

CS 014 • Winter 2003

In-lab Programming Exercise 1

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January 6, 2003

This first assignment is very simple, just to warm you up. Your task is to write a working C++ program called `in_lab_exer_1` which asks the user for three parameters — a character `c`, a positive integer `n`, and another positive integer `h` — and then prints on the console window a Christmas tree shape. For example, when you run your program and answer its prompts with the parameters `c = '+'`, `n = 4`, and `h = 2`, you should see the following printed on the console window:

```
      +
     +++
    +++++
   +++++++
  +
  +++
  +++++
 +++++++
```

The example tree above has `h = 2` branches, each with `n = 4` lines.

Your solution should be written in terms of a function with the following signature:

```
void f(const unsigned char c, const unsigned int n)
```

It's up to you to figure out what this function should do and how to use it.

If you finish early, you can try the following variation on the same problem, for extra credit.

Extra Credit

Write a program similar to the one above, but one which prints a “forest” of Christmas trees. For example,

```
      +                +                +
     +++              +++              +++
    +++++            +++++            +++++
   ++++++++        ++++++++        ++++++++
    +              +              +
   +++            +++            +++
  +++++          +++++          +++++
 ++++++++ ← 5 blanks → ++++++++ ← 5 blanks → ++++++++
```

This forest has 3 trees, separated horizontally by 5 spaces (measured at the bottom-most line of each tree branch). Your program should ask for the following input from the user

- a char `c`
- an int `nlines`
- an int `nbranches`
- an int `ntrees`
- an int `nblanks`

and then print a forest with `ntrees` trees, each with `nbranches` branches, each branch with `nlines` lines. The trees must be separated by `nblanks` blank spaces. The example above has: `c = '+'`, `ntrees = 3`, `nbranches = 2`, `nlines = 4` and `nblanks = 5`.

Note that in order to get the extra credit for which this question is worth, you need to finish it completely and in a “professional” manner. One large chunk of code is **not** acceptable. Partial extra credit will **not** be given.

