University of Echahid Hamma Lakhdar – El-Oued
Department of Computer Science
Level: 2nd Year LMD Computer Science
Course: Algorithms and Data Structures 3
Tutorial No. 1
(Functions)

Objective

This TD introduces the concept of **functions** (subprograms) in C language. Functions allow splitting a large program into smaller, reusable modules.

Key Concepts

- A **function** in C is a block of code that performs a specific task.
- Functions improve **readability**, **reusability**, and **modularity**.
- The general syntax is:

```
return_type function_name(parameter_list) {
    // body of the function
    return value; // if return_type != void
}
```

- **Declaration (prototype):** Informs the compiler about the function's return type and parameters.

```
int add(int a, int b);
```

Example: Simple Function

```
#include <stdio.h>

// Function prototype
int add(int a, int b);

int main() {
    int x = 5, y = 3;
    printf("Sum = %d\n", add(x, y));
    return 0;
}

// Function definition
int add(int a, int b) {
    return a + b;
}
```

Exercise 1: Sum of Two Numbers

Write a function `int sum(int a, int b)` that returns the sum of two integers. In `main()`, read two numbers from the keyboard and display their sum using `sum()`.

Exercise 2: Maximum of Two Numbers

Write a function `int max(int a, int b)` that returns the largest of two integers. Use it in `main()` to find the largest of three numbers entered by the user.

Exercise 3: Factorial Function

Write a function `long factorial(int n)` that returns the factorial of `n`. In `main()`, read `n` and display its factorial.

Exercise 4: Average of Array

Write a function `float average(int arr[], int n)` that returns the average of an array of integers. Use it to compute the average of a list of student grades.

Exercise 5: Prime Test

Write a function `int isPrime(int n)` that returns 1 if `n` is prime and 0 otherwise. Use it to display all prime numbers between 1 and 100.

Additional Challenge

Create a small calculator program using functions:

- `int add(int a, int b)`
- `int sub(int a, int b)`
- `int mul(int a, int b)`
- `float div(int a, int b)`