

# Introduction to C++ Development

## Overview of C++ Program Development

The process of developing a C++ program involves the following steps:

1. Define the Problem
2. Design a Solution
3. Write the Program
4. Compile the Program
5. Link Object Files
6. Test the Program

### Step 1: Define the Problem

This is the **what** step. Defining the problem involves coming up with a clear idea of what the program should accomplish. Depending on the situation, this step can either be the easiest or the hardest part of the development process.

The key to success in this step is having a well-defined and specific idea.

### Step 2: Design a Solution

This is the **how** step and is often the most neglected phase of software development. While there are many ways to solve a problem, not all solutions are good. Programmers frequently jump to coding their first idea, which can result in suboptimal solutions.

### Characteristics of Good Solutions

Good solutions typically:

- Are **straightforward**.
- Are **well-documented**.
- Are built **modularly**.

- Can **recover gracefully**.

Failing to properly plan a solution can lead to fragile, hard-to-maintain programs. Studies have shown that 60–90% of programming time is spent debugging rather than writing code. By investing time upfront to design a robust solution, developers can save significant time and effort in debugging later.

## Step 3: Write the Program

In order to write the program, the following are required:

- Knowledge of a programming language (e.g., C++).
- A text editor to write the code.

The code written by the programmer is called **source code**. Since source code is written using ASCII characters, programming languages use specific syntax to represent mathematical or logical concepts. For example:

- The **not equal to** sign is written as `!=` because the ASCII character set does not include a specific symbol for it.

Modern fonts, such as **Fira Code**, use ligatures to visually combine such representations back into a single symbol for readability.

## File Naming Conventions

Each source code file is saved to disk with a file name. The main program file is typically called `main.cpp`. However, some programs name the file after the program itself (e.g., `poker.cpp`). The best practice is to use `main.cpp` for clarity and consistency.