FACULTY
OF INFORMATICS
Masaryk University

Learning C++

Beginners Basics

Yash Jain
under guidance of Pranav Sir

CONTENTS

ORIGIN

In 1979, Bjarne Stroustrup, a Danish computer scientist, began work on "C with Classes", the predecessor to C++. Stroustrup found that Simula had features that were very helpful for large software development, but the language was too slow for practical use, while BCPL was fast but too low-level to be suitable for large software development. When Stroustrup started working in ATT Bell Labs, he had the problem of analyzing the UNIX kernel with respect to distributed computing. Remembering his Ph.D. experience, Stroustrup set out to enhance the C language with Simula-like features.

C was chosen because it was general-purpose, fast, portable and widely used. As well as C and Simula's influences, other languages also influenced C++, including ALGOL 68, Ada, CLU and ML.

WHY C++?

C++ was the first very widely used OO language. C++ was very important in the 90s and early 2000s.
C++ is still important in game programming and embedded device programming because in C++ you can:

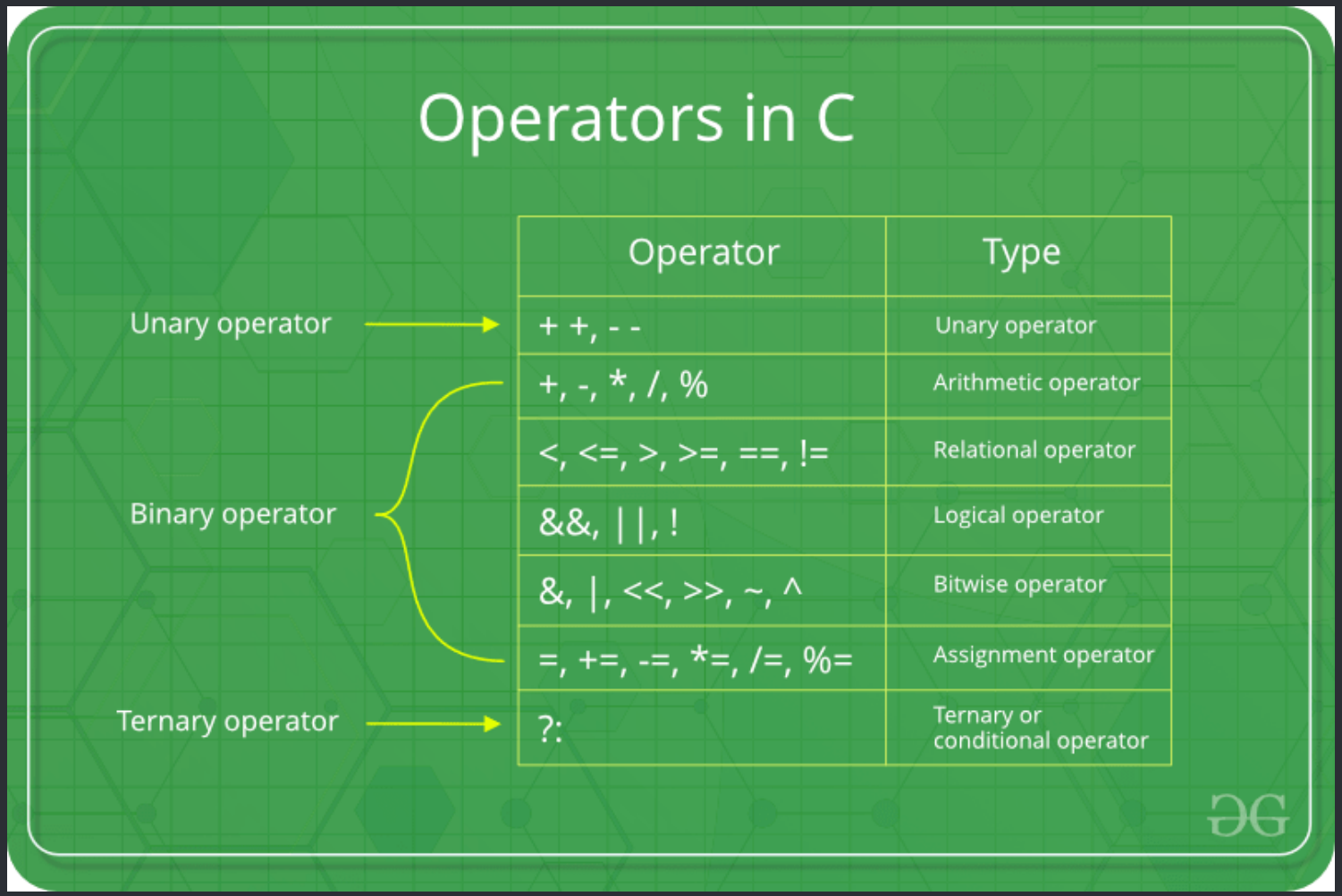
1. Write programs that are very efficient in memory usage - no managed object overhead and no garbage collection pauses
2. Write programs that are very efficient in CPU usage - this language is very close to the hardware
3. Use almost any CPU made - C++ compilers are very common

