Jiangxi University of Science and Technology

Ch01 Introduction to Computer Programming

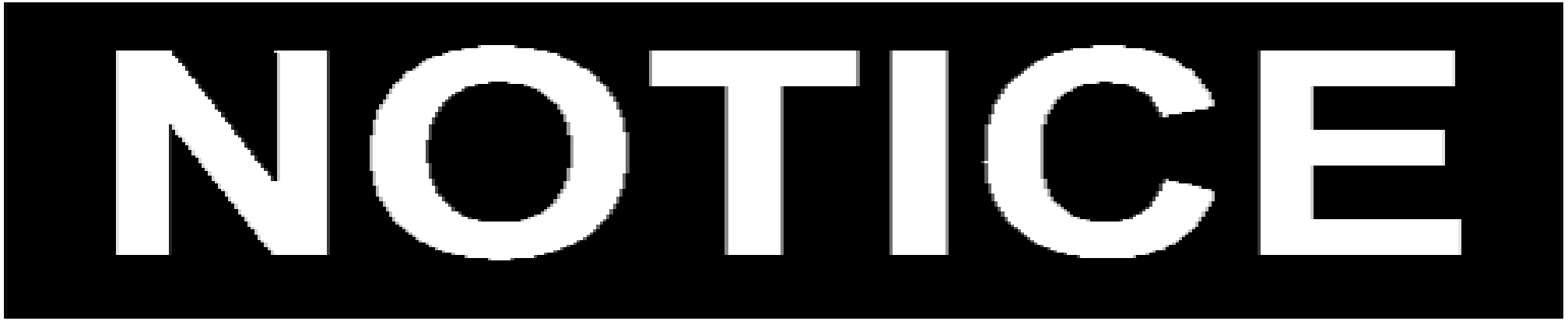
How to install Turbo C++: Compile and Run a C Program

Code::Blocks Tutorial

Today Agenda

THE C PROGRAMMING LANGUAGE

- Compilers & IDEs
- Turbo C compiler
- Test one example
- Data type and Arithmetic Operations



- Along with this PPT there is clip please watch that clip carefully

Types of Translator

THE C PROGRAMMING LANGUAGE

There are 3 types of translator:

Compiler

Converts the whole code into one file (often a .exe file).
The file can then be run on any computer without the translator needing to be present.
Can take a long time to compile source code as the translator will often have to convert the instructions into various sets of machine code as different CPUs will understand instructions with different machine code from one another.

Interpreter

Converts the source code into machine code 1 line at a time.
Program therefore runs very slowly.
Main reason why an interpreter is used is at the testing / development stage.
Programmers can quickly identify errors and fix them.
The translator must be present on the computer for the program is to be run

Assembler

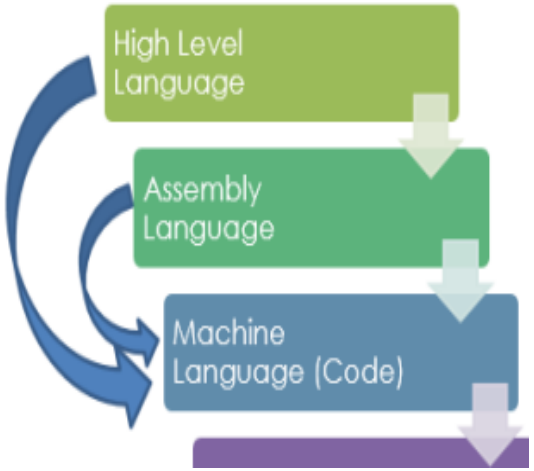
This type of translator is used for Assembly Language (not High Level Languages).

It converts mnemonic assembly language instructions into machine code.

Translators

Compilers
Interpreters

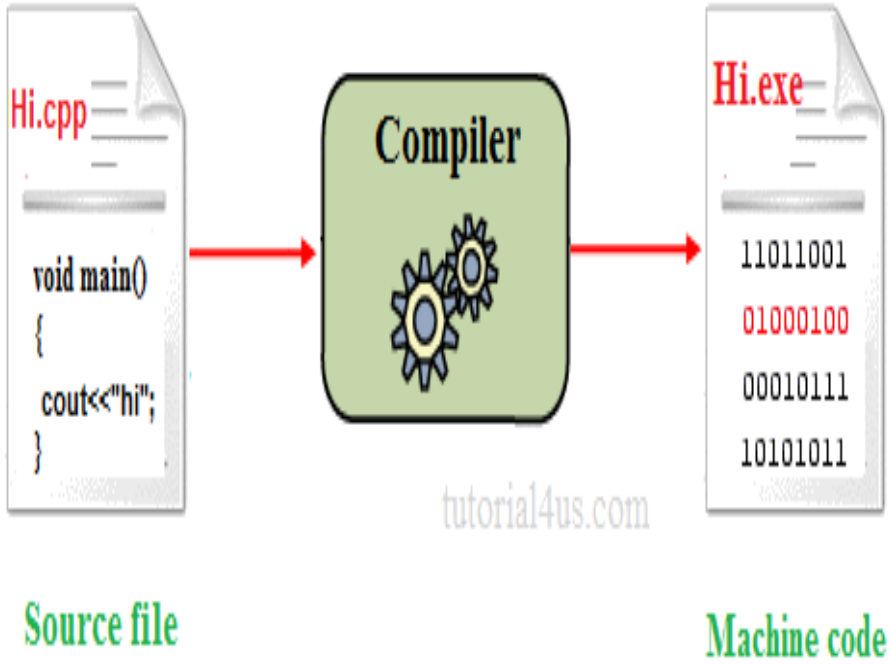
Assemblers



C Compilers & IDEs

THE C PROGRAMMING LANGUAGE

- First thing you need to understand is that computer (Machine) can only understand Machine language (Stream of 0s and 1s).
- In order to convert your C program source code to Machine code, you need to compile it. Compiler is the one, which converts source code to Machine code. In simple words you can say that a compiler converts human readable code to a machine readable format



Difference between an IDE and Compiler

THE C PROGRAMMING LANGUAGE

IDE – Integrated Development Environment

So what is an IDE?

an IDE is the software that helps you write your code, provide code completion, code suggestions and those other neat stuff. Yep that's what you call an IDE.

Compiler

It too is a software or program. But it doesn't do the neat stuff that the IDE does but it is very important. Without it your IDE won't be able to produce the runnable programs from the source codes you write. What a compiler does is it takes the source code that you write and converts it to machine code or some other low-level language (such as assembly code). If you want a formal definition:

From wikipedia:

The name "compiler" is primarily used for programs that translate source code from a high-level programming language to a lower level language (e.g., assembly language or machine code). The most common reason for wanting to transform source code is to create an executable program.

Short answer: a compiler is a part of an Integrated Development Environment (IDE) more specifically the program that takes the source code, written for some programming language, and creates the run-time. Years ago it was machine code directly executed by hardware, now it could also mean some intermediate byte-code (for languages working in a virtual machine like Java family), or even source code itself for script like languages (python, perl, ruby, etc.) byte-code will be generated on first run.

IDEs and Famous IDEs

- Integrated Development Environment
- They have all the tools integrated
  - Editor
  - Compiler
  - Debugger
  - [Publisher]
  - [Documentaries]

Famous IDEs

- Microsoft Visual Studio 2005
- Dev-Cpp 5
- Emacs/Vim + gcc + gdb
- Eclipse IDE 3.2
- Borland Turbo C / C++ Builder
- Metrowerks CodeWarrior \
- KDeveloper

Famous Compiler + Debugger

THE C PROGRAMMING LANGUAGE

- Microsoft C/C++ compiler [cl.exe]
  - Old microsoft QuickC + Microsoft C/C++
- GNU GCC – G++ Compiler | gdb 3.2 , 4.0 [Win,Linux,Unix,Solaris]
- Intel C/C++ compiler [Win,Linux]
- Borland TurboC / C Compiler 5.6.4 [Windows] + Kylix 3.0 [Linux]
- Watcom C, Open Watcom
- Apple GCC 3.3, 4.0 on Mac OS X.
- HP C++ for Tru64 UNIX 7.1.
- Metrowerks CodeWarrior 9.5 [OS X, Windows]

Turbo C : Step by Step Guide

THE C PROGRAMMING LANGUAGE

- Made by Borland
- Small & Easy but inefficient
- For DOS, altough it runs under windows too.
- The borland company was bought by Microsoft, nowadays a new version of C++Builder has been released.

