Programming Fundamentals

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Section (1) Outline

1. Introduction
2. Install Code Blocks
3. Create new C++ Project
4. How to input or output data using C++ language ?
5. Examples
6. Backslash codes
7. Function
8. ASCII Table

Intro.

* A programming language is a set of instructions and syntax used to create software programs.
* Examples of popular programming languages include Python, Java, C++, JavaScript, and Python.

Types of Programming Languages

1- Low-Level Languages: These include **Machine Language** and **Assembly Language**. They are close to the computer's hardware but difficult for humans to understand and write.

➢**Machine Language:**

The lowest-level programming language, consisting only of binary code (0s and 1s) that the computer's processor can execute directly. It is fast but very difficult for humans to read and write.

➢**Assembly Language:**

A low-level programming language that uses symbolic codes (mnemonics) instead of binary, making it slightly easier for humans to understand. It requires an **assembler** to convert it into machine language.

2- High-Level Languages: Examples include **C, Java, and Python**. These languages are easier to read and write because they use commands that resemble natural language.

C++: A Middle-Level Programming Language

C++ is considered a High-Level Programming Language, but it also includes some Low-Level features, making it a Hybrid (Middle-Level) Language.

Why?

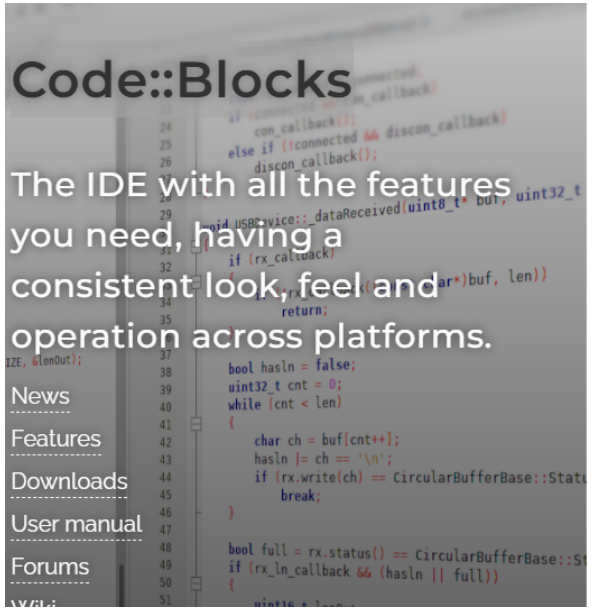
✅ **High-Level**: It supports **Object-Oriented Programming (OOP)**, provides built-in libraries, and is closer to natural language.

✅ **Low-Level**: It allows **direct memory manipulation**, such as using **pointers** and manual memory management.

C++ / Code::Blocks

Step 1 ➔Install Code::Blocks :

1- Open this link (https://www.codeblocks.org/downloads/)



Downloads

There are different ways to download and install Code::Blocks on your computer:

- **Download the binary release**

  This is the easy way for installing Code::Blocks. Download the setup file, run it on yc Code::Blocks will be installed, ready for you to work with it. Can't get any easier than th

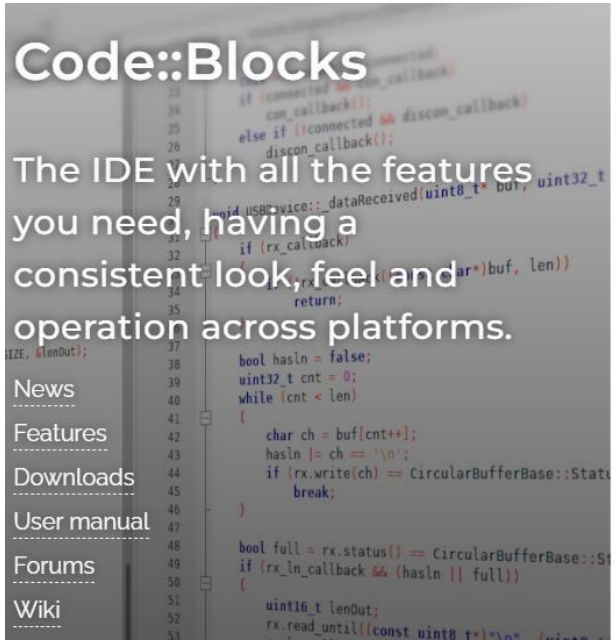
  - **Download a nightly build**

    There are also more recent so-called nightly builds available in the **forums**. Ple consider nightly builds to be stable, usually, unless stated otherwise.

  - Other distributions usually follow provided by the community (big "Thank you want to provide some, make sure to announce in the forums such that we can p C::B homepage

C++ / Code::Blocks

2- select windows XP



Binary releases

Please select a setup package depending on your platform:

- Windows XP / Vista / 7 / 8.x / 10
- Linux 32 and 64 bit
- Mac OS X

NOTE: For older OS'es use older releases. There are releases for many OS version and platforr Sourceforge.net page.

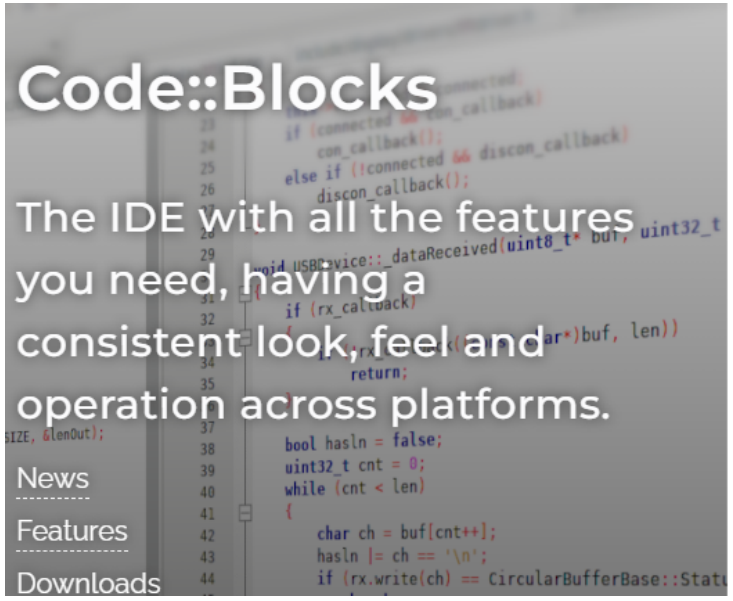
NOTE: There are also more recent nightly builds available in the forums or (for Ubuntu users) in th PPA repository. Please note that we consider nightly builds to be stable, usually.

NOTE: We have a Changelog for 20.03, that gives you an overview over the enhancements and fixe put in the new release.

NOTE: The default builds are 64 bit (starting with release 20.03). We also provide 32bit

C++ / Code::Blocks

3- select FossHUP Website to download this program.

