C Developer

Foundation and First Steps

SUPINFO

Course Objectives

- ✓ Install tools
- ✓ Compile your first program

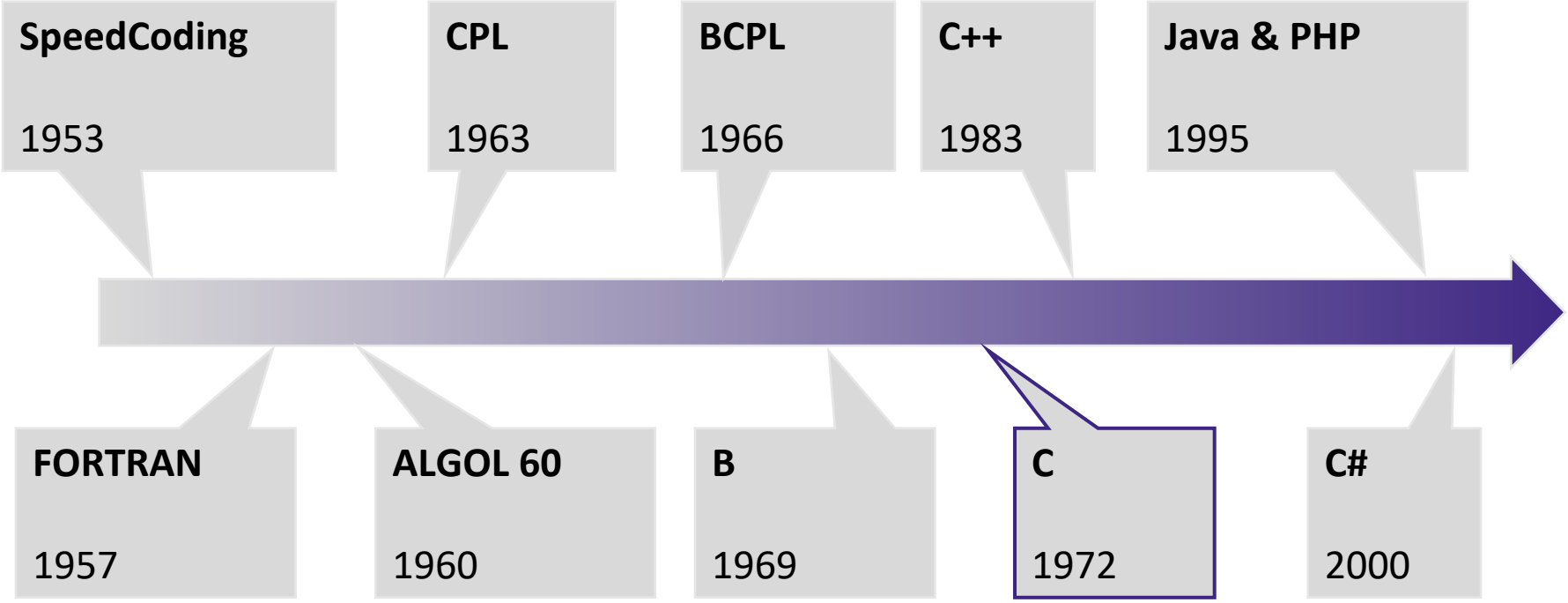
Course Plan

1. C Language and Programs
2. Tools
3. Program Creation

1. C Language and Programs

1. C Language and Programs

History



1. C Language and Programs

History

1969 – Ken Thompson, author of the B Language is joined by Dennis Ritchie

1972 – Dennis Ritchie added arrays, pointers, structures, *etc*.