Install Turbo C : Step by Step Guide

THE C PROGRAMMING LANGUAGE

Step 1:

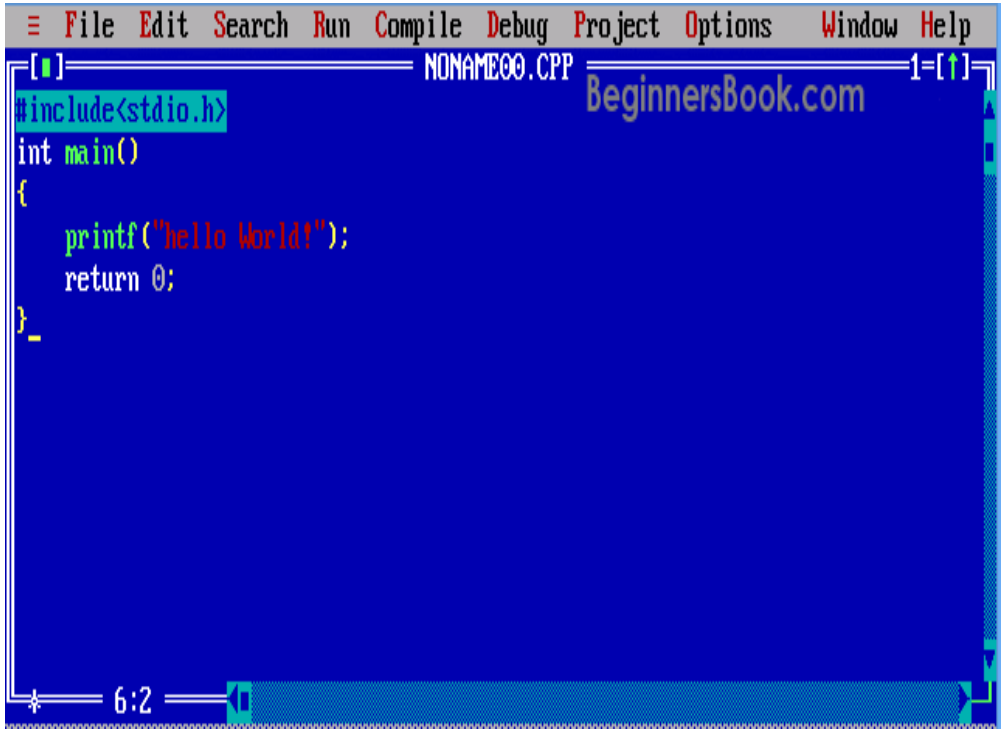
Locate the TC.exe file and open it.

You will find it at location **C:\TC\BIN\.**

Step 2:

File > New (as shown in above picture) and then write your C program

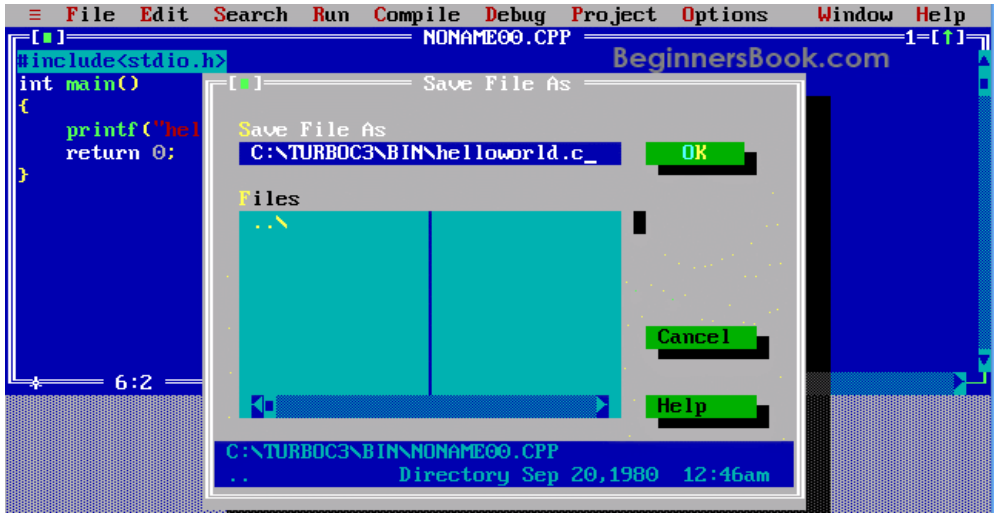
```c
#include<stdio.h>
int main()
{
    printf("hello World!");
    return 0;
}
```



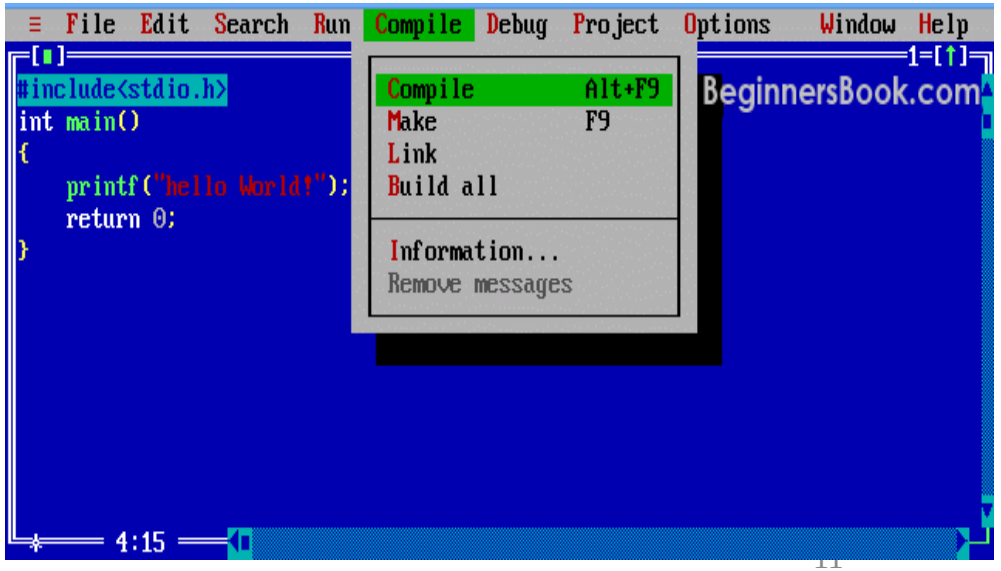
Install Turbo C : Step by Step Guide

THE C PROGRAMMING LANGUAGE

Step 3:
Save the program using F2 (OR file > Save), remember the extension should be ".c".



Step 4:
Compile the program using Alt + F9 **OR** Compile > Compile (as shown in the below screenshot).

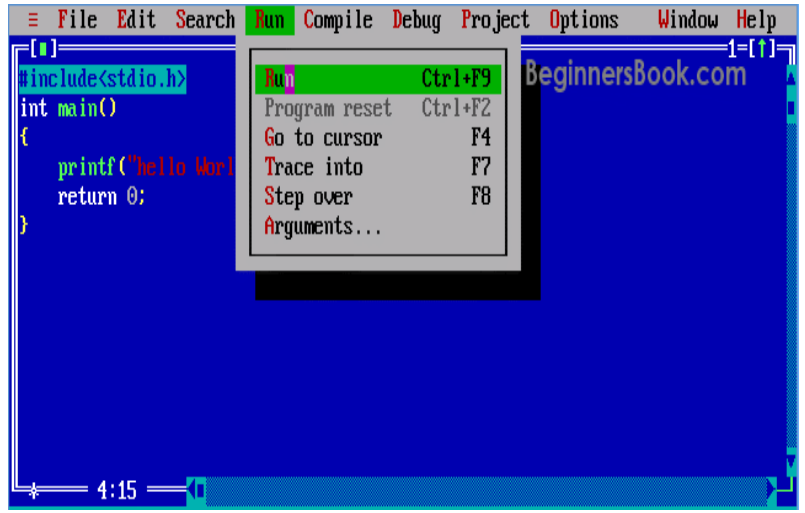


Install Turbo C : Step by Step Guide

THE C PROGRAMMING LANGUAGE

- **Step 5**:

Press Ctrl + F9 to Run (or select Run > Run in menu bar) the C program



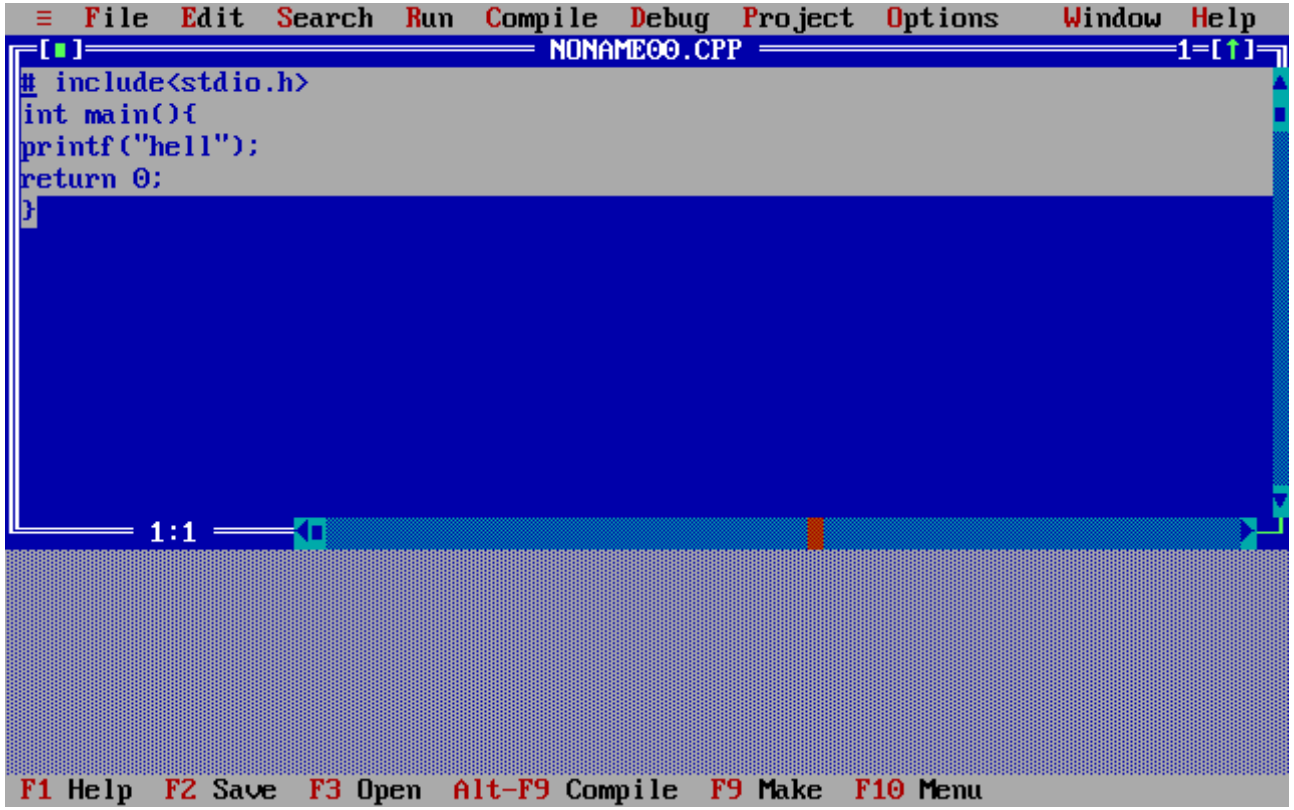
Step 6:

Alt+F5 to view the output of the program at the output screen.

NOW Let us try this code

THE C PROGRAMMING LANGUAGE

```
# include<stdio.h>
int main()
{
        printf ("HI JIAXNI…..");
        return 0;
}
```



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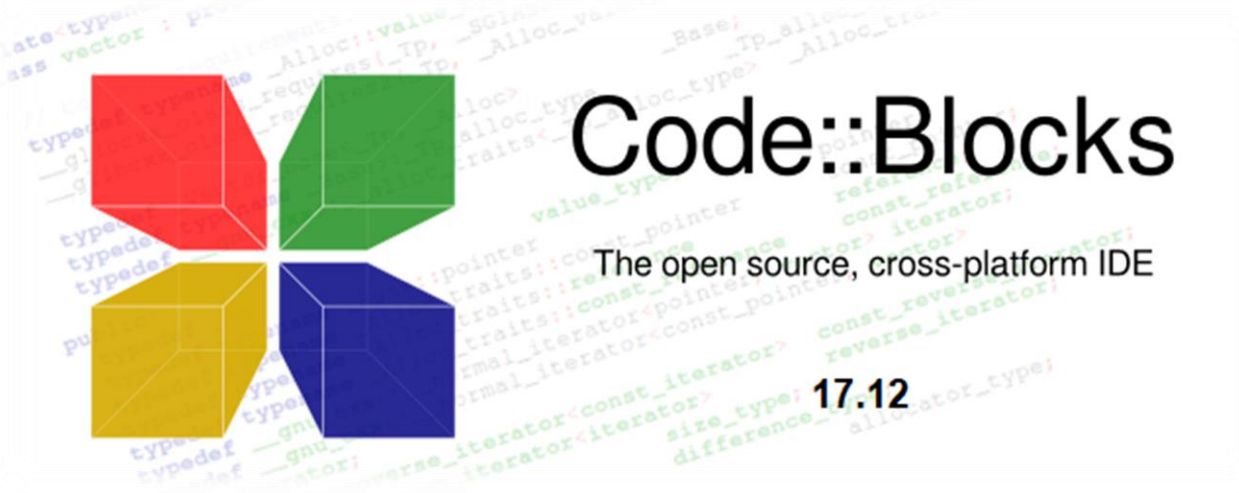
Code::Blocks Tutorial

Introduction



What is Code::Blocks

- Code::Blocks is a cross-platform IDE (Integrated Development Environment) for programming in C and C++.
- It’s an Open-Source IDE which has been around over 10 years and has been crowd-sourced by an open community and brought to its original face which is today.
- It is compiled with TDM GCC 5.12 (for the 17.12 latest version)
- It’s a great beginner’s toolkit to learning programming.

Installing Code::Blocks

THE C PROGRAMMING LANGUAGE

- Install code-blocks from http://www.codeblocks.org/downloads/26
- Install any version you like but be sure to choose the MINGW version unless you are already an expert person like me :P
- After installing on first screen associate every file possible to code::blocks when it asks you.
- Snoop around a bit to get yourself familiar of the software

Download binary

Not secure | www.codeblocks.org/downloads/26

Paused

Code::Blocks

Code::Blocks - The IDE with all the features you need, having a consistent look, feel and operation across platforms.

Home | Features | Downloads | Forums | Wiki

Main

- Home
- Features
- Screenshots
- Downloads
  - Binaries
  - Source
  - SVN
- Plugins
- User manual
- Licensing
- Donations

Quick links

- FAQ
- Wiki
- Forums
- Forums (mobile)
- Nightlies
- Ticket System
- Browse SVN
- Browse SVN

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 platforms on the **Sourceforge.net** page.

NOTE: There are also more recent *nightly builds* available in the **forums** or (for Debian and Fedora users) in **Jens' Debian repository** and **Jens' Fedora repository**. Please note that we consider nightly builds to be *stable*, usually.

NOTE: We have a **Changelog for 17.12**, that gives you an overview over the enhancements and fixes we have put in the new release.

Windows XP / Vista / 7 / 8.x / 10:

File	Date	Download from
codeblocks-17.12-setup.exe	30 Dec 2017	Sourceforge.net
codeblocks-17.12-setup-nonadmin.exe	30 Dec 2017	Sourceforge.net
codeblocks-17.12-nosetup.zip	30 Dec 2017	Sourceforge.net
codeblocks-17.12mingw-setup.exe	30 Dec 2017	Sourceforge.net

FA 2:38 PM 10/28/2018

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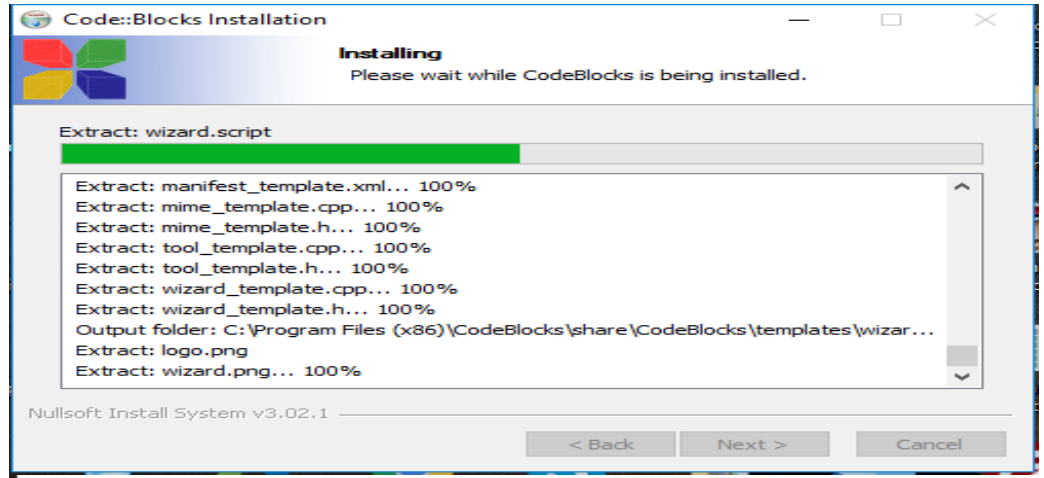