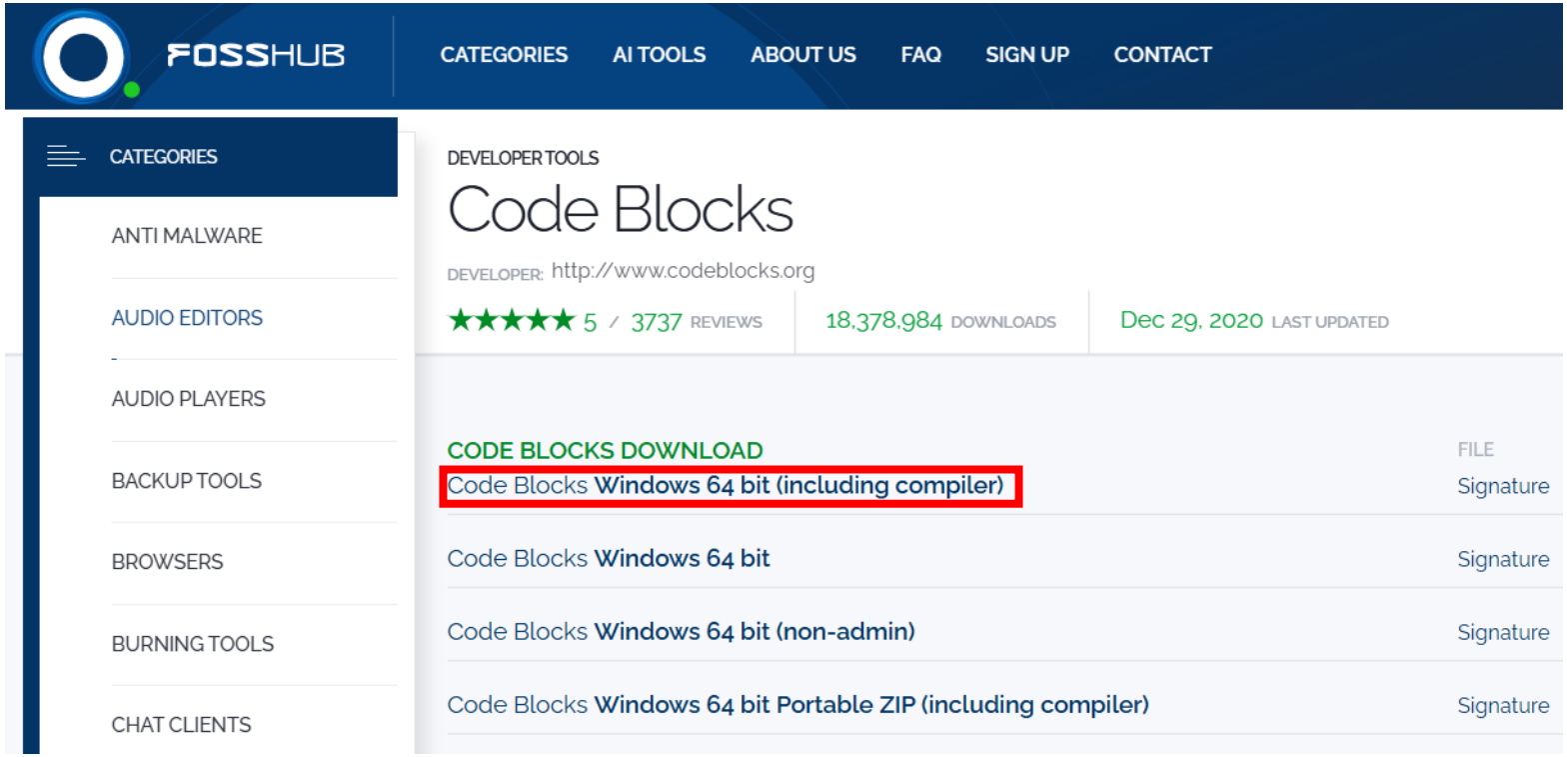


File	Download from
codeblocks-20.03-setup.exe	FossHUB or Sourceforge.net
codeblocks-20.03-setup-nonadmin.exe	FossHUB or Sourceforge.net
codeblocks-20.03-nosetup.zip	FossHUB or Sourceforge.net
codeblocks-20.03mingw-setup.exe	FossHUB or Sourceforge.net
codeblocks-20.03mingw-nosetup.zip	FossHUB or Sourceforge.net
codeblocks-20.03-32bit-setup.exe	FossHUB or Sourceforge.net
codeblocks-20.03-32bit-setup-nonadmin.exe	FossHUB or Sourceforge.net
codeblocks-20.03-32bit-nosetup.zip	FossHUB or Sourceforge.net
codeblocks-20.03mingw-32bit-setup.exe	FossHUB or Sourceforge.net
codeblocks-20.03mingw-32bit-nosetup.zip	FossHUB or Sourceforge.net

NOTE: The codeblocks-20.03-setup.exe file includes Code::Blocks with all plugins.