1973 – UNIX is rewrited in C

1. C Language and Programs

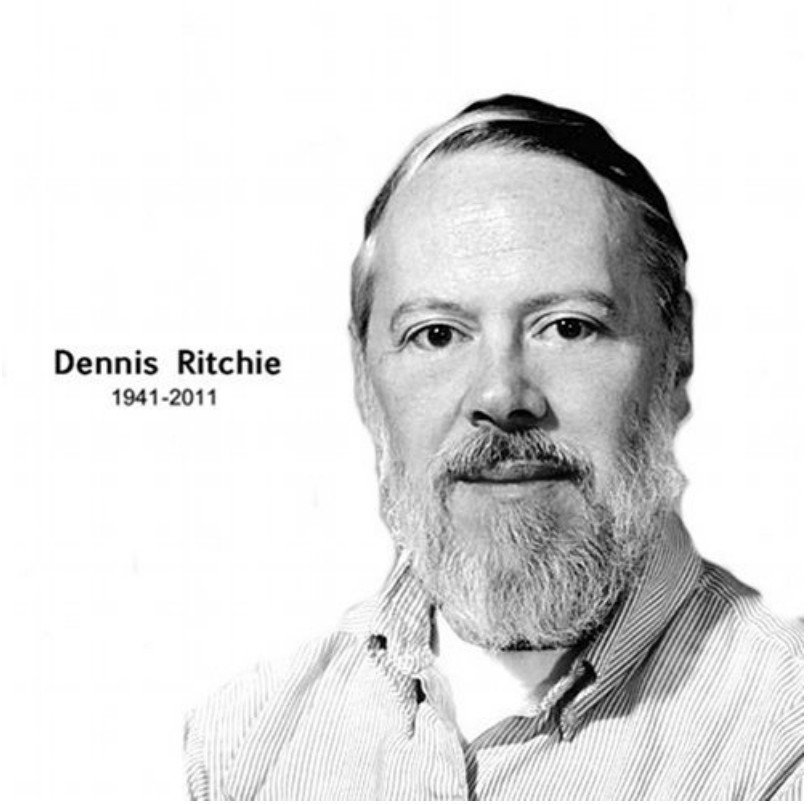
History

Dennis Ritchie (1941-2011)

1970 – Developer for Bell Labs (AT&T)

