CS2610 COA Lab exam

26 April 2022

Problem Definition

Given a choice value C followed by a string S or an integer N, you are expected to implement the following pseudocode.

```
if (C == 1) {
        Do sub task 1 with string S
} else if ( C == 2 ) {
        Do sub task 2 with integer N
}
```

The details about the sub tasks are given below.

Problem 1

Given the string S, print the number of occurrences of upper case characters in the string.
For example, if the string is *HellO*, print 2 as the output.

Problem 2

Given the string S, print the number of occurrences of lower case characters in the string.
For example, if the string is *HellO*, print 3 as the output.

Problem 3

Given the string S, print the number of occurrences of vowels in the string.
For example, if the string is *Hello*, print 2 as the output.

Problem 4

Given the string S, print the number of occurrences of consonants (alphabets that are not vowels) in the string.
For example, if the string is *Hello*, print 3 as the output.

Problem 5

Given the string S, print the number of occurrences of number characters in the string.
For example, if the string is *cs20b123*, print 5 as the output.

Problem 6

Given the string S, print the number of occurrences of the following special characters in the string: #$%&:;<=>?@
For example, if the string is *<cs20b123@cse>*, print 3 as the output.

Problem 7

Given the string S, print the number of words in the string.
For example, if the string is *hello world*, print 2 as the output.

Problem 11

Given the integer N, print the value of $f(N)$ where the function f is defined as:

$$f(x) = \begin{cases} 3 * f(x-1), & \text{if } x > 10 \\ f(x-1) + f(x-2), & \text{if } x <= 10 \text{ and } x > 7 \\ 1, & \text{if } x <= 7 \text{ and } x > 0 \end{cases}$$

You can assume that the output fits in a signed 32-bit integer.

Problem 12

Given the integer N, print the value of $f(N)$ where the function f is defined as:

$$f(x) = \begin{cases} 1 + f(x-2), & \text{if } x > 10 \\ f(x-3) + f(x-2) + 2, & \text{if } x <= 10 \text{ and } x > 7 \\ 4, & \text{if } x <= 7 \text{ and } x > 0 \end{cases}$$

You can assume that the output fits in a signed 32-bit integer.

Problem 13

Given the integer N, print the value of $f(N)$ where the function f is defined as:

$$f(x) = \begin{cases} x + f(x-1), & \text{if } x > 10 \\ f(x-1) + 7 + 2 * f(x-3), & \text{if } x <= 10 \text{ and } x > 7 \\ 2, & \text{if } x <= 7 \text{ and } x > 0 \end{cases}$$

You can assume that the output fits in a signed 32-bit integer.

Problem 14

Given the integer N, print the value of $f(N)$ where the function f is defined as:

$$f(x) = \begin{cases} f(x-2) + 4 * x, & \text{if } x > 10 \\ f(x-2) + f(x-1), & \text{if } x <= 10 \text{ and } x > 7 \\ x, & \text{if } x <= 7 \text{ and } x > 0 \end{cases}$$

You can assume that the output fits in a signed 32-bit integer.

Problem 15

Given the integer N, print the value of $f(N)$ where the function f is defined as:

$$f(x) = \begin{cases} 4 * f(x-2), & \text{if } x > 10 \\ f(x-1) + 3 + x, & \text{if } x <= 10 \text{ and } x > 7 \\ 2, & \text{if } x <= 7 \text{ and } x > 0 \end{cases}$$

You can assume that the output fits in a signed 32-bit integer.

Problem 16

Given the integer N, print the value of $f(N)$ where the function f is defined as:

$$f(x) = \begin{cases} x * 4 + f(x-2), & \text{if } x > 10 \\ f(x-3) + 2 + f(x-1), & \text{if } x <= 10 \text{ and } x > 7 \\ 7, & \text{if } x <= 7 \text{ and } x > 0 \end{cases}$$

You can assume that the output fits in a signed 32-bit integer.

Problem 17

Given the integer N, print the value of $f(N)$ where the function f is defined as:

$$f(x) = \begin{cases} f(x-1) + (x-1), & \text{if } x > 10 \\ 2 * x + 4 * f(x-2), & \text{if } x <= 10 \text{ and } x > 7 \\ 9, & \text{if } x <= 7 \text{ and } x > 0 \end{cases}$$

You can assume that the output fits in a signed 32-bit integer.

Input format

- The first line of the input will contain the choice value C.
- The second line of the input will contain a string (for sub task 1) or an integer (for sub task 2).

Sample input 1

```
1
Hello
```

Sample input 2

```
2
14
```

Output format

- For both sub tasks, the output is just a single integer.
- Please do not print any other text. Follow the output format strictly.

Constraints

- C will have the value 1 or 2
- The length of the input string for sub task 1 will be between 1 and 20 (both inclusive)
- The input integer for sub task 2 will be between 1 and 20 (both inclusive)

Submission instructions

- The final code submission should be done on Moodle.
- Submit only a single assembly file named as roll_no.asm. If your roll number is cs20b123 then submit the assembly file as cs20b123.asm