# C-worksheet

## Week 1

- [ ] Learn about pointers and references.
- [ ] Use pointers for array input and output
- [ ] Use pointers to take string input.
- [ ] Learn about the basics of recursion and its applications.- Youtube playlist from some of the decent channels

**Test yourself:**

- [ ] Write a program in C to take string as an input and check if it is palindrome or not. **Use pointers**
    - [ ] (Palindrome is a type of string that reads the same from both left and right side ,example - MADAM).
- [ ] Write a program in C to swap two numbers using pointers.
- [ ] Write a program to copy elements of one array to another using pointers.
- [ ] Write a program to print the first 10 natural numbers using recursion.
- [ ] Write a program to find nth fibonacci using recursion.
- [ ] Write progam to sort array using recursion (bubble sort, selection sort, merge sort, quick sort)
- [ ] Write a program to multiply two matrices using recursion.
- [ ] Write a program to convert binary into decimal and vice-versa using recursion. (eg. 3 ⇒ 011)
- [ ] Program to find GCD (Greatest common divisor) of two numbers using recursion.

BONUS PROBLEMS

## Week 0:

We will be starting with the absolute basics in the first week. To program stuff, the first thing you need to know is not a programming language, but the skill to put your thoughts into actionable steps. There are three tools that help you with, namely Flowcharts, Algorithms, and Pseudocode. You will learn more about them through the tasks given to you.
Another thing we will be covering is your setup. For Windows users, this will be setting up your MinGW and path variables, while for Ubuntu users thi will be to install gcc. You will also need to choose an editor (or an IDE, both are different btw, for example, sublime is an editor whereas VSCode is an IDE). Of course, you can change editors anytime you want, but you should see which one you want carefully and stick with it. Some

of the most used and easy to learn options are Sublime (editor), VSCode (IDE). But you are free to try anything!

**Pro Tip: Always Use Dark Mode!**

## For Windows:

1) Install C using Mingw
2) Install any Editor.

## For Ubuntu:

1) Install GCC using the command sudo apt install gcc.
2) Install any editor.

References: https://itsfoss.com/run-c-program-linux/

## Tasks:

- Read up on Flowcharts, Pseudocode, and algorithms.
- Write flowchart, pseudocode or algorithm (anyone for each, but do all three at least once) for the following: (write code for all)
    - Find the sum of 3 numbers
    - Finding whether a given number is even or odd
    - Finding which number from the given 2 is larger than the other.
    - Swapping two numbers without an extra variable
    - Finding the sum of given *n* numbers (*n* is arbitrary, make sure your code works for all values of n)
    - Finding if a given number is prime or not
    - Finding all prime numbers from 1 to *n* ($n \in N$)
    - Finding the first *n* fibonacci numbers ($n \in N$)
- Read up on data types in c (continued next week)
- Let's start with basic and use scanf printf for now.
- Learn about data types, expressions. Refer
- Input a float or double and print it with only 2 precision.
- Learn for and while loops in C.
- Study about syntax and basic implementation of String.
- Print all odd numbers from 100 to 1 using for and while loops.

  **Test yourself** - Write programs for displaying the below patterns, **for any N**, where N represents the number of rows for the pattern. Use a loop to do this.
    - N = 5

      *

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*****
```

- N = 5

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*********
*******
*****
***
*
```

- N = 5

```
    *
   * *
  * * *
 * * * *
* * * * *
```

N = 5

```
1                   1
1 2               2 1
1 2 3           3 2 1
1 2 3 4       4 3 2 1
1 2 3 4 5 5 4 3 2 1
```

- Implement Pascal's Triangle.
- Input a string and print the frequencies of each character present in the string. (a - z,A-Z)
- Using the above program, sort a given string based on the ASCII values
- Implement a calculator with basic operations (+,-,/,*,%) and exit functionality.

BONUS PROBLEM- Add Binary