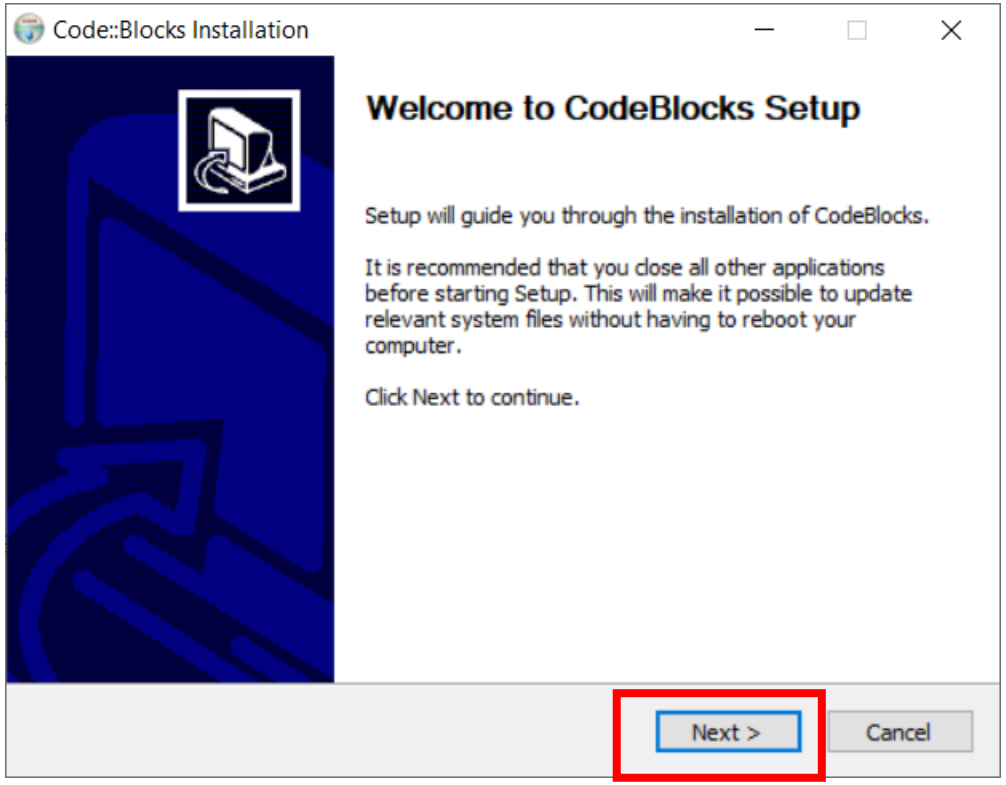
C++ / Code::Blocks

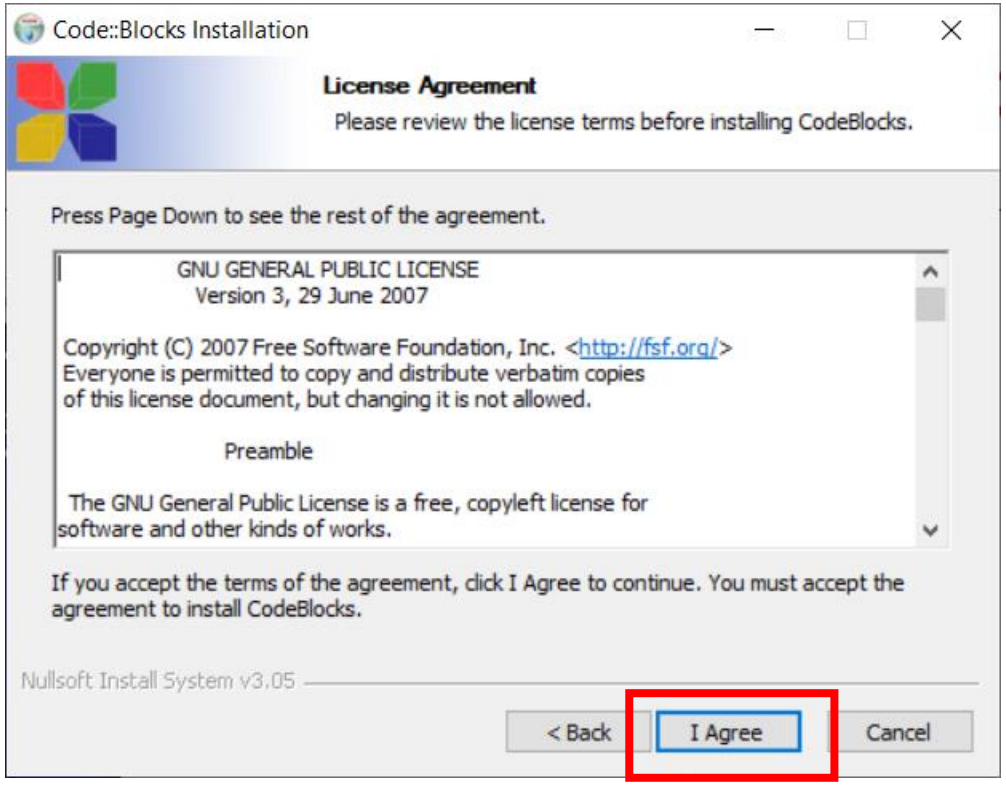
4- select the appropriate version for your device



