

# C++ Session I



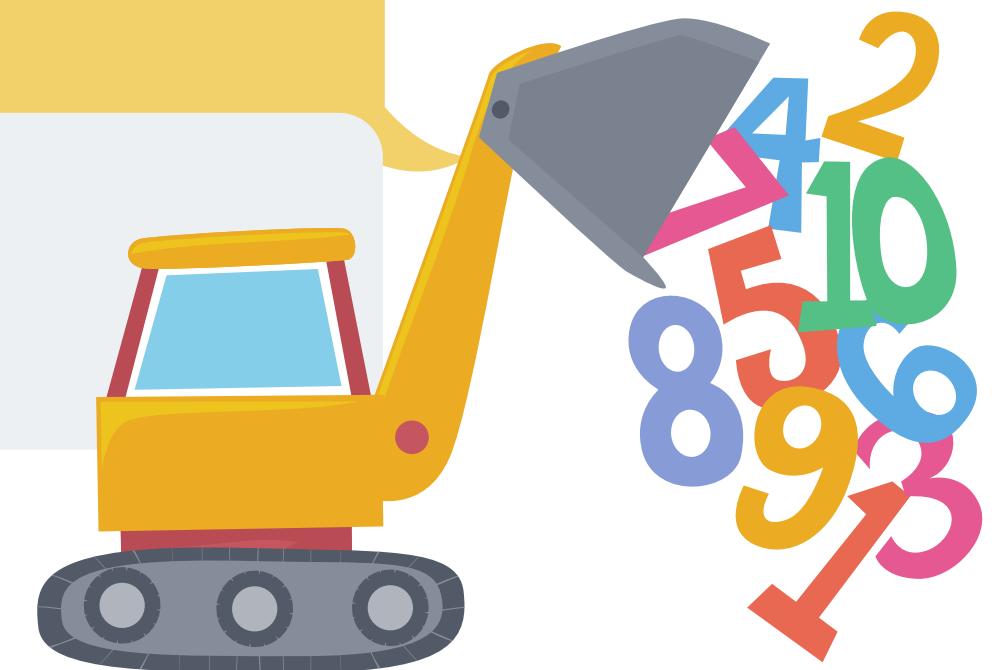


# To be covered:

- Number System
- Setting up C++ Development Environment
- Programming Basics
- Writing first C++ program
- Preprocessors
- Namespace



# Number System





# Types

There are four most common types of Number Systems. They are as follows:

**Decimal**

**Binary**

**Octal**

**Hexadecimal**

Base 10

Base 2

Base 8

Base 16



# What are Bases?

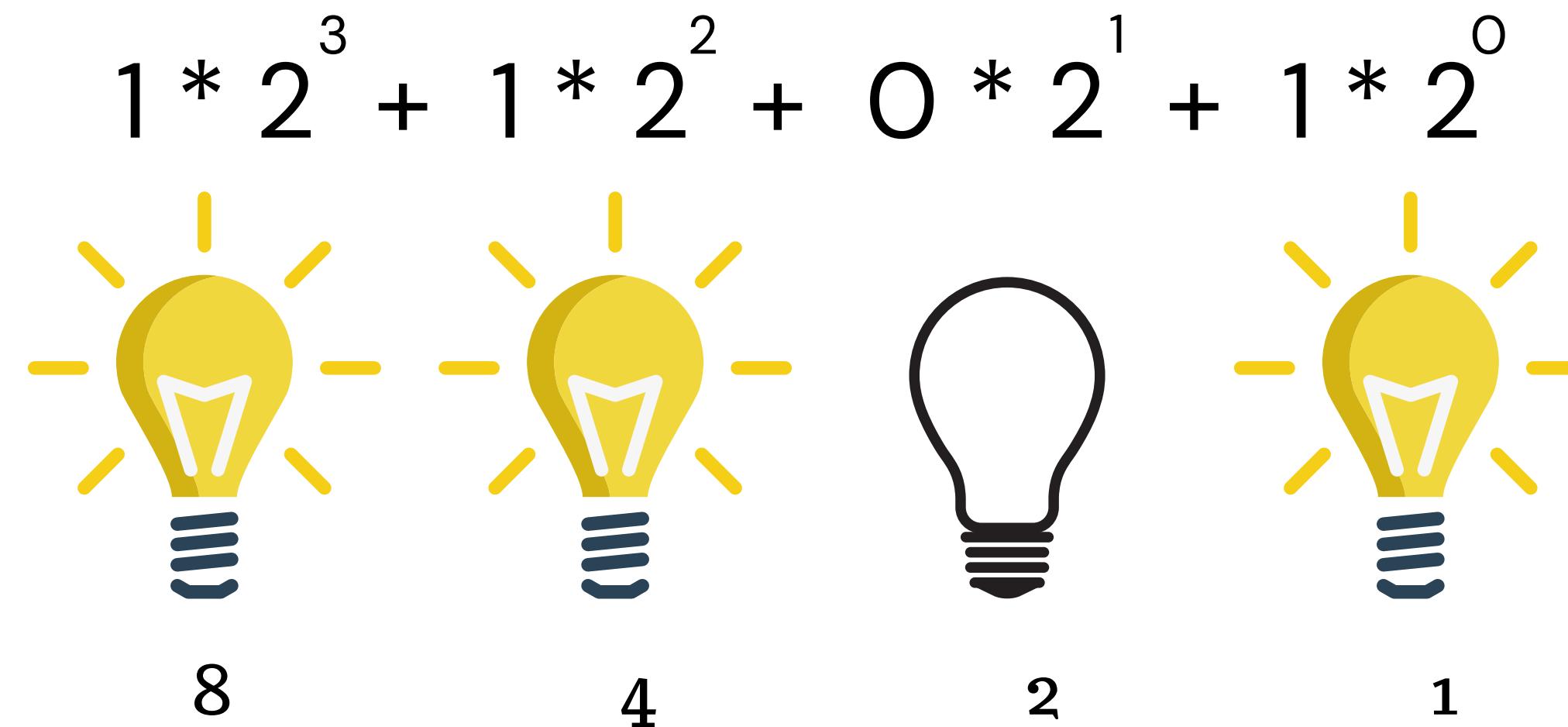
- Let suppose there is a number system with base x. Then it can have numbers range from 0 to  $(x-1)$ .
- For example, Decimal has a base of 10 because it contains numbers from 0 to 9. The positions hold a value like units, tens, hundreds, etc.

$$7 * \underline{10}^3 + 3 * \underline{10}^2 + 5 * \underline{10}^1 + 6 * \underline{10}^0$$

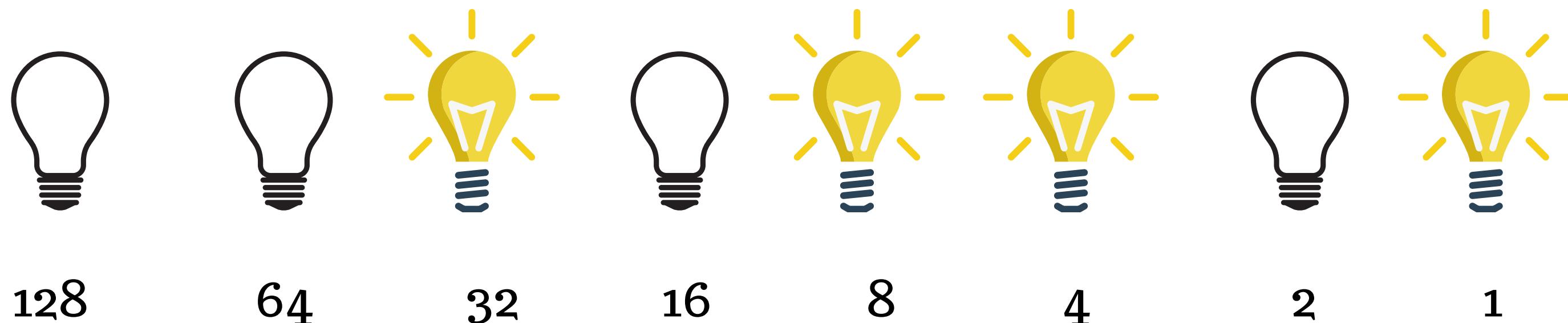
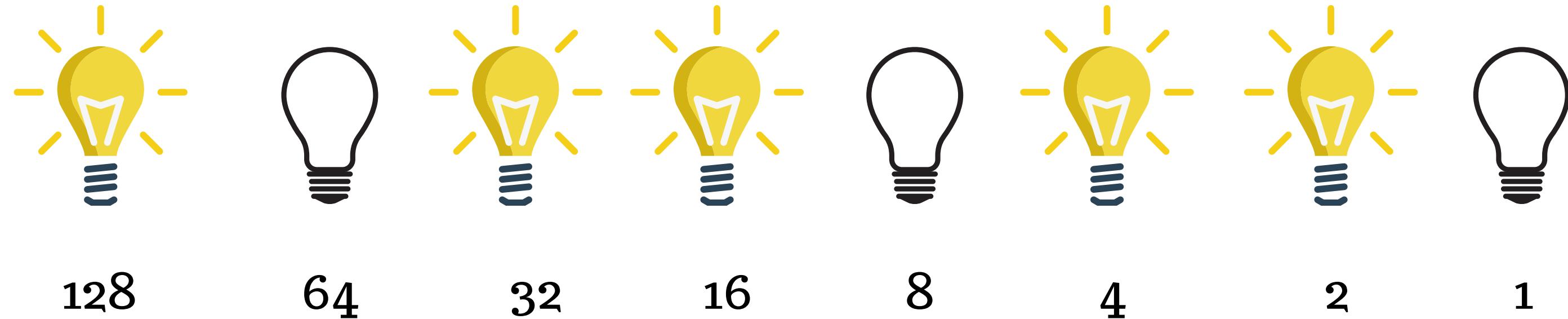
- Similarly, Octal has a base of 8 and it contains numbers from 0 to 7.
- Hexadecimal has a base of 16 and it contains digits from 0 to 9 and alphabets from A to F.