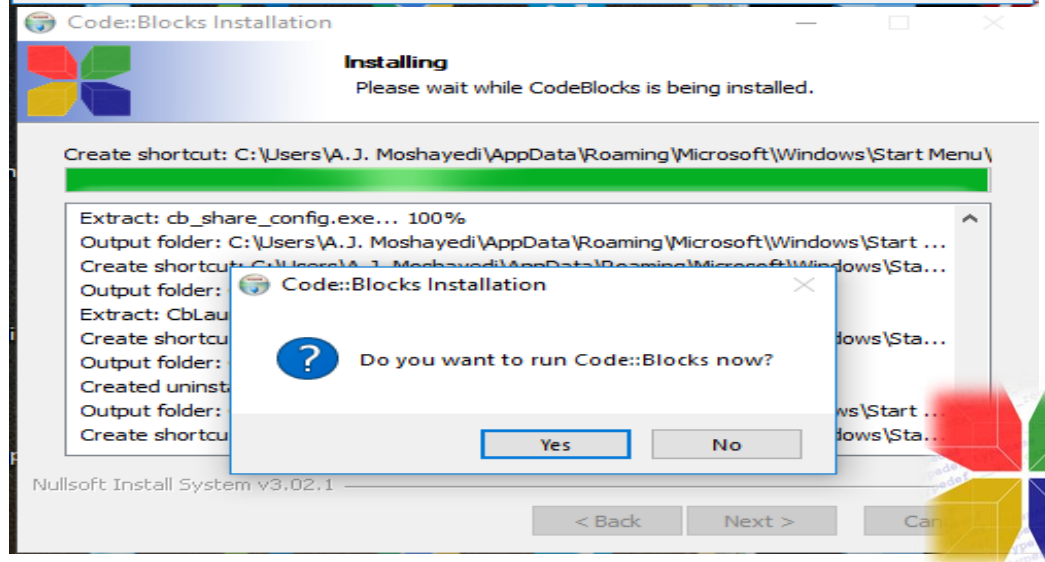

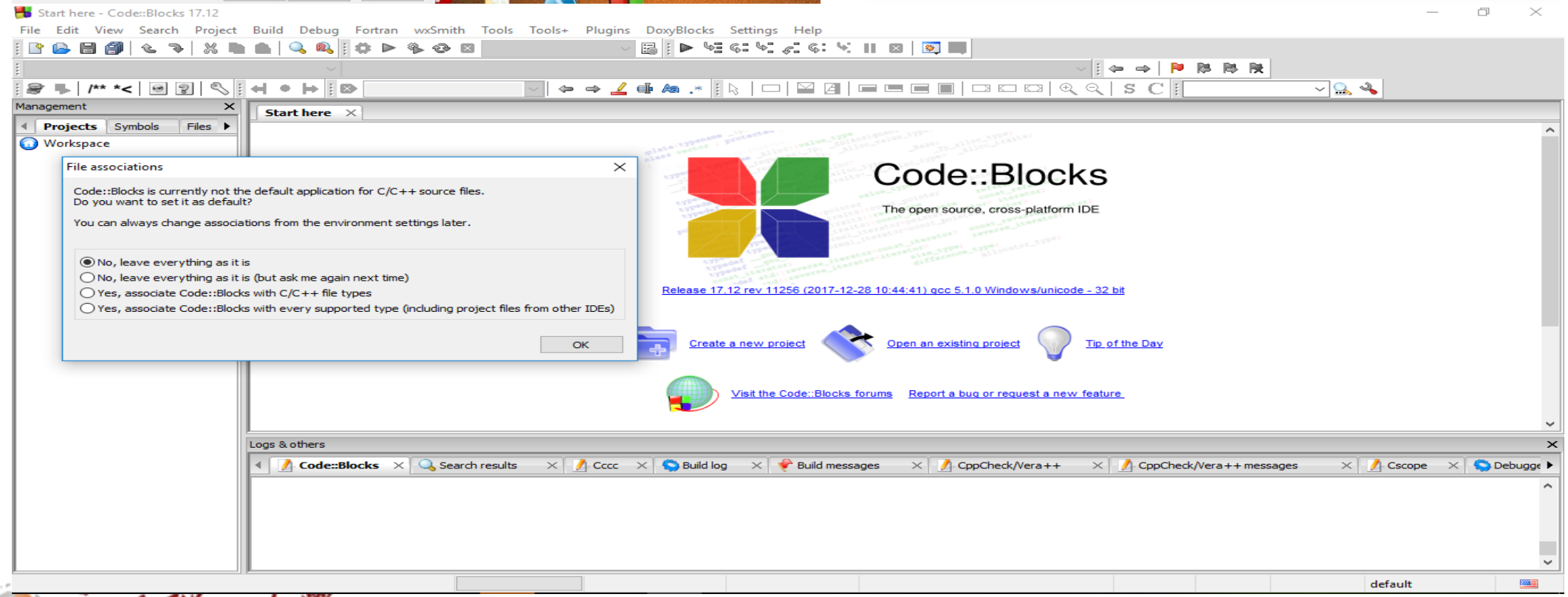

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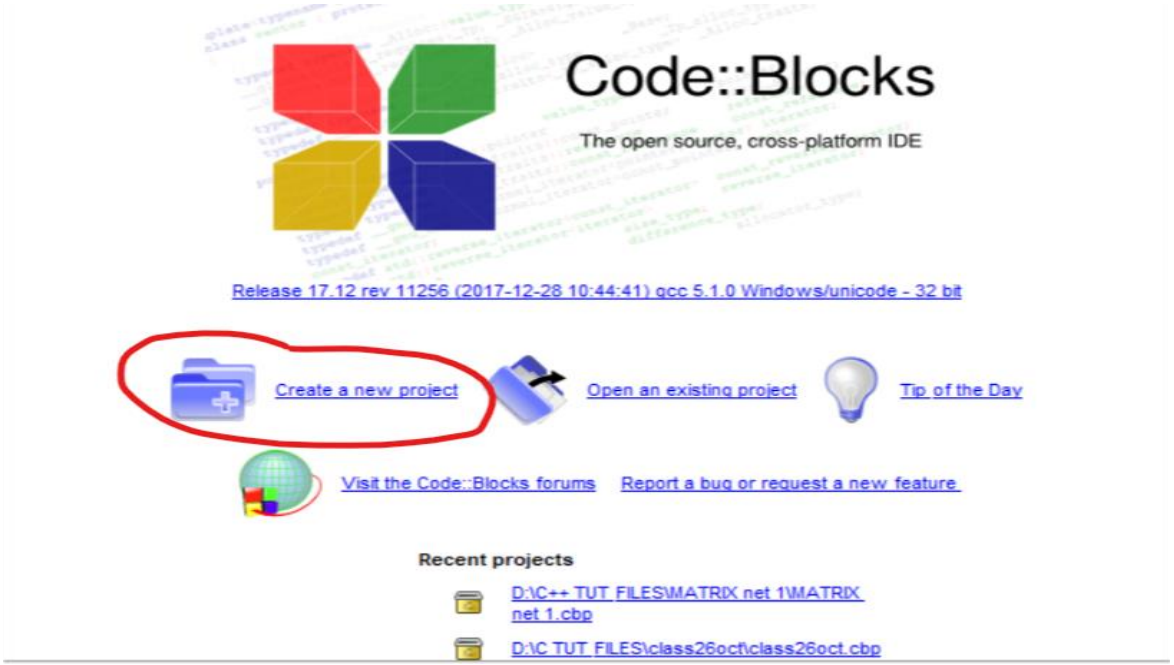
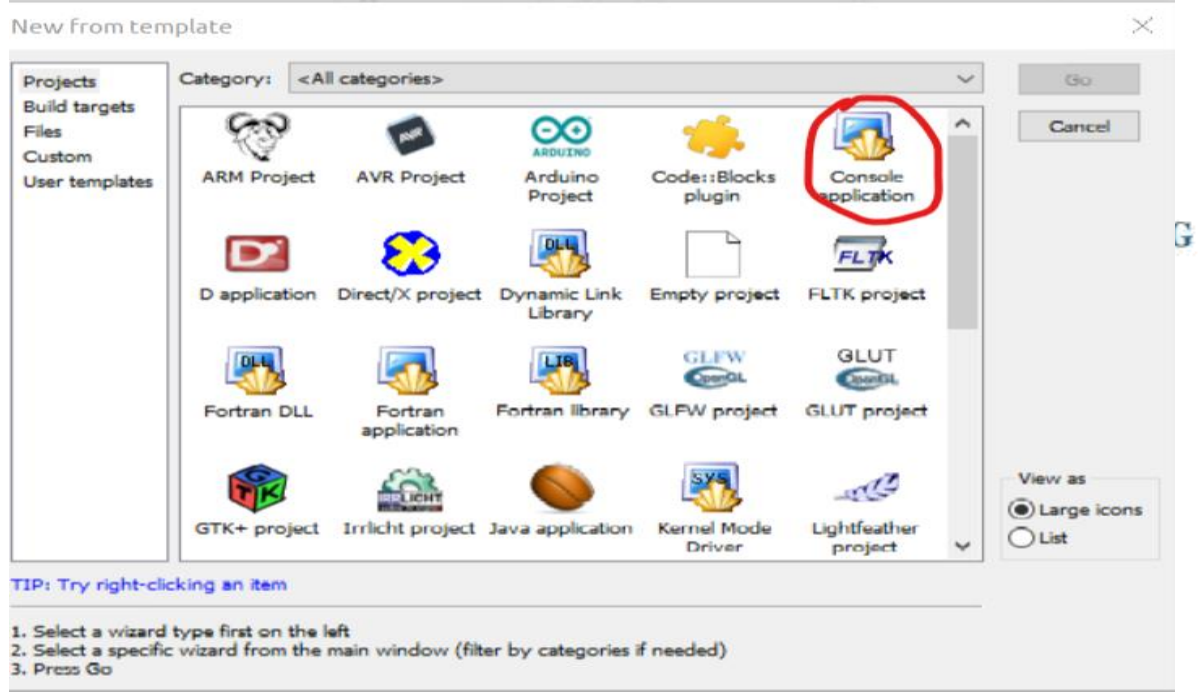
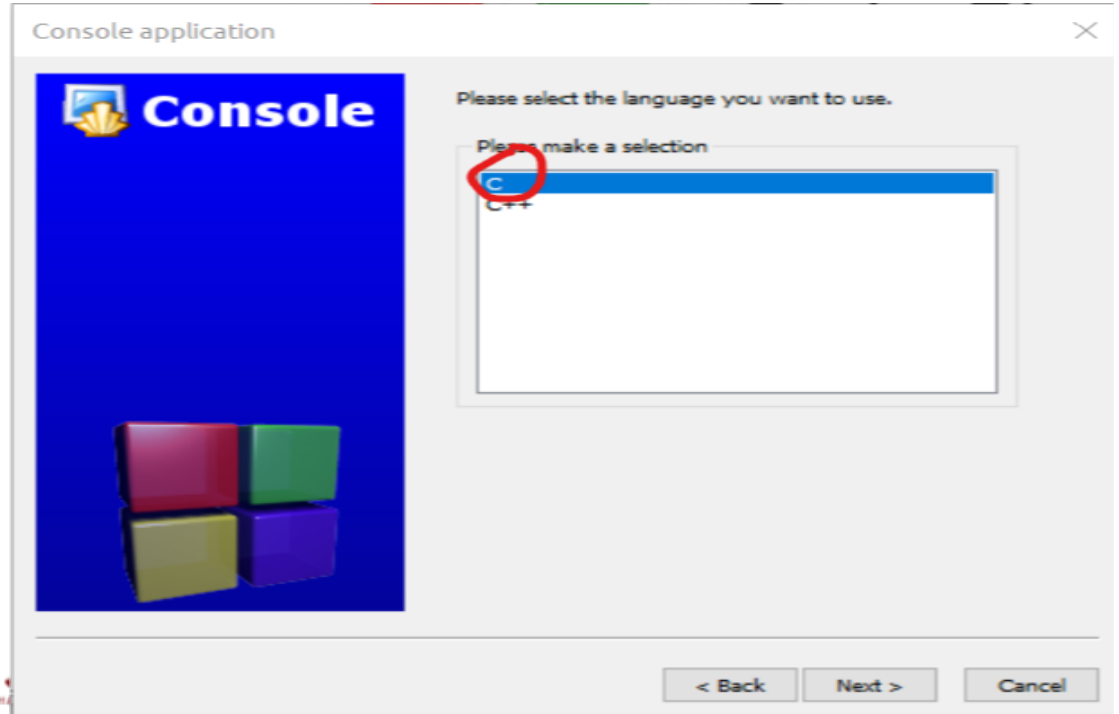
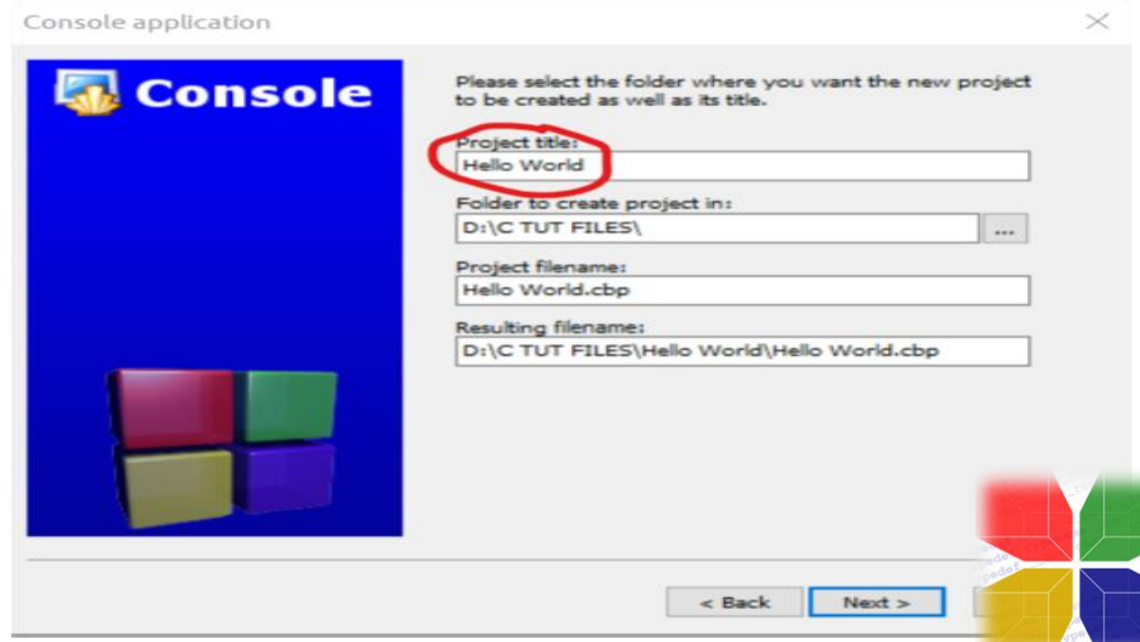
Creating first project

- Click -> Create new Project and select CONSOLE APPLICATION.
- Choose C language
- Put the name of your project and finish
- FOLLOW THE IMAGE NEXT PAGE to Know in Detail


Code::Blocks
The open source, cross-platform IDE
Release 17.12 rev 11256 (2017-12-28 10:44:41) gcc 5.1.0 Windows/unicode - 32 bit
Create a new project
Open an existing project
Tip of the Day
Visit the Code::Blocks forums
Report a bug or request a new feature
Recent projects
D:\C++ TUT FILES\MATRIX net 1\MATRIX net 1.cbp
D:\C TUT FILES\class26oct\class26oct.cbp


New from template
Projects
Build targets
Files
Custom
User templates
Category:
<All categories>
ARM Project
AVR Project
Arduino Project
Code::Blocks plugin
Console application
D application
Direct/X project
Dynamic Link Library
Empty project
FLTK project
Fortran DLL
Fortran application
Fortran library
GLFW project
GLUT project
GTK+ project
Irrlicht project
Java application
Kernel Mode Driver
Lightfeather project
Go
Cancel
View as
Large icons
List
TIP: Try right-clicking an item
1. Select a wizard type first on the left
2. Select a specific wizard from the main window (filter by categories if needed)
3. Press Go


Console application
Console
Please select the language you want to use.
Please make a selection
C
C++
< Back
Next >
Cancel


Console application
Console
Please select the folder where you want the new project to be created as well as its title.
Project title:
Hello World
Folder to create project in:
D:\C TUT FILES\
Project filename:
Hello World.cbp
Resulting filename:
D:\C TUT FILES\Hello World\Hello World.cbp
< Back
Next >

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Code::Blocks