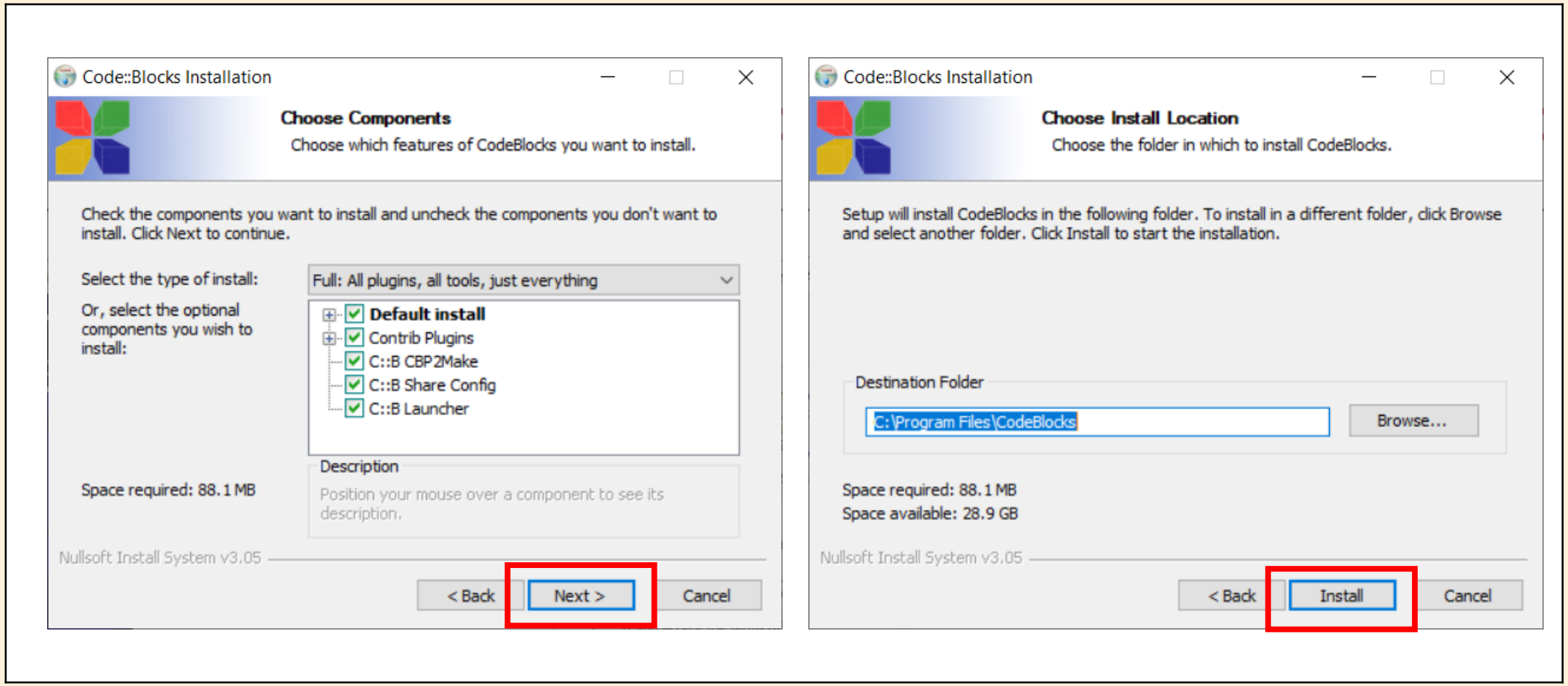
C++ / Code::Blocks

5- Set up code::blocks program



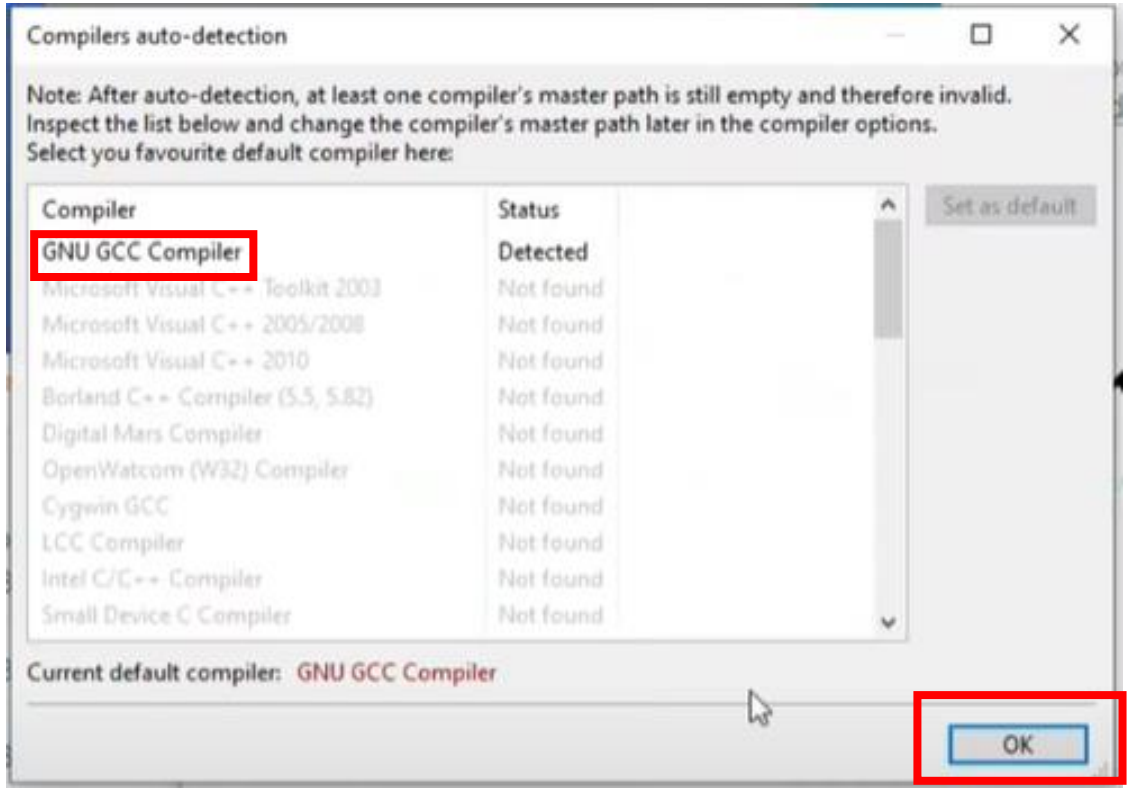


C++ / Code::Blocks



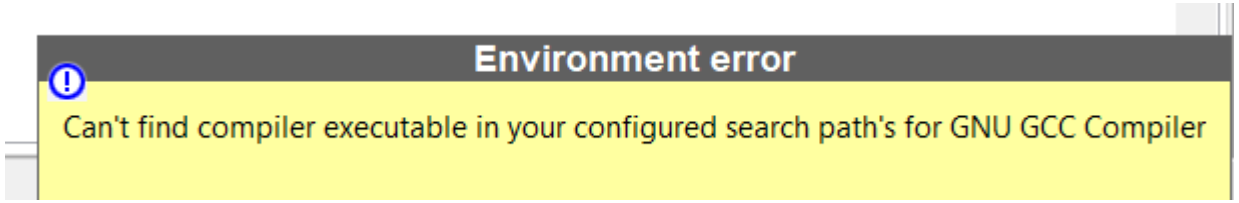
C++ / Code::Blocks

6- select the compiler so that I can write C++ code

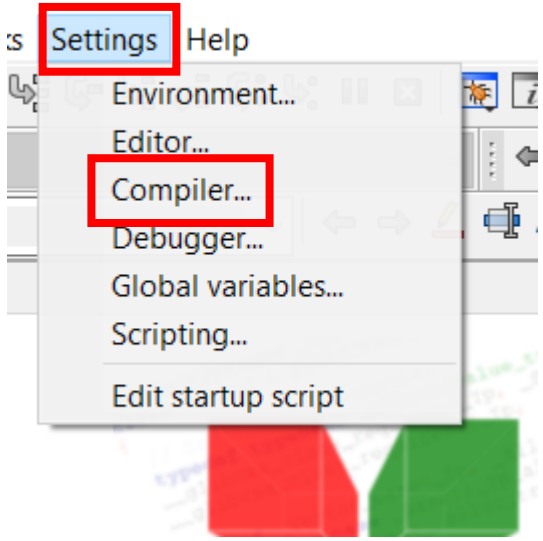


C++ / Code::Blocks

7- If the compiler is not available, the following steps must be followed:



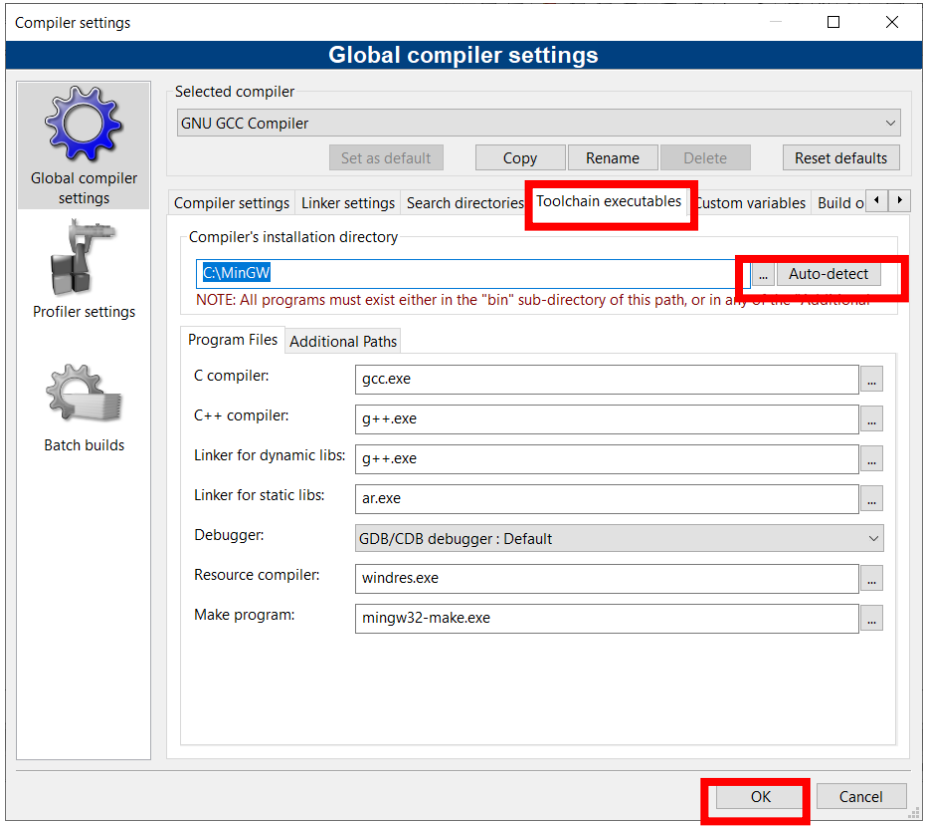
Step 1:



