COS132: 7th Practical: April 2023

Topic: ***Laws of Program Transformation***

Given is the following run-able C++ program (whereby especially the **centre part** is important):

```
#include <iostream>
using namespace std;
int main()
{
    int i=0 ;
    int a[3];
    char op ;
    int arg ;

    cin >> op ;
    cin >> arg;

    while(i<3)
    {
        if(op=='+') a[i] = i+arg;
        else
        {
         if (op=='*') a[i]=i*arg;
              // else do nothing
        }
        cout << a[i];
        cout << "|" ;
        i = i + 1   ;
    }
return 0;
}
```

Your Task:

- Knowing that *statically declared arrays are only "syntactic sugar"*, first ***apply the Array Laws*** (which you have studied) to transform the given program into its equivalent form without array.
- Thereafter, knowing that *Iteration and Recursion are "equally powerful"* in Turing-computable data domains, ***apply the Law of Recursion*** to further transform the array-free program (which you have obtained from the previous task-step) into its equivalent recursive form (*without* any WHILE and also *without* any FOR).
- ***Test*** *your final program* (i.e.: the *recursive* program *without* array) thoroughly, such as to convince yourself that it is indeed computationally equivalent to the initially given form (i.e.: the iterative form with array).
- Finally, ***submit*** your solution via ClickUp's file upload facility.

Attention!

Ask the Lab-Tutors (in the weekly Colour-Labs) for **advice** before you submit any software which does not work.

NULL Marks will be given to any submission that violates any of the given Requirements**!**

As always, the submitted *file type must* be either *.**txt** or *.**cpp**

Deadline: Tuesday 2nd of May!

And now: ***HAPPY TRANSFORMING :)***