How To Compile And Run A Program

Hello World!!!

Run Code Blocks

THE C PROGRAMMING LANGUAGE

- In the previous PPT we saw how to download and install Code::Blocks
- Now, in this lesson we will run our first program
- In ever tutorial of the world of any programming language hello world program is the first program anyone ever learns.
- Here its no different
- So lets jump into it

Source Code

THE C PROGRAMMING LANGUAGE

```
1  #include <stdio.h>
2  #include <stdlib.h>
3
4  int main()
5  {
6      printf("Hello world!\n");
7      return 0;
8  }
9
```

Here, the first two lines is called the pre-processor directive meaning they are the library containing all the instructions that the processor needs to run the actual program

Next is the starting of the main function (line 4)

Then, we write printf which is a function inside the main function which commands the machine to print out to console whatever follows afterwards according to pre-programmed parameters

```
After typing the code press F9 or
 CTRL+F10 to Build and then
 CTRL+F9 to Run

 Once you do that it will print out the following output in the console:


Hello World!!


We can even design it a bit with ASCII Character inside the double quoted
 string placeholders
 and print it as follows:


********HELLOW WORLD**********



Process returned 0 (0x0)   execution time : 0.016 s
Press any key to continue.
```

Trial Program

main.c

```c
#include <stdio.h>
#include <stdlib.h>
#define ENDVALUE 50

int main()
{
    int celsius;
    float fahren;
    //display the heading lines
    printf("DEGREES DEGREES\n");
    printf("CELSIUS FAHRENHEIT\n");
    printf("------- --------\n");
    //now fill in the table using a while loop
    celsius=5; /*starting celsius value*/
    while (celsius<=ENDVALUE){
        fahren=(9.0/5.0)*celsius+32.0;
        printf("%5d %11.2f \n", celsius, fahren);
        celsius=celsius+5;
    }
    return 0;
}
```