C++ / Code::Blocks

7- If the compiler is not available, the following steps must be followed:

Step 2:

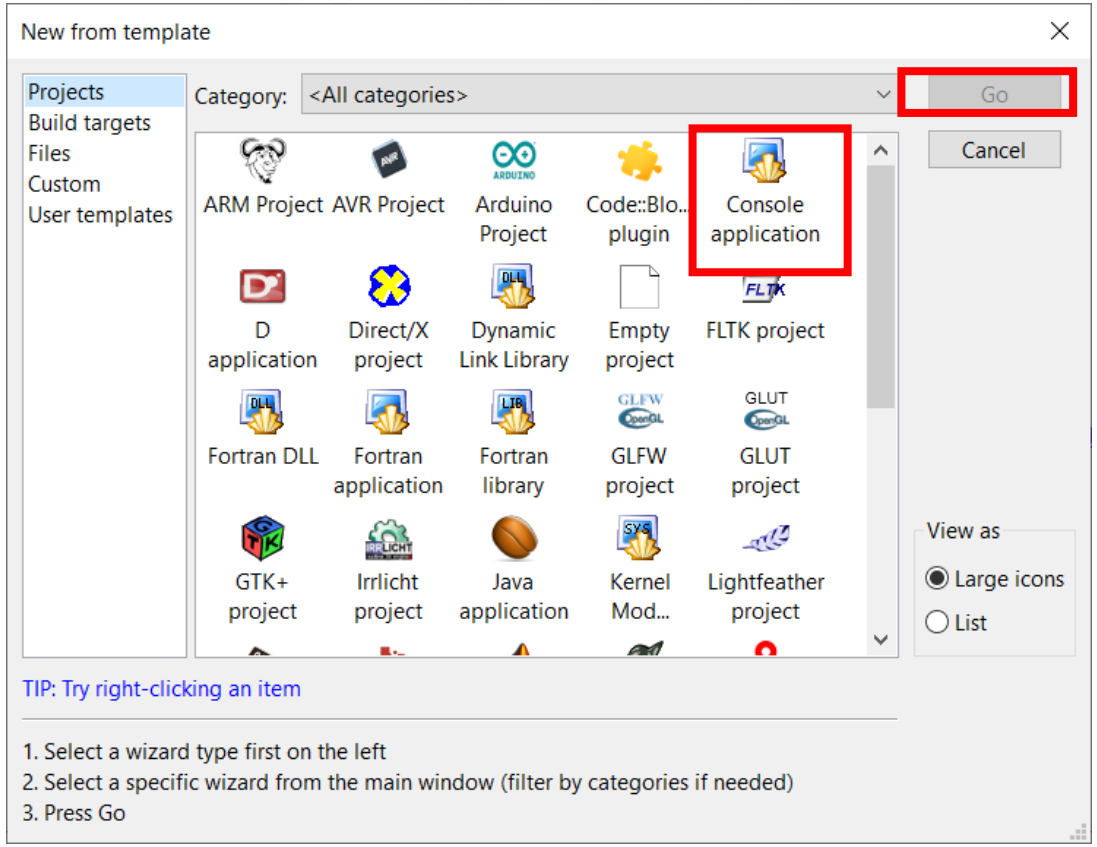


select Auto detect or find this path

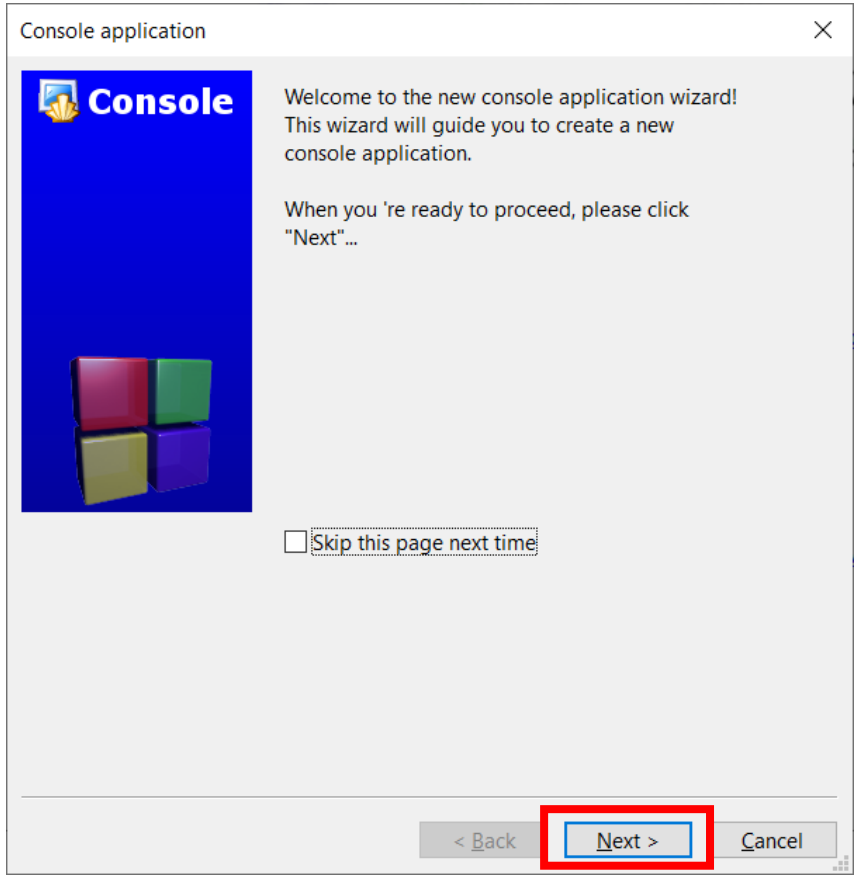
Find Path : C:\Program Files\CodeBlocks\MinGW