1972 – C language creation

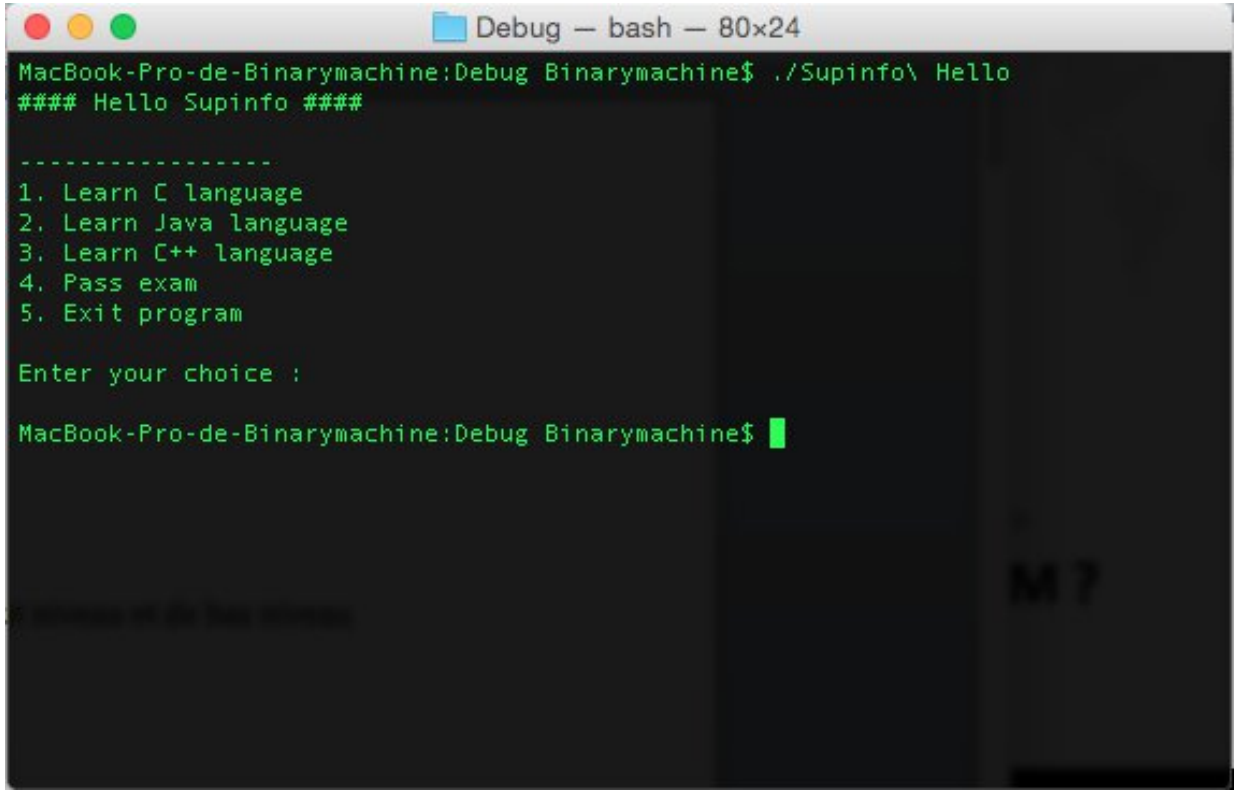
1983 – Turing Award



1. C Language and Programs

Features

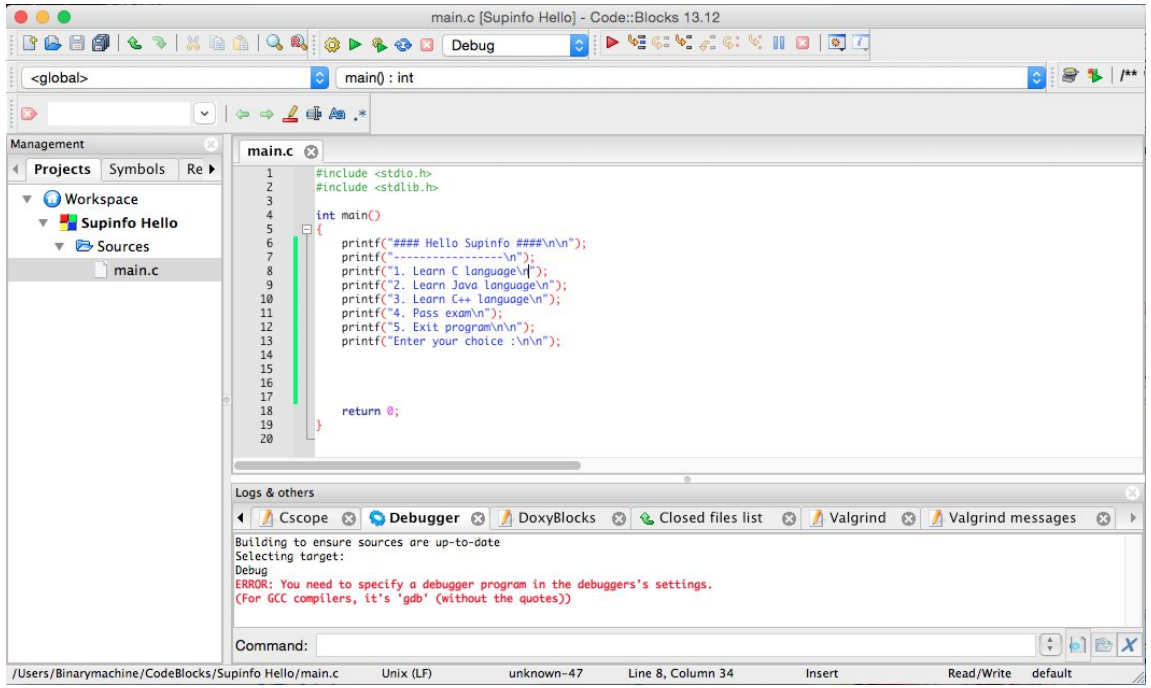
- Console application
- Daemon
- Utility
- Driver



1. C Language and Programs

Features

- Graphic application
- Games



1. C Language and Programs

Low-level and High-level Languages

- High-level
  - The system management is abstract
- Low-level
  - Memory management can be done by the developer
  - Can manage system resources to optimize

1. C Language and Programs

Low-level and High-level Languages

The C language is used in:

- Operating System
- Embedded System
- Robotics
- Games
- Utility
- Parallel programming
- *etc*.

1. C Language and Programs

Programs

A program is a computer tool that meets a need

- Solution to a need for:
  - Data processing
  - Tasks performing
  - Human/machine interaction

- Each application is:
  - Compiled or Interpreted language
  - Written in understandable language
  - A sequence of instructions

1. C Language and Programs

Questions

2. Tools

2. Tools

Environment

- A text editor
  - To write source code
- A compiler
  - To compile and edit links

2. Tools

Environment

IDE examples:

- Visual C++, Dev C++ for Windows
- Xcode for Mac
- Code::Blocks for Windows, Mac and Linux

We will use Code::Blocks for this course!

