FUNCTIONS IN C++ (TO-THE-POINT NOTES)

1. WHAT IS A FUNCTION?

A reusable block of code that performs a specific task. Improves modularity, readability, and reduces repetition.

Basic Syntax:

return_type function_name(parameters) {

// body

}

2. TYPES OF FUNCTIONS

- Library Functions: Already available (sqrt, pow, sort).
- User-Defined Functions: Created by the programmer.
- Void Functions: Do not return a value.
- Return-Type Functions: Return a specific value.

3. WHY FUNCTIONS ARE IMPORTANT (INTERVIEW POV)

- Reduces code duplication.
- Helps modular programming.
- Easier debugging.
- Used heavily in coding tests for clean structure.

4. FUNCTION PARAMETERS

(1) Pass by Value:

- A copy of the variable is sent.
- Original value remains unchanged.

Example:

void fun(int x) { x++; }

(2) Pass by Reference (&):

- No copy; modifies original.

void fun(int &x;) { x++; }

(3) Pass by Pointer (*):

- Address is passed; *x accesses value.

void fun(int *x) { (*x)++; }

5. FUNCTION OVERLOADING

Same function name, different parameters.

int add(int a, int b);

double add(double a, double b);

Return type alone cannot overload.

6. DEFAULT ARGUMENTS

void fun(int a, int b = 5);

fun(10); // b = 5 automatically

7. INLINE FUNCTIONS

inline int square(int x) { return x*x; }

Used for small functions; reduces function call overhead.

8. RECURSION (IMPORTANT)

A function calling itself.

Example:

int fact(int n) {

if(n==0) return 1;

return n * fact(n-1);

}

Used in: factorial, fibonacci, tree traversal, backtracking.

9. RETURNING MULTIPLE VALUES

Methods:

- Using reference parameters
- Using pointers
- Returning structs/pairs/vectors

10. BEST PRACTICES (CODING TEST POV)

- Keep functions short and meaningful.
- Use descriptive names.
- Avoid unnecessary global variables.
- Pass large structures by reference to avoid copying.
- Always handle base cases in recursive functions.

11. COMMON INTERVIEW QUESTIONS

- Difference between pass by value/reference/pointer.
- Can a function return multiple values?
- What is recursion? Advantages/disadvantages.
- What is inline function?
- What is function overloading?