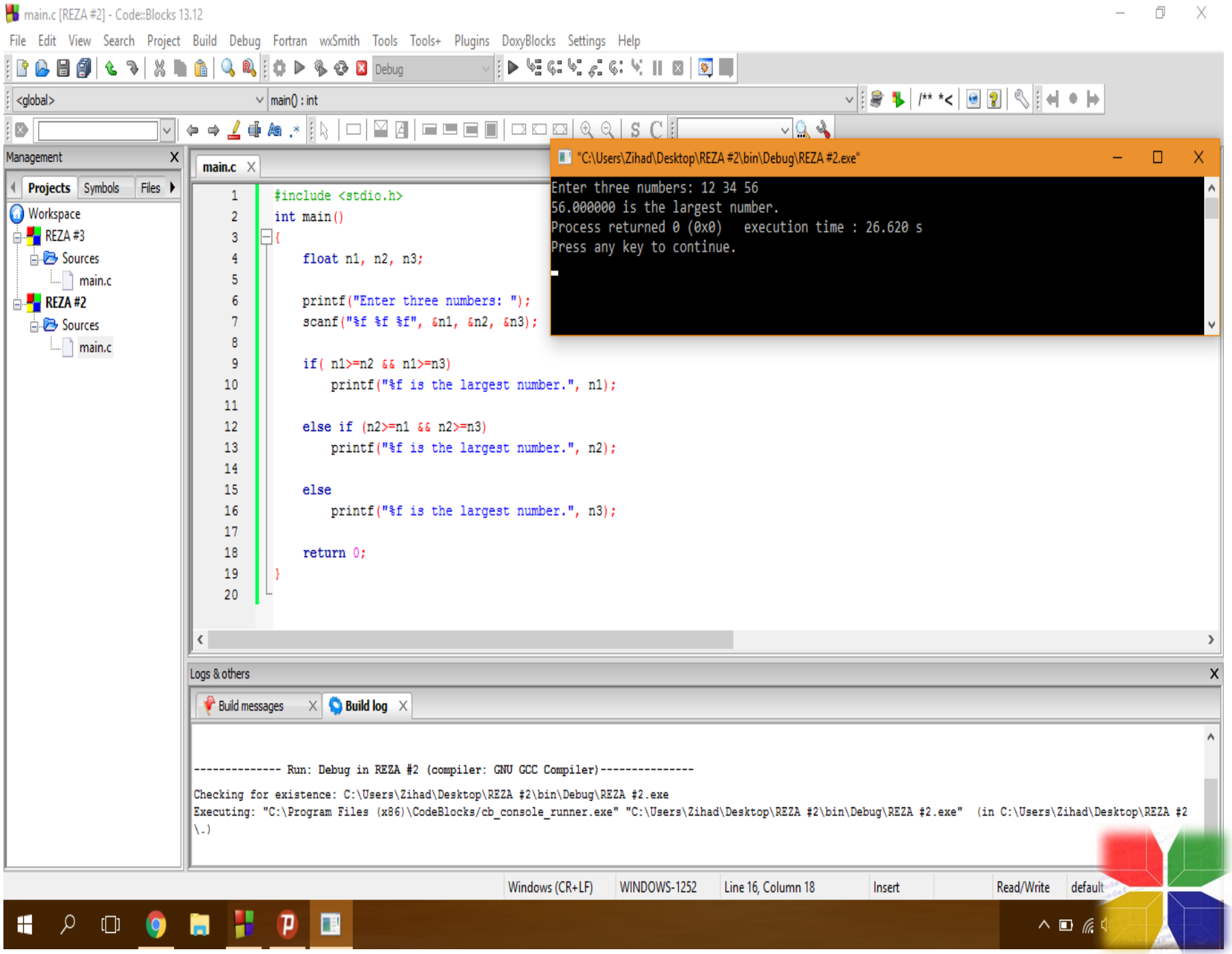
```c
#include <stdio.h>
#include <stdlib.h>
#define ENDVALUE 50

int main()
{
    int celsius;
    float fahren;
    //display the heading lin
    printf("DEGREES DEGREES\n
    printf("CELSIUS FAHRENHEI
    printf("------- --------\
    //now fill in the table u
    celsius=5; /*starting cel
    while (celsius<=ENDVALUE)
        fahren=(9.0/5.0)*cels
        printf("%5d %11.2f \n
        celsius=celsius+5;
    }
    return 0;
}
```

```
"D:\C TUT FILES\practice1024\bin\Debug\practice1024.exe"
DEGREES DEGREES
CELSIUS FAHRENHEIT
------- --------
    5       41.00
   10       50.00
   15       59.00
   20       68.00
   25       77.00
   30       86.00
   35       95.00
   40      104.00
   45      113.00
   50      122.00

Process returned 0 (0x0)   execution time : 0.028 s
Press any key to continue.
```

Challenge 1: Write a Program to find largest of three input numbers



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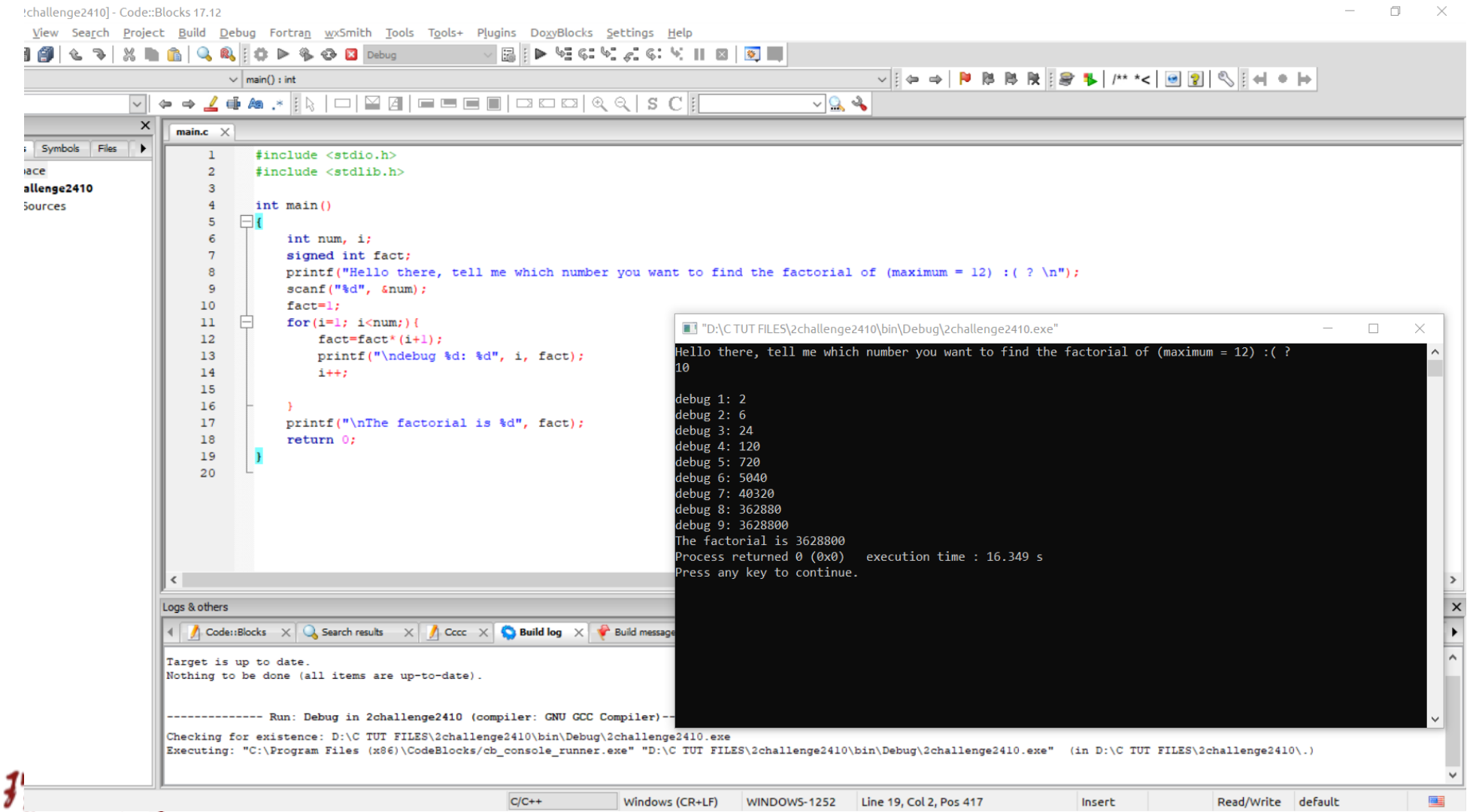

