

Lab 3 Recursion

UWYO COSC 2030

1 Lab: Recursion

Recursion is a helpful tool that can be applied to many problems. It is a powerful tool that can compress problems down to fewer lines of code than usual. “the repeated application of a recursive procedure or definition.”

- <https://en.wikipedia.org/wiki/Recursion>
- Google recursion (it does something special)

TOP DEFINITION

recursion

[See](#) recursion.

by **Anonymous** December 05, 2002



2 Lab: Assignment

Github Classroom Assignment Link: <https://classroom.github.com/a/Lfm-gCPM>

Using the C++ program Lab3.cpp on the website, complete the functions:

- findBinaryNotation
- isPalindrome
- recurSummation
- arrRev

DO NOT change main or the function definitions, only the functions for you to write. Remember that the most important part of recursion is knowing your exit condition (i.e. when do you stop?). You may code in whatever editor you want (Visual Studio, VS Code, Nano, Terminal, etc.) or use an online code editor/compiler like OnlineGDB.

3 Lab: Recursion Example

You can think of the output of a recursive function as a nested mathematical statement. For example, the output of the function below:

```
// This code returns a string that counts down from the input number.
string printCountdown(int num)
{
    if(num == 0)
    {
        return "0. Blastoff!";
    }
    else
    {
        return (to_string(num) + ", ") + printCountdown(num-1);
    }
}
```

can be thought of as $(5, + (4, + (3, + (2, + (1, + (0. Blastoff!))))))$ where each $()$ is a function call of `printCountdown()`.

Each time it hits a recursive call, the current return statement pauses until that recursive function call is resolved. Once it reaches the exit statement/base case (which doesn't have a recursive call), it is able to resolve and finish all of the previous return statements that were on hold. So the final output string of `printCountdown(5)` would be "5, 4, 3, 2, 1, 0. Blastoff!"

4 Lab: Submission

Turn in on Github by uploading only the .cpp file. Make sure you include a readme with your name, the lab section you attended (3-5 is Section 1, 5-7 is section 2), and any help you gave/received (if applicable). Submissions missing these will be penalized.