2. Tools

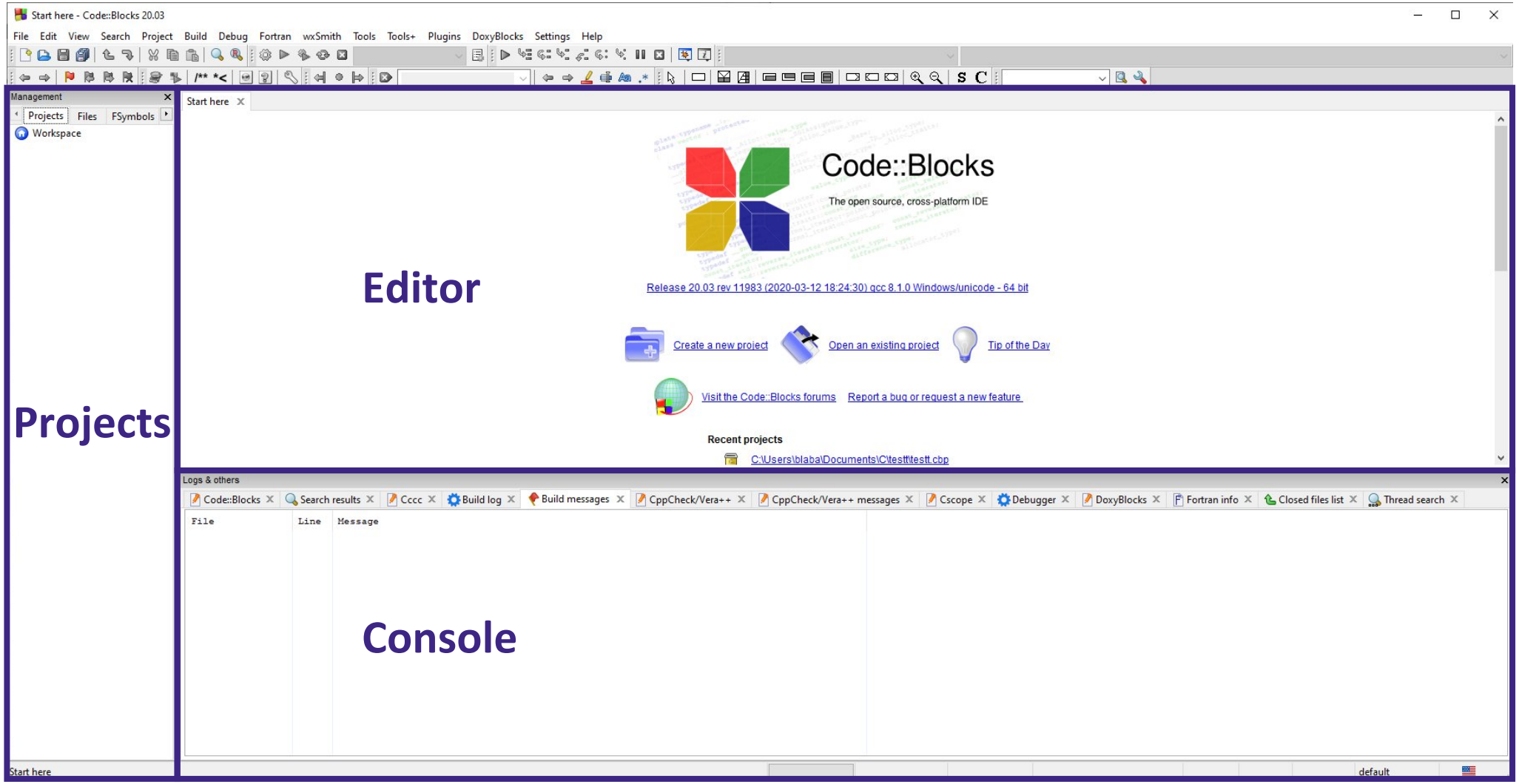
Code::Blocks

- Free
- Open-Source
- Cross-platform
- Designed for C, C++ and Fortran
- Extensible by plugins