DATA TYPES

Data Types in C++

Type	Used for	Size
char	For characters	1 byte.
int	For integers	2 bytes.
float	For single precision floating point	4 bytes.
double	For double precision floating point	8 bytes.
bool	For booleans	1 byte
wchar	Wide Character	2 bytes

OPERATORS



Operators in C and C++ are same

WE USE % OPERATOR ONLY FOR INTEGERS

BASICS

C++ inherits most of C’s syntax. The following is Bjarne Stroustrup’s version of the Hello world program that uses the C++ Standard Library stream facility to write a message to standard output:

include <iostream>
int main()
{
std::cout « "Hello, world!";
}
We can use the std namespace and directly write
cout«"Hello, World!";

Loops in C++

Loops in programming comes into use when we need to repeatedly execute a block of statements.
There are mainly two types of loops:
Entry Controlled loops: In this type of loops the test condition is tested before entering the loop body. **For** Loop and **While** Loop are entry controlled loops.
Exit Controlled Loops: In this type of loops the test condition is tested or evaluated at the end of loop body. Therefore, the loop body will execute atleast once, irrespective of whether the test condition is true or false.**Do – while** loop is exit controlled loop.

Loops Syntax (entry controlled)

FOR LOOP

```
for (initialization expr; test expr; update expr)
{
    //body of the loop
    statements we want to execute
}
```

WHILE LOOP

```
while (testexpression)
{
    statements
    updateexpression;
}
```

Loops Syntax (exit controlled)

DO-WHILE LOOP

```
initialization expression;
do
{
    statements
    update expression;
} while (test expression);
```

DECISION MAKING

Decision making statements in programming languages decides the direction of flow of program execution. Decision making statements available in C++ are:

1. if statement
2. if..else statements
3. nested if statements
4. if-else-if ladder
5. switch statements

DECISION MAKING

if Statement

```
if(condition) {
    Statements to execute if condition is true
}
```

if..else Statements

```
if (condition) {
    Executes this block if
    condition is true
}
else {
    Executes this block if
    condition is false
}
```