# Binary Number System

- In the base 2 number system, only two binary digits exist, i.e., 0 and 1. Specifically, the usual base-2 is a radix of 2. The figures described under this system are the combination of 0 and 1. For example, 1101 is a binary number.
- Every 0 and 1 represent one bit of a memory and 8 bits form one byte of memory.



# PRACTICE

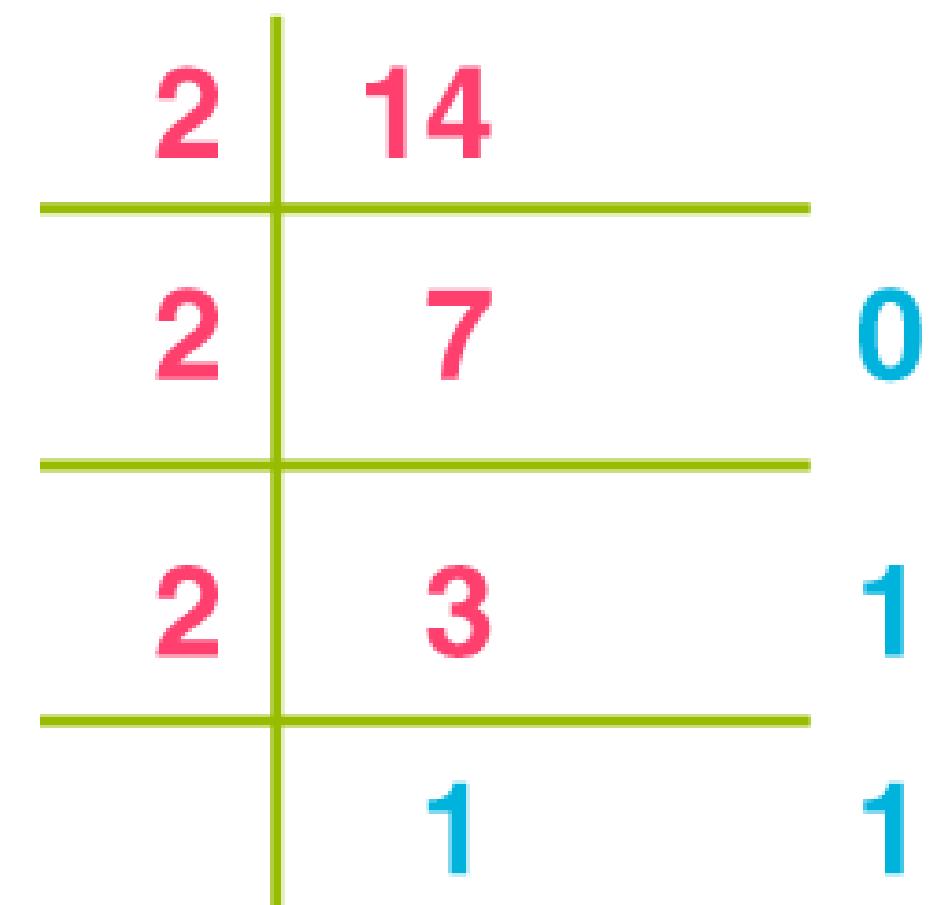


# Conversion from decimal to Binary

- To convert a decimal number into its binary form, we divide the number by 2 till it becomes 0.