https://www.codeblocks.org/downloads/binaries/

2. Tools

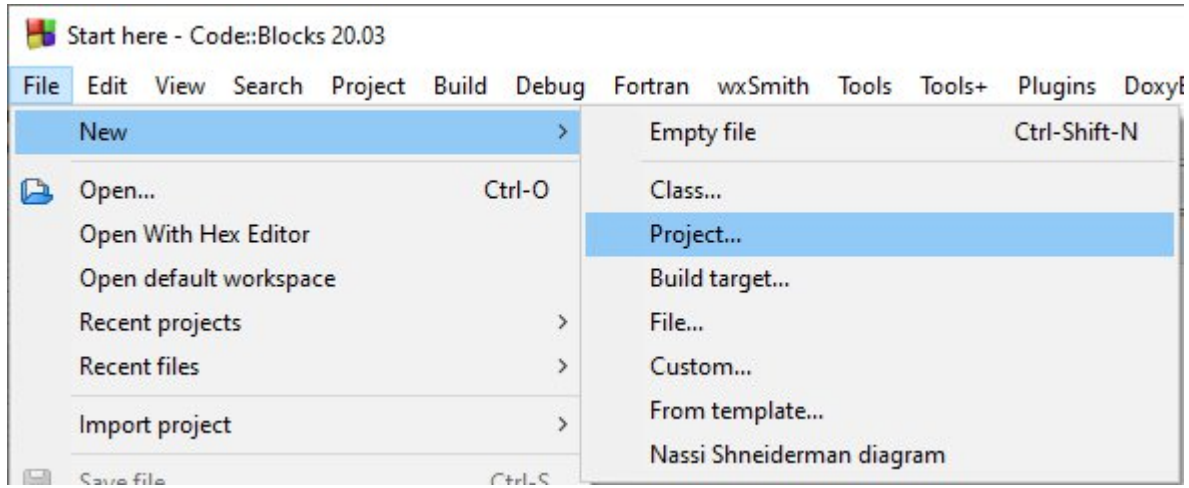
Code::Blocks



2. Tools

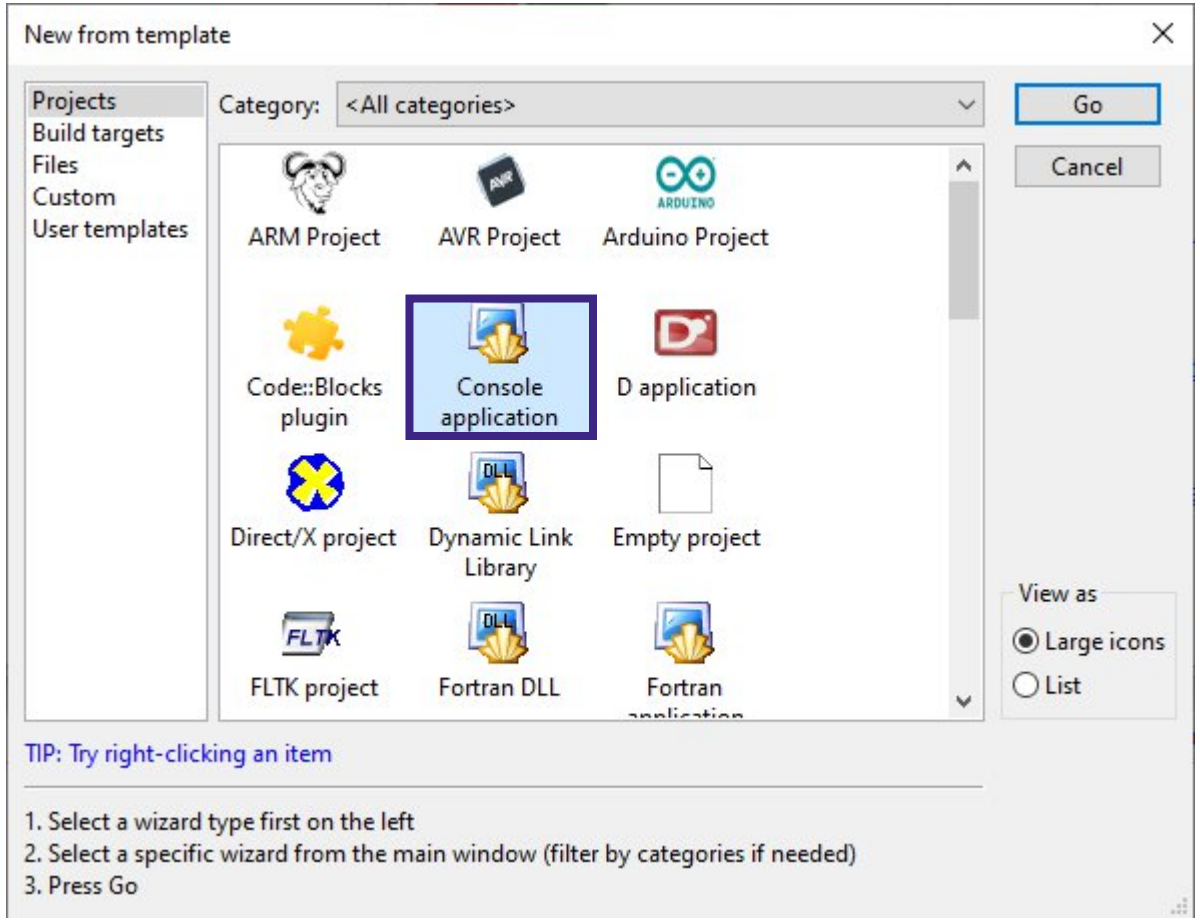