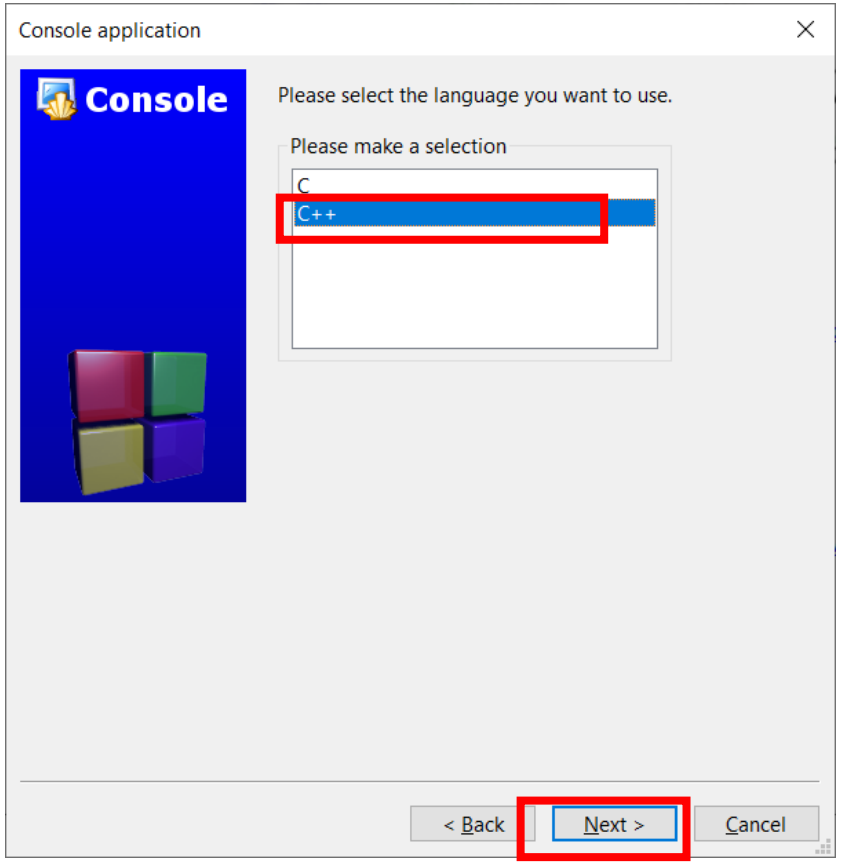
Create a new c++ project

1- File
2- New
3- Project
4- We choose the project we need, whether it is empty or not. (Console application)