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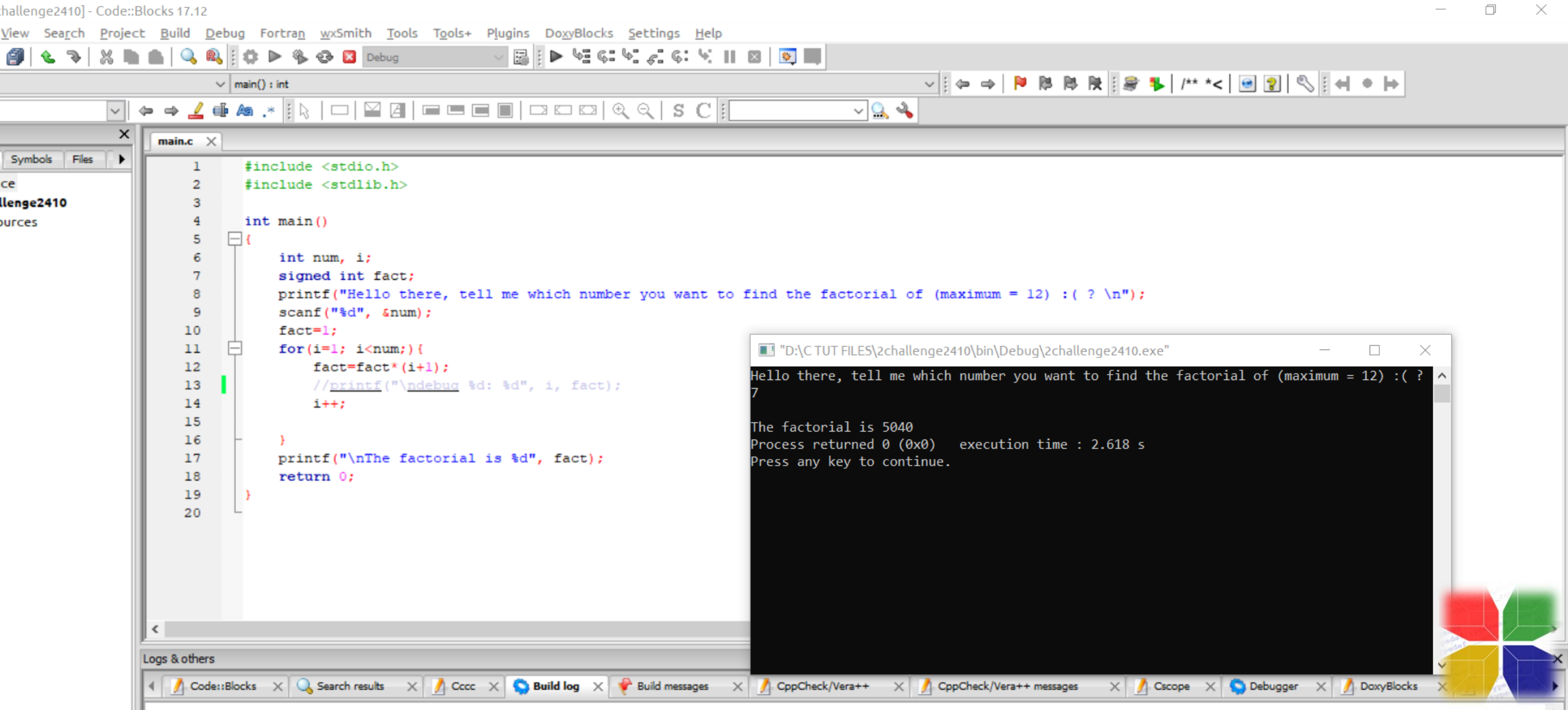
Challenge 2: Write a Program to find factorial (No-Debug)



Challenge 3: Prime Number (in C)

THE C PROGRAMMING LANGUAGE

```c
#include <stdio.h>
int main()
{
int n, i, flag = 0;
printf("Enter a positive integer: ");
scanf("%d", &n);

for(i = 2; i <= n/2; ++i) {
// condition for nonprime number if(n%i == 0) {
flag = 1; break; }
}
if (n == 1) {
printf("1 is neither a prime nor a composite number.");
}
else {
if (flag == 0)
printf("%d is a prime number.", n);
else
printf("%d is not a prime number.", n);
}
return 0;
}
```

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Output of Challenge 3

main.c

```
9     for(i = 2; i <= n/2; ++i)
10    {
11        // condition for non-prime nu
12        if(n%i == 0)
13        {
14            flag = 1;
15            break;
16        }
17    }
18
19    if (n == 1)
20    {
21      printf("1 is neither a prime nc
22    }
23    else
24    {
25        if (flag == 0)
26          printf("%d is a prime numbe
27        else
28          printf("%d is not a prime n
29    }
30
31    return 0;
32 }
33
```

"D:\C TUT FILES\C Prime number\bin\Debug\C Prime number.exe"

```
Enter a positive integer: 129
129 is not a prime number.
Process returned 0 (0x0)   execution time : 10.636 s
Press any key to continue.
```

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main.cpp

```cpp
#include <iostream>

using namespace std;

int main()
{
    int num, i;
    cout << "Type in the number you want to decide to be prime number: " << endl;
    cin >> num;

    double mod;
    for(i=2;i<num;i++){
        mod=num%i;
        if(mod==0){
            cout << "NOT PRIME" <<endl;
            break;
        }
        else{
            cout << "PRIME" <<endl;
            break;
        }
    }

    return 0;
}
```

"D:\C TUT FILES\3challenge2410\bin\Debug\3challenge2410.exe"

```
Type in the number you want to decide to be prime number:
5
PRIME

Process returned 0 (0x0)   execution time : 1.959 s
Press any key to continue.
```

"D:\C TUT FILES\3challenge2410\bin\Debug\3challenge2410.exe"

```
Type in the number you want to decide to be prime number:
14
NOT PRIME

Process returned 0 (0x0)   execution time : 5.017 s
Press any key to continue.
```

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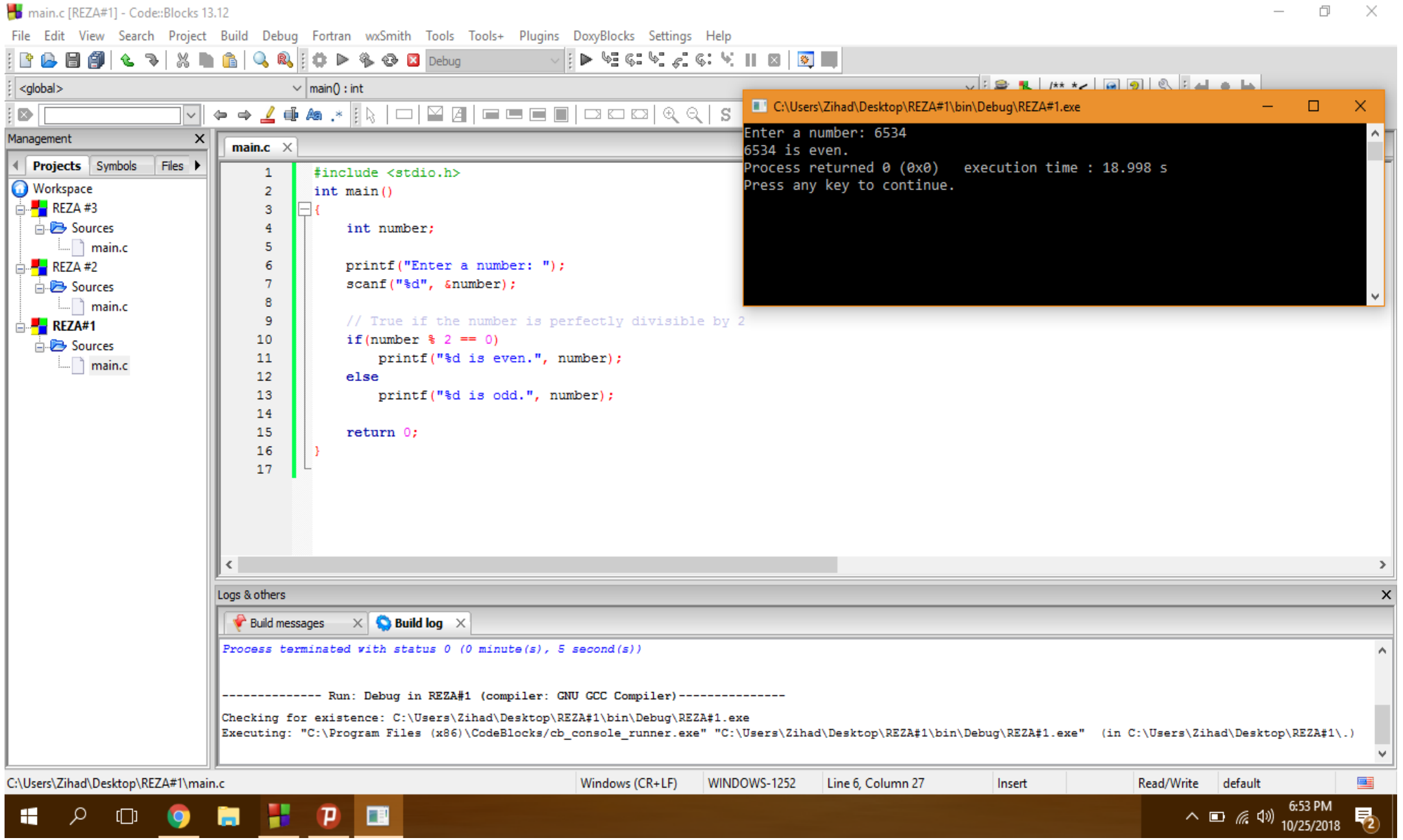

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code blocks can't find my compiler

