

# Introduction to C++ (Beginner Friendly Notes)

## 1. WHY C++ AFTER C?

C++ was created to improve C by adding Object-Oriented Programming and better features.

C++ = C + Object-Oriented Features + Improvements.

It supports large-scale software development and safer memory handling.

## 2. C++ vs C – What's New?

Major Additions:

- cout and cin (stream-based input/output)
- Function overloading
- Default arguments
- References
- Classes & Objects
- Better memory management

## 3. INPUT & OUTPUT IN C++

Include: #include <iostream>

Output example:

```
std::cout << "Hello";
```

Input example:

```
int age;  
std::cin >> age;
```

## 4. FUNCTIONS IN C++

C++ adds:

- Default Arguments
- Function Overloading
- References

Default Argument Example:

```
void welcome(string name = "Guest")
```

Function Overloading Example:

```
void print(int x)  
void print(double x)
```

References Example:

```
void increment(int &x)
```

## 5. Dynamic Memory in C++

Use:

```
new -> allocate memory  
delete -> free memory
```

Example:

```
int* ptr = new int;  
delete ptr;
```

## 6. Bitwise Operators

& -> AND  
| -> OR  
^ -> XOR  
~ -> NOT  
<< -> Left Shift  
>> -> Right Shift

## 7. Dynamic Programming (Concept)

Dynamic Programming is a problem-solving technique that breaks problems into smaller parts and stores results to avoid repeated work.