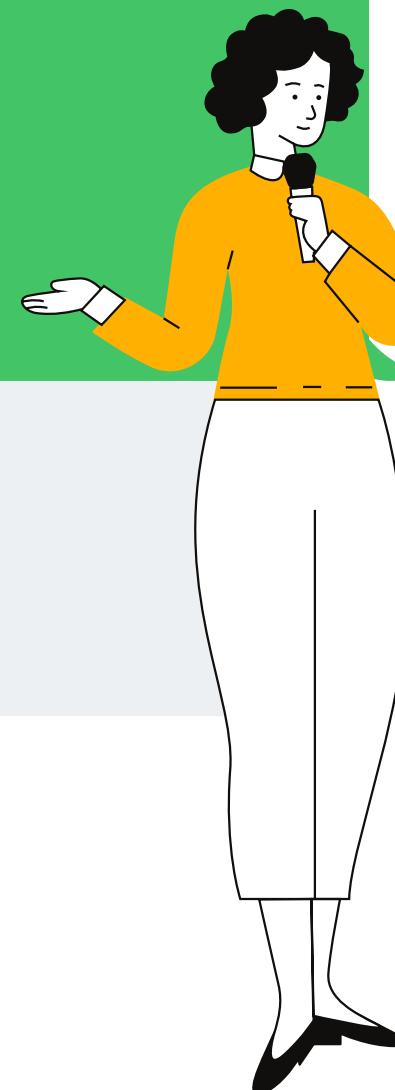
- For example,

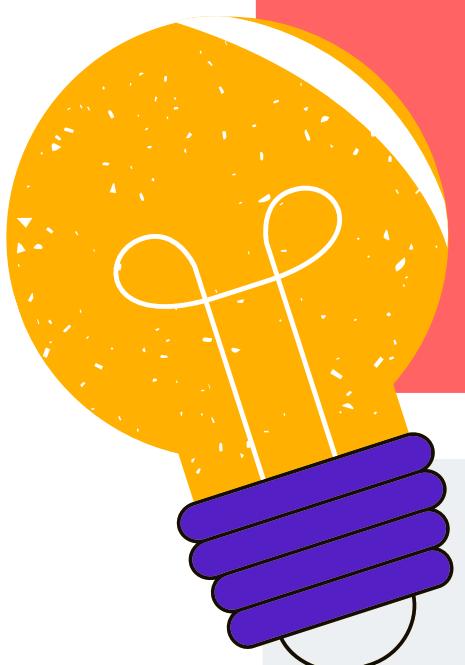
- 16 - 10000
- 21 - 10101
- 5 - 101
- 14 - 1110
- 91 - 1011011