Code::Blocks

OR



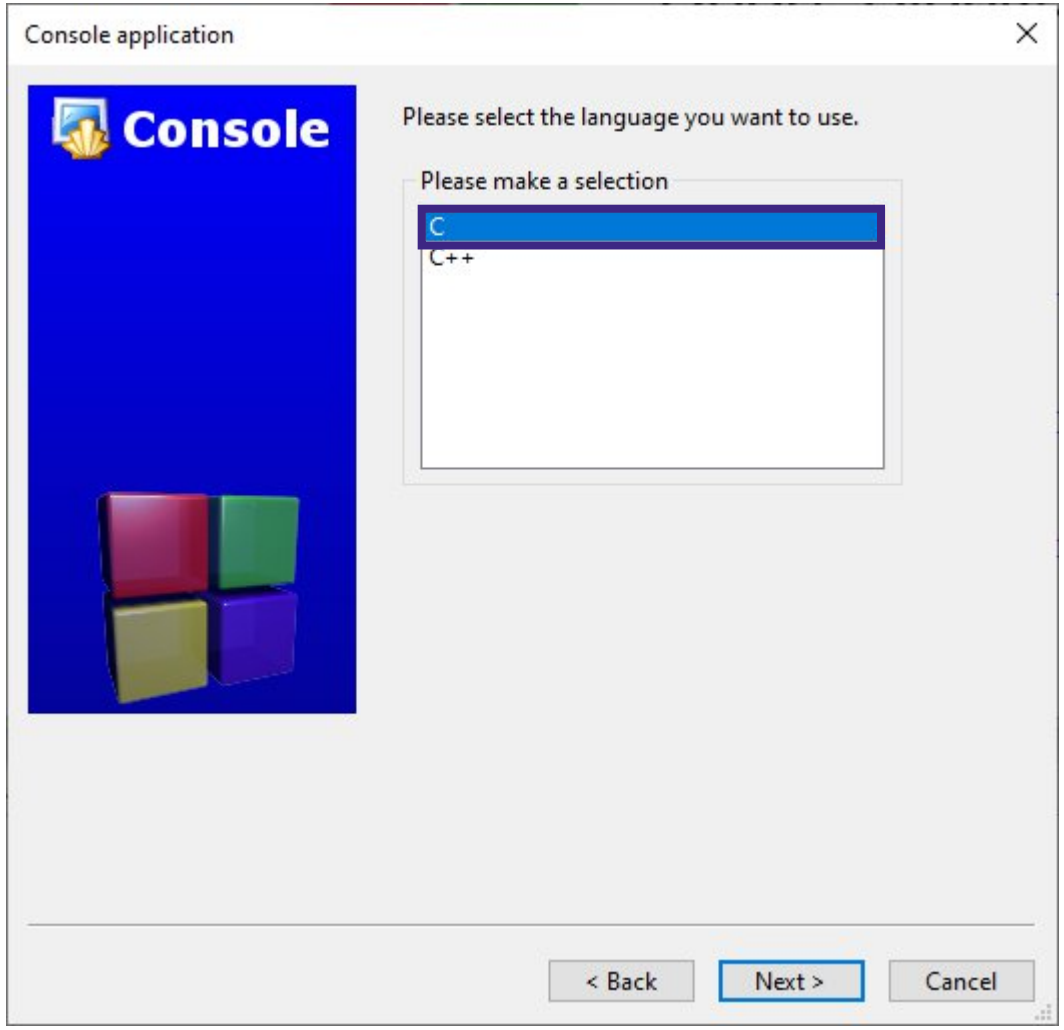
2. Tools

Code::Blocks



2. Tools

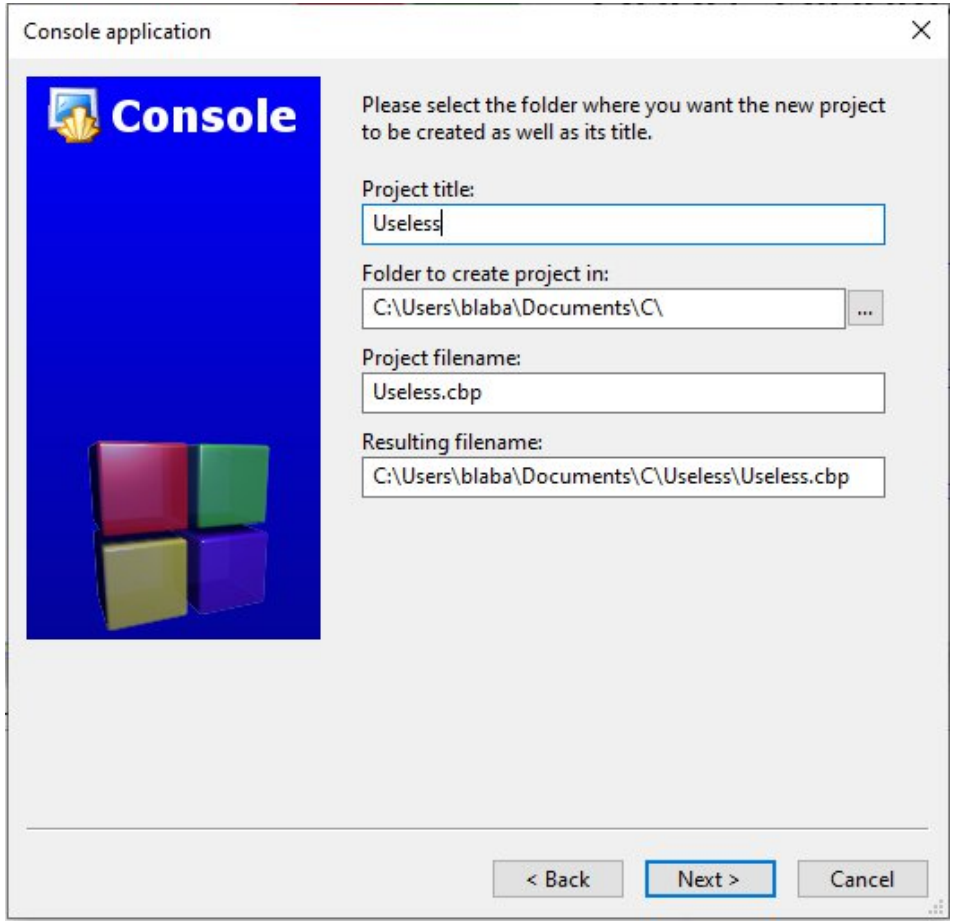