- sometimes It may have happened that you have below error

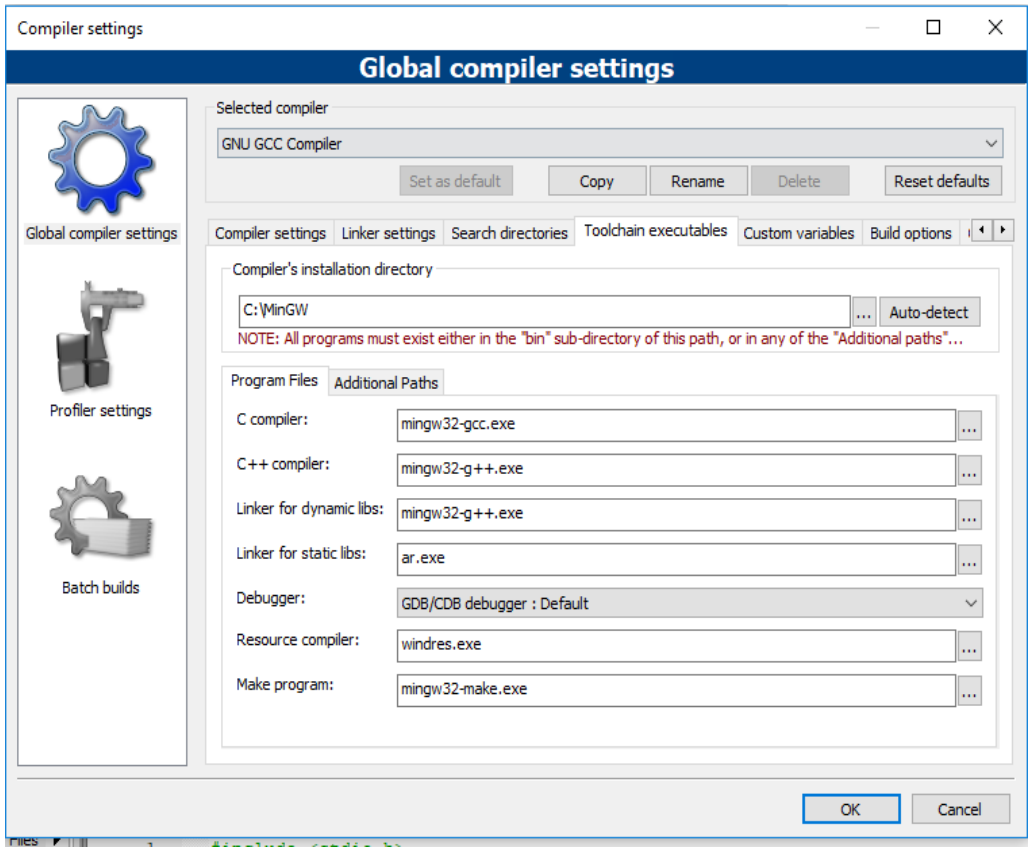
```
Project/Target: "salam - Debug":
  The compiler's setup (GNU GCC Compiler) is invalid, so Code::Blocks cannot find/run the compiler.
  Probably the toolchain path within the compiler options is not setup correctly?!
  Do you have a compiler installed?
Goto "Settings->Compiler...->Global compiler settings->GNU GCC Compiler->Toolchain executables" and fix the compiler's setup.

Tried to run compiler executable 'C:\Program Files (x86)\CodeBlocks/bin/mingw32-gcc.exe', but failed!

Run aborted...
```

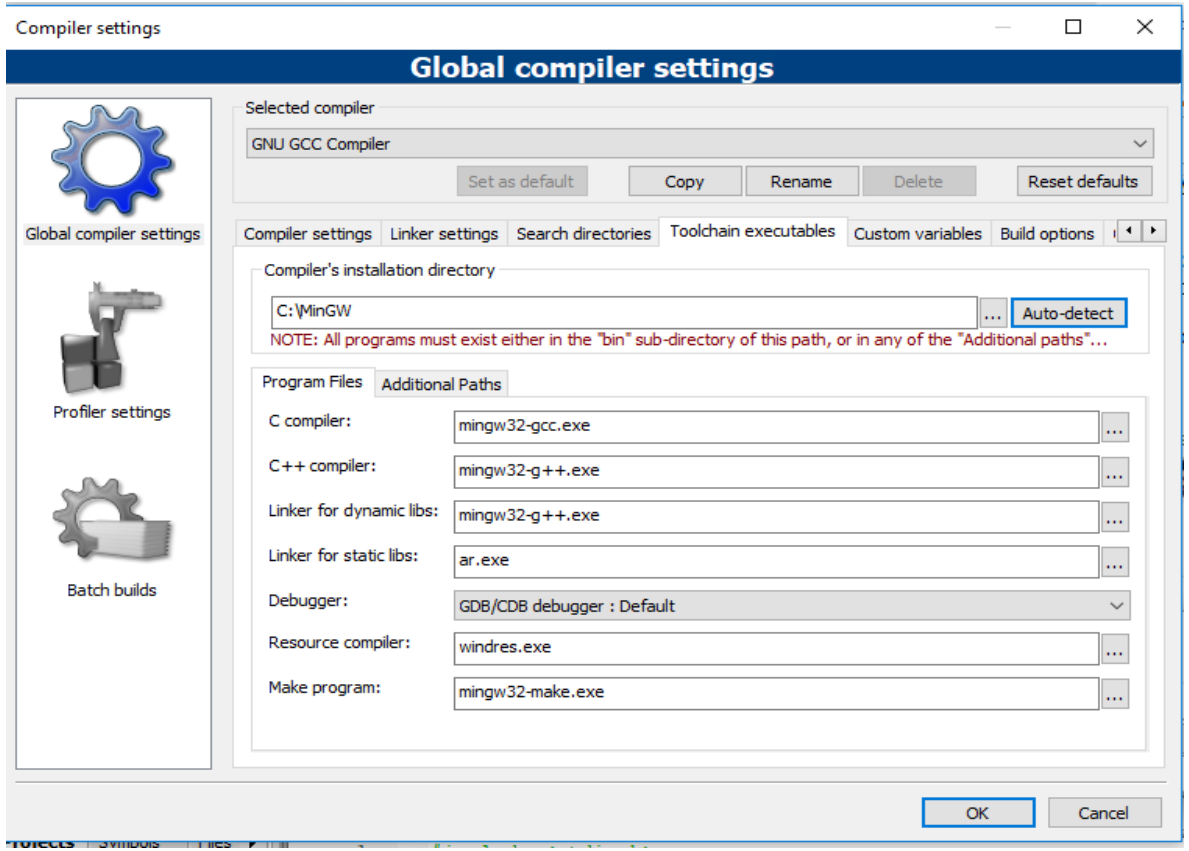
- To solve this problem
- First be sure that from
- http://www.codeblocks.org/downloads/26
- Download the
- codeblocks-17.12mingw_fortran-setup.exe

Windows XP / Vista / 7 / 8.x / 10:

File	Date	Download from
codeblocks-17.12-setup.exe	30 Dec 2017	FossHUB or Sourceforge.net
codeblocks-17.12-setup-nonadmin.exe	30 Dec 2017	FossHUB or Sourceforge.net
codeblocks-17.12-nosetup.zip	30 Dec 2017	FossHUB or Sourceforge.net
codeblocks-17.12mingw-setup.exe	30 Dec 2017	FossHUB or Sourceforge.net
codeblocks-17.12mingw-nosetup.zip	30 Dec 2017	FossHUB or Sourceforge.net
codeblocks-17.12mingw_fortran-setup.exe	30 Dec 2017	FossHUB or Sourceforge.net

- Then go to **Settings>Global compiler settings>Toolchain executables(tab)** and see the *Compiler's installation directory*, it may be set by default to **C:\MinGW** something like that.
- Just press the **Auto-detect** button and it will find the actual directory of the compiler.
- Click **OK** and you are ready to *Code!*


Compiler settings
Global compiler settings
Global compiler settings
Profiler settings
Batch builds
Selected compiler
GNU GCC Compiler
Set as default
Copy
Rename
Delete
Reset defaults
Compiler settings
Linker settings
Search directories
Toolchain executables
Custom variables
Build options
Compiler's installation directory
C:\MinGW
Auto-detect
NOTE: All programs must exist either in the "bin" sub-directory of this path, or in any of the "Additional paths"...
Program Files
Additional Paths
C compiler:
mingw32-gcc.exe
C++ compiler:
mingw32-g++.exe
Linker for dynamic libs:
mingw32-g++.exe
Linker for static libs:
ar.exe
Debugger:
GDB/CDB debugger : Default
Resource compiler:
windres.exe
Make program:
mingw32-make.exe
OK
Cancel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GDB/CDB debugger : Default
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windres.exe
Make program:
mingw32-make.exe
OK
Cancel

Reference

- BOOK
- Some part of this PPT given by Prof 欧阳城添

(Prof: Chengtian Ouyang)

- with special thank
- https://www.codingunit.com/c-tutorial-first-c-program-hello-world

Credits: Roy & Reza