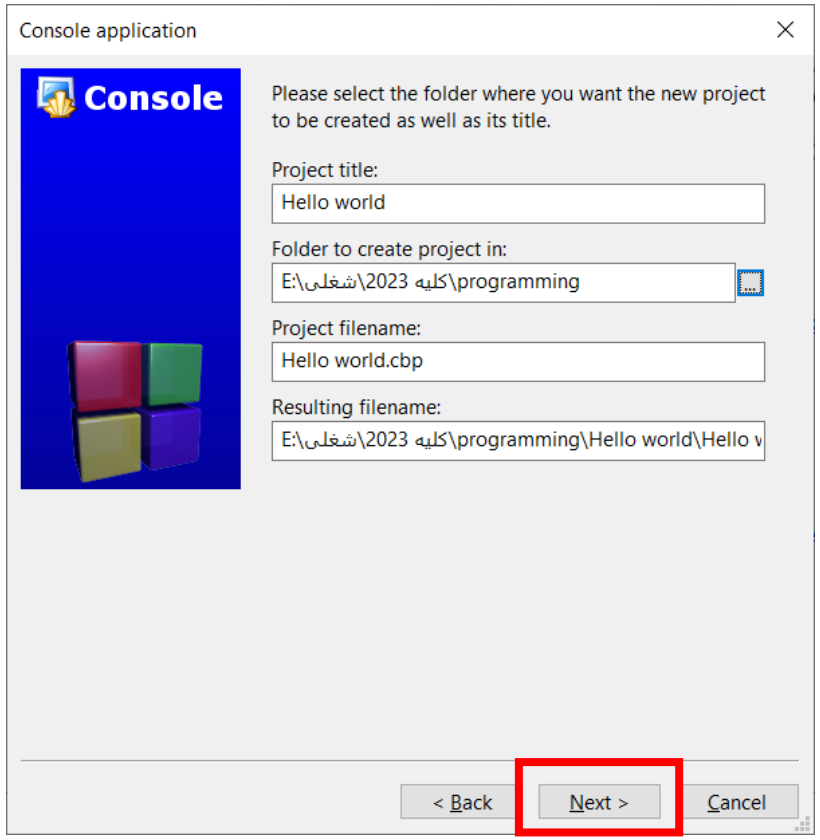


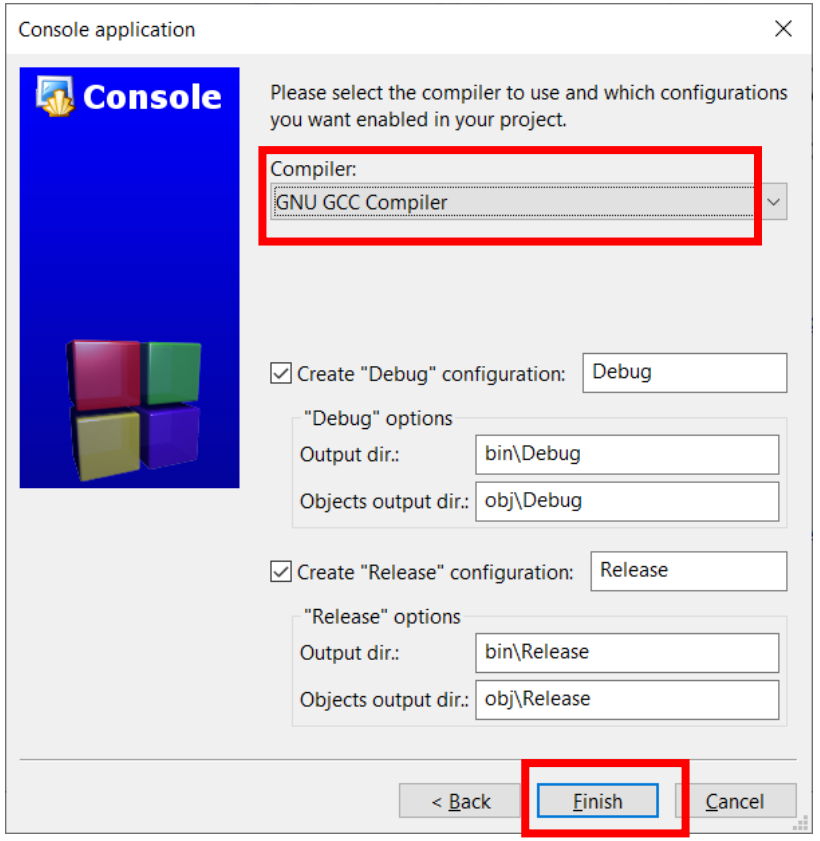
Create a new c++ project



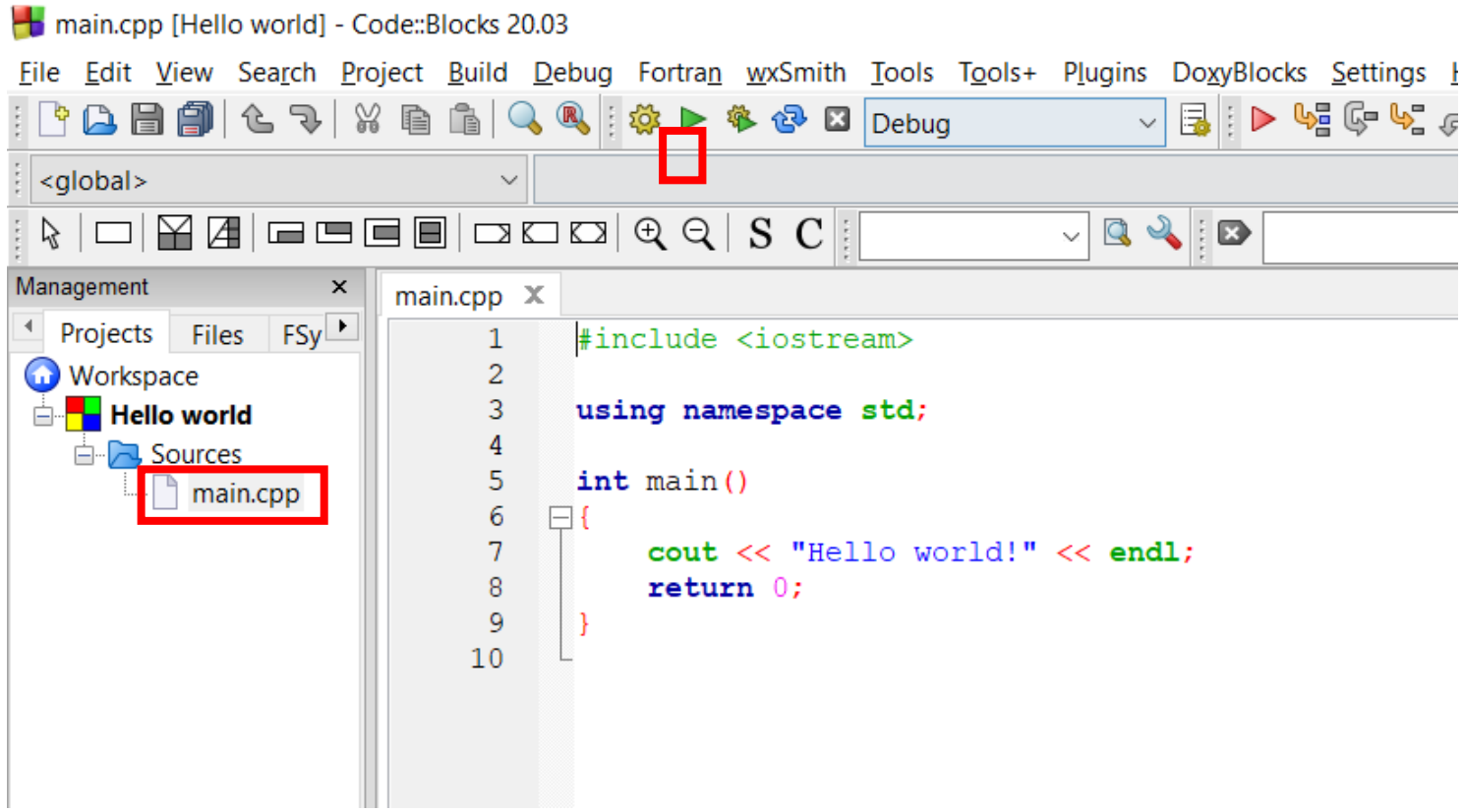


Create a new c++ project

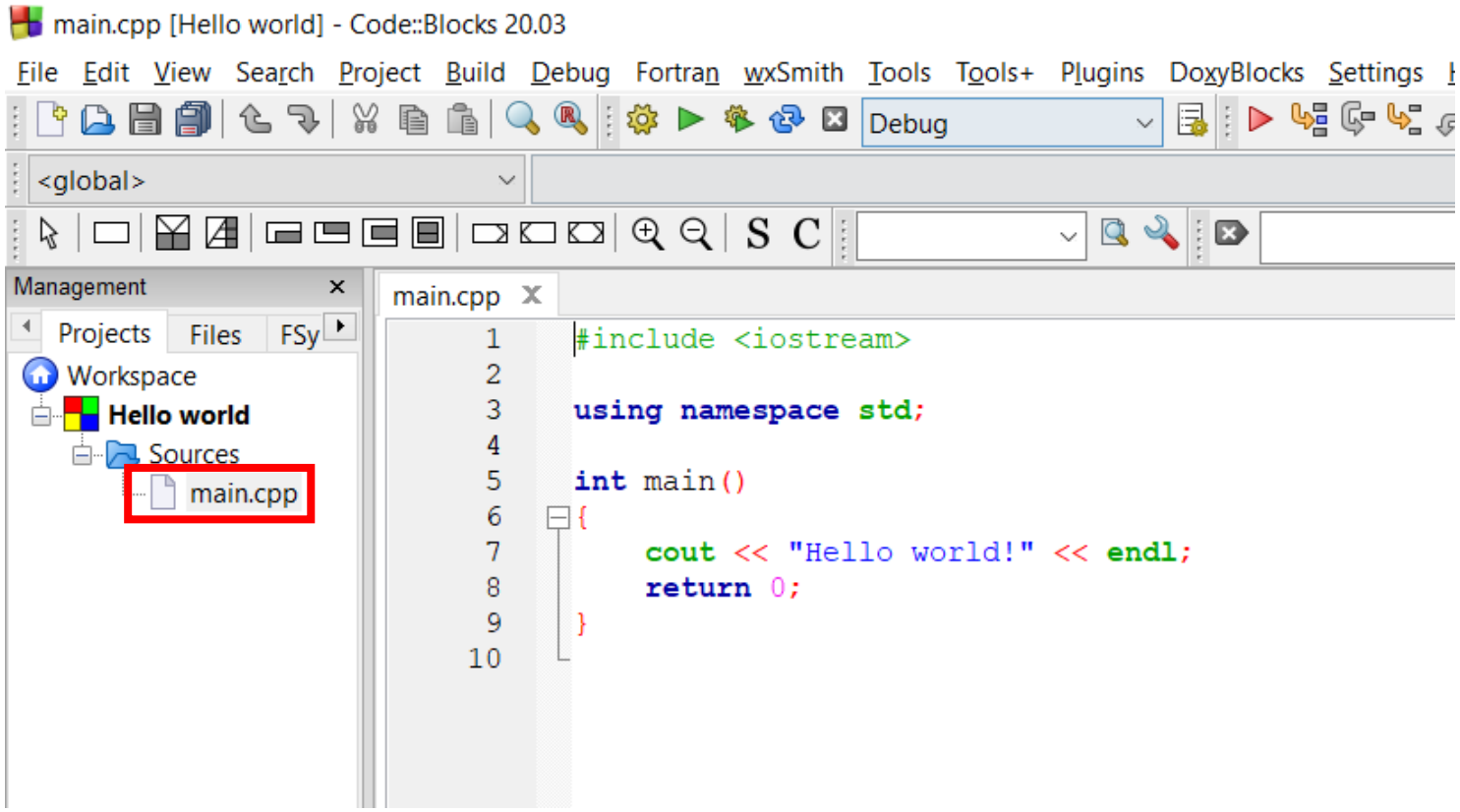




Create a new c++ project



Create a new C++ project



cout

- **cout** is defined in <iostream> header file.
- **cout** is used to output something to the user.
- General form:

```
cout << varName;
```

or

```
cout << "Some String";
```

- General form to display multiple outputs :

```
cout << var1 << "Some String" << var2 << endl;
```

cin

- **cin** is defined in <iostream> header file.
- **cin** is used to accept the input from the user
- General form to accept single input :

```
cin >> varName;
```

- General form to accept multiple inputs:

```
cin >> var1 >> var2 >> … >> varN;
```

Comments

- Comments are for the reader, not the compiler
- Two types:
  - Single line

```
// This is a C++ program. It prints the sentence:
// Welcome to C++ Programming.
```

  - Multiple line

```
/*
You can include comments that can
occupy several lines.
*/
```

Read two integer numbers from the user then print their sum and average.

```
#include<iostream>
using namespace std;
void main()
{
int num1, num2;
cout << "Enter two numbers: ";
cin >> num1 >> num2;
cout << "sum of 2 numbers = " << num1 + num2<<endl;
cout << "average of 2 numbers = " << (num1 + num2)/2 << endl;
system("Pause");
}
```

Read two integer numbers from the user then print their sum and average. (another solution)

```cpp
#include <iostream>

using namespace std;

int main()
{
    int x,y,z ;
    cout << "Enter your first number" << endl;
    cin >> x;

    cout << "Enter your second number" << endl;
    cin >> y;

    z=x+y;
    cout <<"sum of 2 numbers = " << x << "+" << y << "=" << z <<endl;
    // or cout <<"sum of 2 numbers = " << x + y <<endl;
     cout <<"average of 2 numbers  = " << (x+y)/2  ;


     return 0;
}
```

Backslash codes

Code	Meaning
\b	Backspace
\r	Carriage return
\n	New line
\t	Horizontal tab
\a	Alert
\"	Double quotes
\'	Single quote
\\	Backslash
\x	Hexadecimal
\	Octal

Read a positive integer from the user and print its square

```