Code::Blocks



2. Tools

Code::Blocks

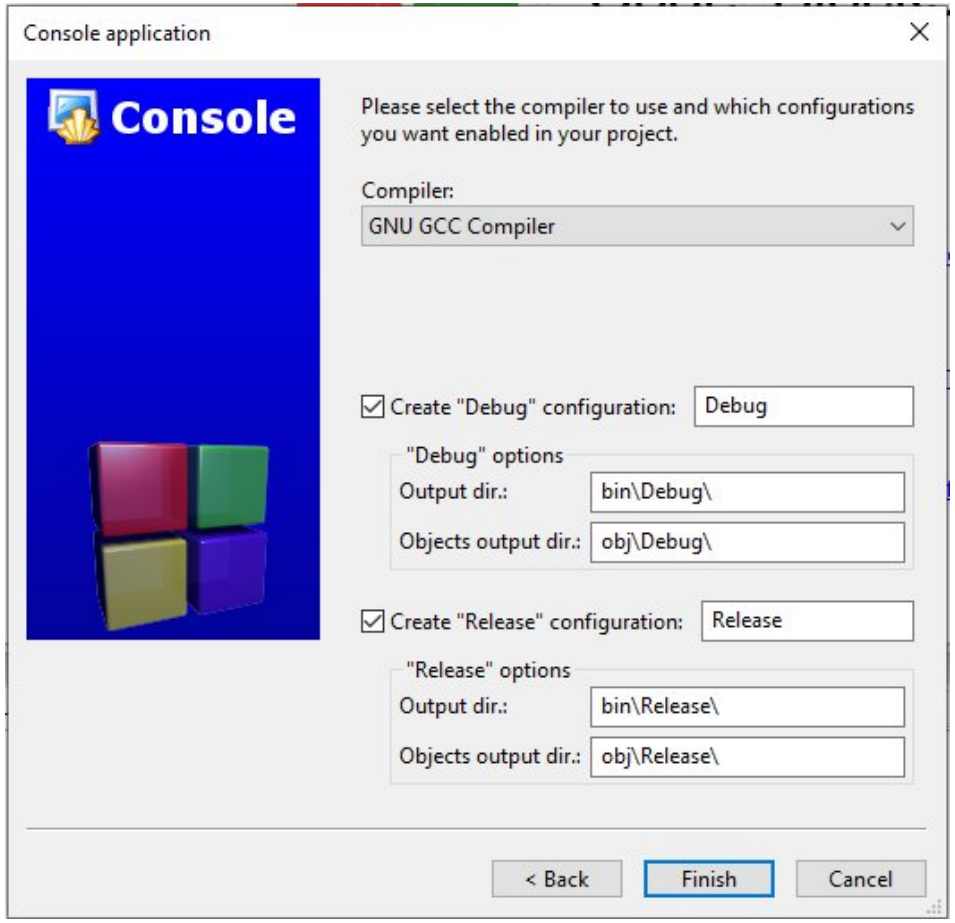
Enter a name for your project and the project location



