
$

```

Hint. First write a function `void printNChar(int n, char c)` which will print the character `c` `n` times. Let  $N$  and  $P$  be respectively be defined as follow

$$N = \min\{a_i | a_i \leq 0\} \text{ and}$$
$$P = \min\{a_i | a_i \geq 0\}$$

Then what will be the column number of ' | ' in each line ?. Derive an equation on the number of stars and spaces in each line.