#include<iostream>
#include<math.h>
using namespace std;
void main()
{
int num;
cout << "Enter number : ";
cin >> num;
cout << "Power = " << num *num <<endl;
cout << "Power using Pow function " << pow(num, 2)<<endl;
system("Pause");
}
```

Function (Structure)

```
#include<iostream>
using namespace std;
int sum(int a, int b)
{
int z = a + b;
cout << "sum of "<<a<<" and "<<b<<"=" << z<<endl;
return 0;
}
int main()
{
sum(3, 4);
sum(5, 6);
int x, y;
cout << "enter 2 numbers: "<<endl;
cin >> x >> y;
sum(x, y);
system("Pause");
return 0;
}
```

ASCII Table

Dec	Hex	Oct	Char	Dec	Hex	Oct	Char	Dec	Hex	Oct	Char	Dec	Hex	Oct	Char
0	0	0		32	20	40	[space]	64	40	100	@	96	60	140	`
1	1	1		33	21	41	!	65	41	101	A	97	61	141	a
2	2	2		34	22	42	"	66	42	102	B	98	62	142	b
3	3	3		35	23	43	#	67	43	103	C	99	63	143	c
4	4	4		36	24	44	$	68	44	104	D	100	64	144	d
5	5	5		37	25	45	%	69	45	105	E	101	65	145	e
6	6	6		38	26	46	&	70	46	106	F	102	66	146	f
7	7	7		39	27	47	'	71	47	107	G	103	67	147	g
8	8	10		40	28	50	(	72	48	110	H	104	68	150	h
9	9	11		41	29	51	)	73	49	111	I	105	69	151	i
10	A	12		42	2A	52	*	74	4A	112	J	106	6A	152	j
11	B	13		43	2B	53	+	75	4B	113	K	107	6B	153	k
12	C	14		44	2C	54	,	76	4C	114	L	108	6C	154	l
13	D	15		45	2D	55	-	77	4D	115	M	109	6D	155	m
14	E	16		46	2E	56	.	78	4E	116	N	110	6E	156	n
15	F	17		47	2F	57	/	79	4F	117	O	111	6F	157	o
16	10	20		48	30	60	0	80	50	120	P	112	70	160	p
17	11	21		49	31	61	1	81	51	121	Q	113	71	161	q
18	12	22		50	32	62	2	82	52	122	R	114	72	162	r
19	13	23		51	33	63	3	83	53	123	S	115	73	163	s
20	14	24		52	34	64	4	84	54	124	T	116	74	164	t
21	15	25		53	35	65	5	85	55	125	U	117	75	165	u
22	16	26		54	36	66	6	86	56	126	V	118	76	166	v
23	17	27		55	37	67	7	87	57	127	W	119	77	167	w
24	18	30		56	38	70	8	88	58	130	X	120	78	170	x
25	19	31		57	39	71	9	89	59	131	Y	121	79	171	y
26	1A	32		58	3A	72	:	90	5A	132	Z	122	7A	172	z
27	1B	33		59	3B	73	;	91	5B	133	[	123	7B	173	{
28	1C	34		60	3C	74	<	92	5C	134	\	124	7C	174	|
29	1D	35		61	3D	75	=	93	5D	135	]	125	7D	175	}
30	1E	36		62	3E	76	>	94	5E	136	^	126	7E	176	~
31	1F	37		63	3F	77	?	95	5F	137	_	127	7F	177	

Do you have any questions ?

Thank you

piece of advice

Aim for the impossible and don’t stop until you’ve made it possible