# Setting up C++ Development

## Environment





Writing first

C++ Program



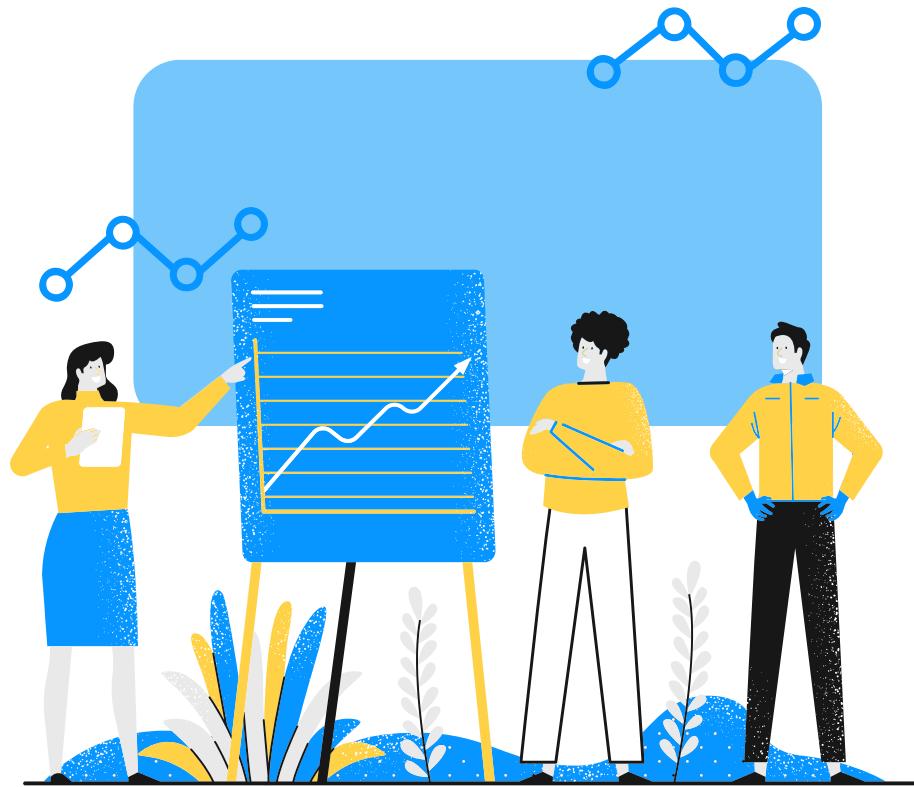
# Programming

## Basics





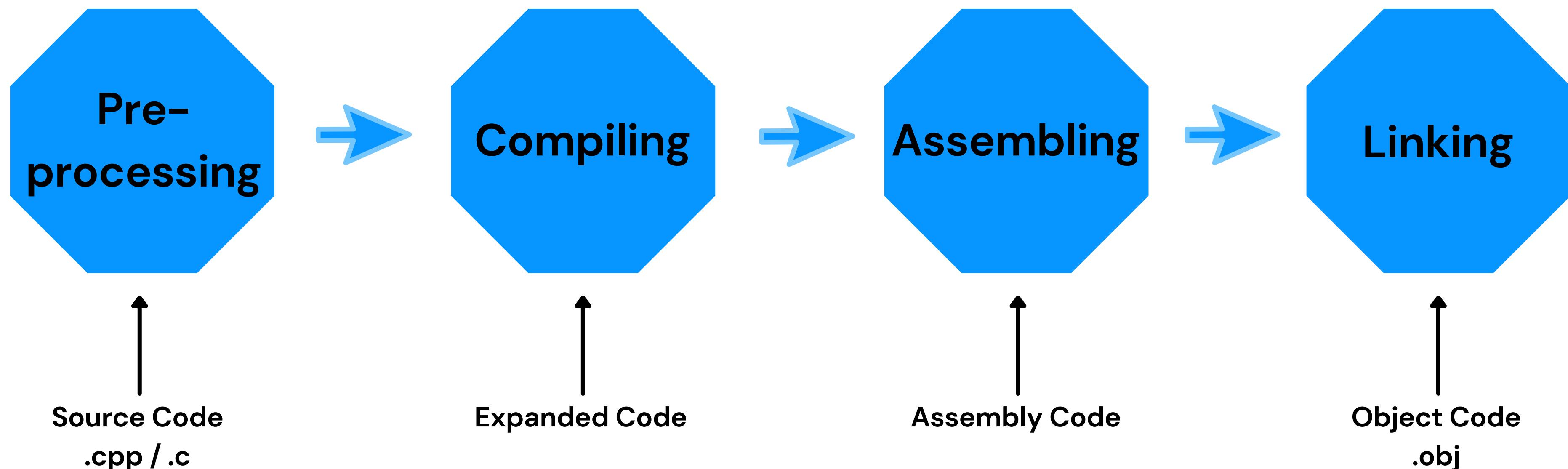
**Computer Programming is a set  
of instructions, that helps the  
developer to perform certain  
tasks that return the desired  
output for the valid inputs.**





# Compilation

The compilation process converts the source code taken as input into the object code or machine code. It can be divided into four processes:





# Some Basic Terms

- **Source code:** Source code is the actual text that is used to construct the program using the language of choice.
- **Algorithm:** It is a set of steps or instruction statements to be followed to accomplish specific tasks. A developer can design his algorithm to achieve the desired output. For Example, a recipe to cook a dessert. The algorithm describes the steps to be followed for completing a specific task, but it does not say how to achieve any of the steps.
- **Compiler:** Compiler is a software program that helps in converting the source code into binary code or byte code, also called machine language, that is easy for a computer to understand, and can be further executed using an interpreter to run the program.

# Namespace &

## Preprocessors





# Preprocessors

Preprocessor programs provide preprocessors directives which tell the compiler to preprocess the source code before compiling. All of these preprocessor directives begin with a '#' (hash) symbol.

There are 4 main types of preprocessor directives:

1. Macros
2. File Inclusion
3. Conditional Compilation
4. Other directives





**Macros:** Macros are a piece of code in a program which is given some name. Whenever this name is encountered by the compiler the compiler replaces the name with the actual piece of code. The '#define' directive is used to define a macro. We can also pass arguments to macros. Macros defined with arguments works similarly as functions.