DECISION MAKING

nested if Statements

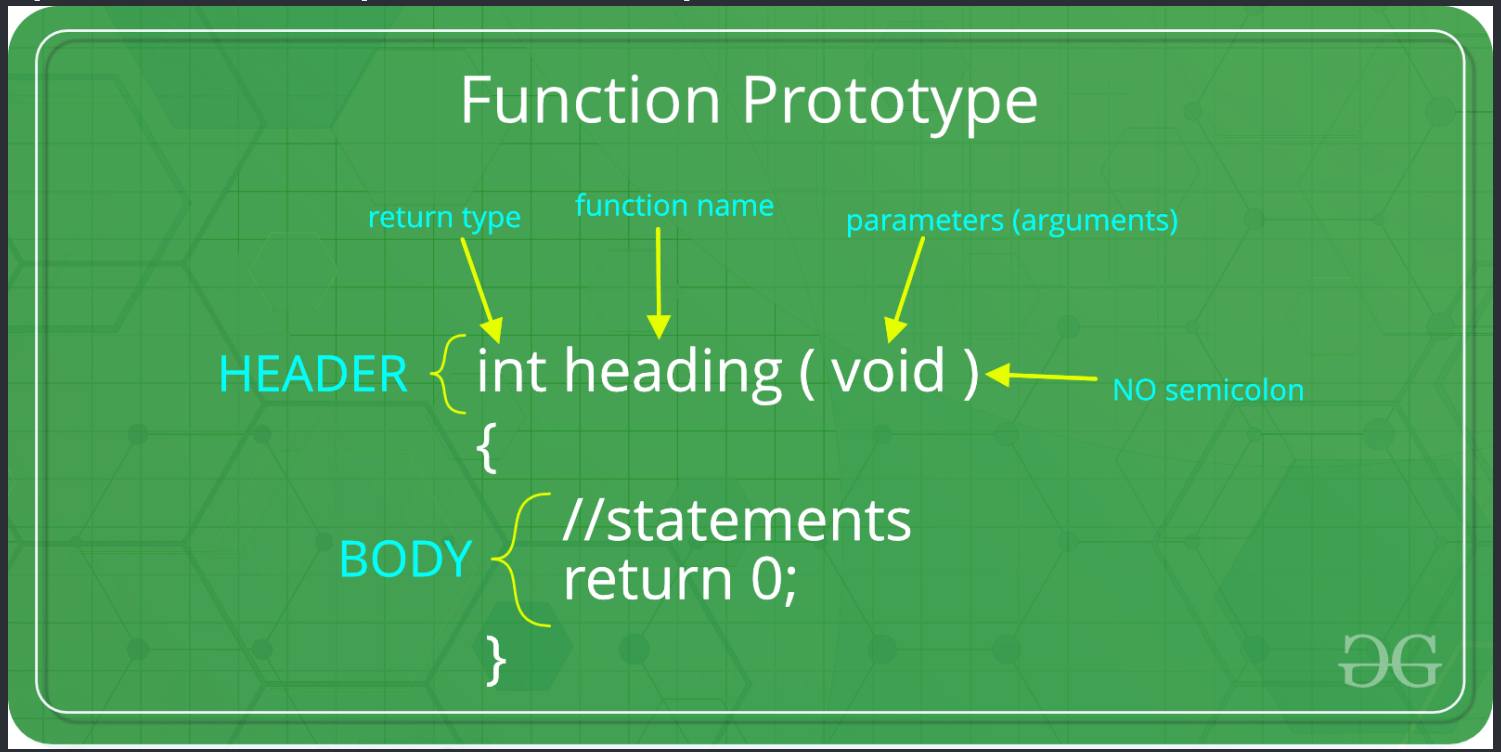
```
if(condition1)
{     Statements to execute if condition1 is true ;
    if (condition2)
        { Executes when condition2 is true ; }
}
```

if-else-if ladder

```
if (condition)
statement;
else if (condition)
statement;
....
else     statement;
```

FUNCTIONS

A function is a set of statements that take inputs, do some specific computation and produces output.



Function Prototype

FUNCTIONS

Following are some important points about functions in C++.

1. Every C++ program has a function called main() that is called by operating system when a user runs the program.
2. Every function has a return type. If a function doesn't return any value, then void is used as return type.
3. Functions can return any type except arrays and functions. We can get around this limitation by returning pointer to array or pointer to function.

FUNCTIONS

```
include <iostream>
using namespace std;
int max(int x, int y)
{
if (x > y)
    return x;
else
    return y;
}
int main(void)
{
int a = 10, b = 20;
cout«max(a,b)«endl;
return 0;     }
```

References

[1] Geek For Geeks
`https://www.cdn.geeksforgeeks.org`

[2] Bjarne Stroustrup: Programming: Principles and Practice Using C++Programming

[3] Knuth: Computers and Typesetting,
`http://www-cs-faculty.stanford.edu/~uno/abcde.html`

[4] IMAGES
`https://www.cdn.geeksforgeeks.org`