

Lab Serie No. 04: Recursion

Declaration Syntax of goto

The **goto** statement allows us to transfer control unconditionally from one point in the code to another. It provides a way to jump to a specific label within the same function or block. The **goto** statement can be used to create loops (useful to convert recursive solutions), perform error handling, and break out of nested loops. The syntax is as follow: `goto Label;` The label is a valid identifier followed by a colon (:) placed before the statement to which we want to jump. Here is an example:

```
#include <stdio.h>

int main() {
    int i = 1;

start: // label
    if (i <= 10) {
        printf("%d\n", 5*i);
        i++;
        goto start; // jump to the 'start' label
    }
    return 0;
}
```

Exercise 01

Implement a recursive program that computes the exponentiation of a given base raised to a specified exponent (**base^{exp}**).

Exercise 02

Write a recursive program **DecToBin** to convert a decimal number to its binary representation.

Exercise 03

Write a recursive function **reverse(L)** that returns the list obtained by reversing the order of elements in the linked list **L**.

Exercise 04

Write a program to determine whether a given word is a palindrome or not. A palindrome is a word, phrase, number, or other sequence of characters that reads the same forward and backward. **Ex:** "**radar**" and "**madam**" are palindromes.

Exercise 05

Write a recursive function **MaxRec** that takes an array of integers and its size as input and returns the maximum element in the array.

Convert the recursive function to an iterative one using **goto** statement and **lables**.