**File Inclusion:** This type of preprocessor directive tells the compiler to include a file in the source code program. There are two types of files which can be included by the user in the program:

- **Header File or Standard files:** These files contains definition of pre-defined functions like cin, cout etc. These files must be included for working with these functions. Different function are declared in different header files.
- **User defined files:** When a program becomes very large, it is good practice to divide it into smaller files and include whenever needed. These types of files are user defined files.



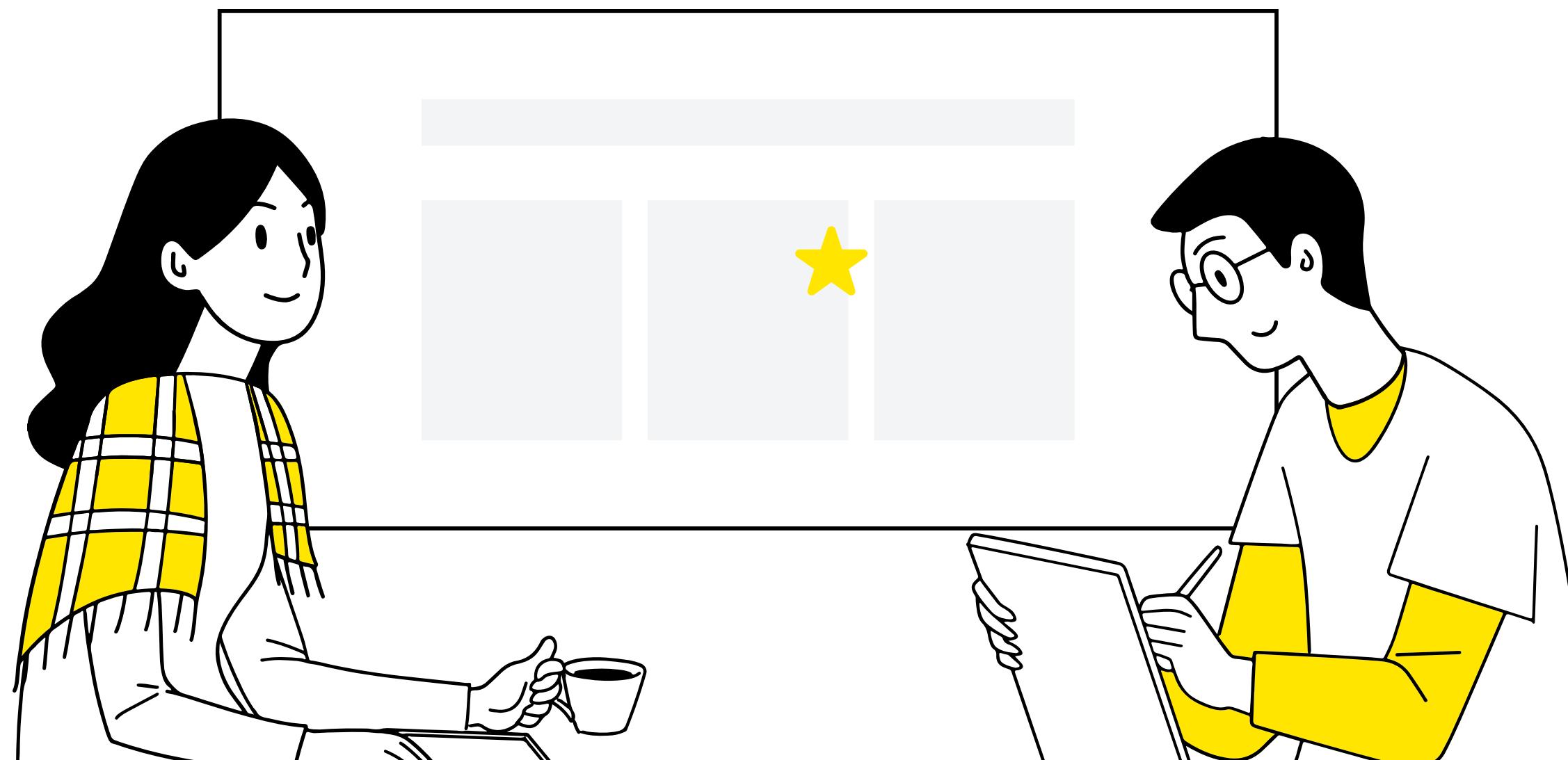
# QUESTION TIME

Let's make the most out of our learning sessions.





# Quiz Time!



The purpose of the quiz is not to shame or embarrass anyone, but to make sure everyone is on the same page.



**See you in the  
next session  
Hope you had  
fun!**