2. Tools

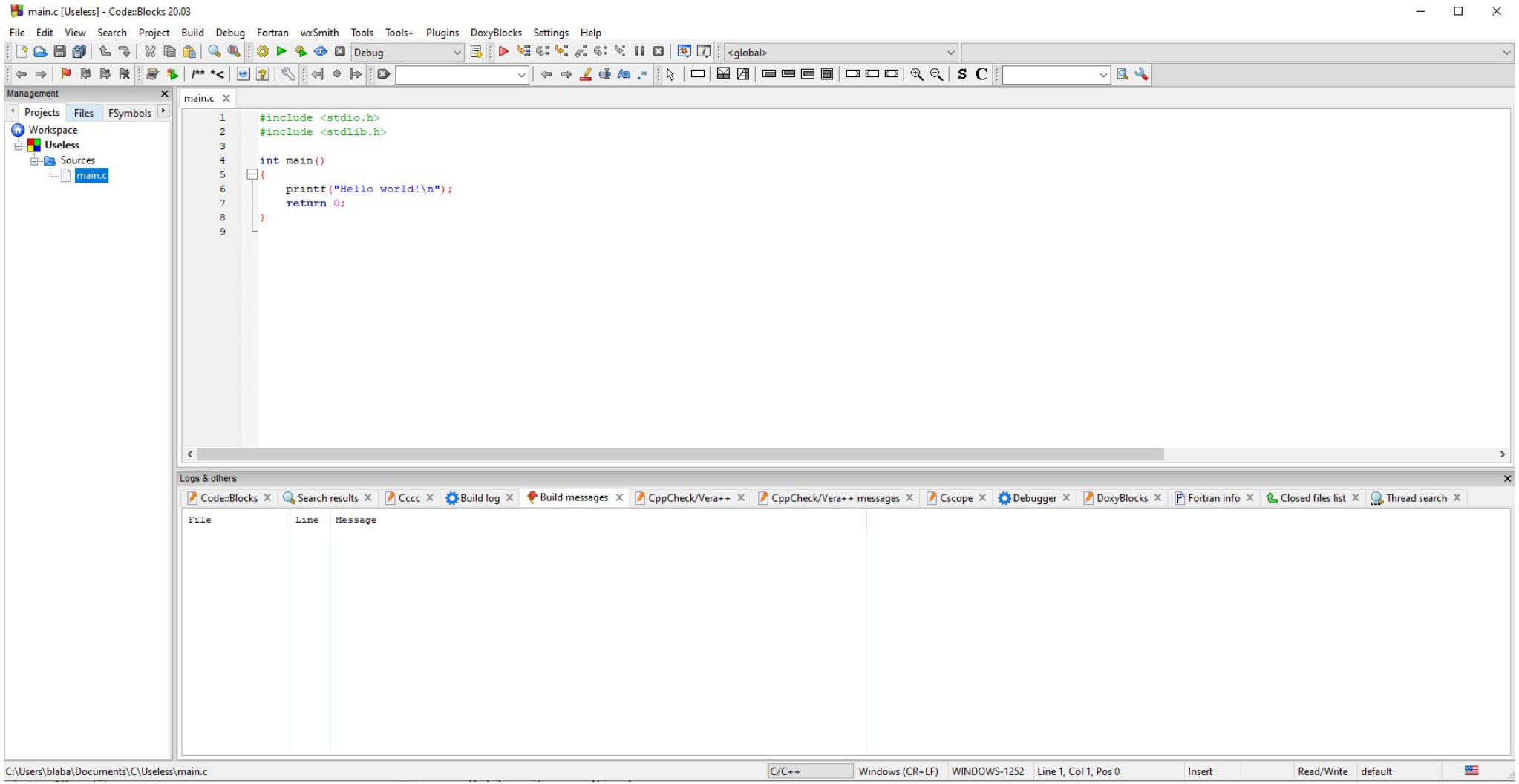
Code::Blocks

Keep the default compilation settings



2. Tools

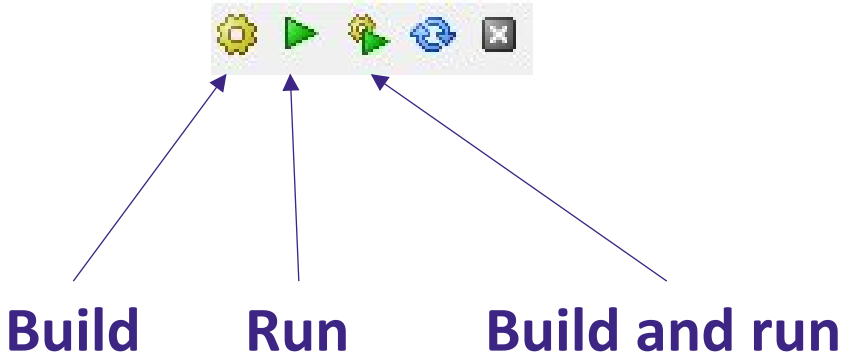
Code::Blocks



2. Tools

Code::Blocks

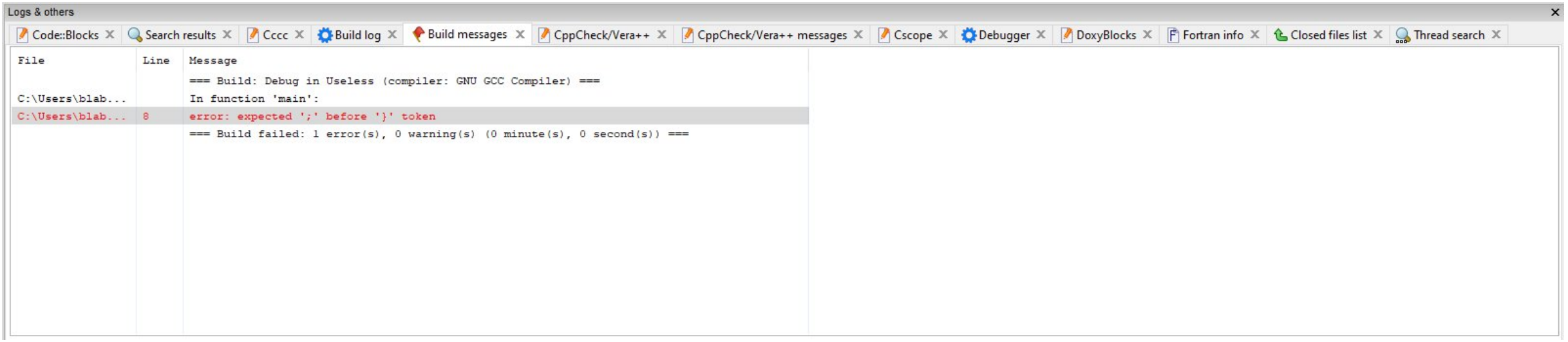
To test a project, click on **Build** then on **Run** or directly on **Build and run**



2. Tools

Code::Blocks

The debugger is a very useful part of the IDE. Find your errors with it.



2. Tools

Questions

3. Program Creation

3. Program Creation

Overview

Three steps:

1. **Write source code** to include the features
2. **Compilation** to convert to binary "machine code"
3. **Link Editing** to group all binary files into an executable file

3. Program Creation

Step 1: Write source code

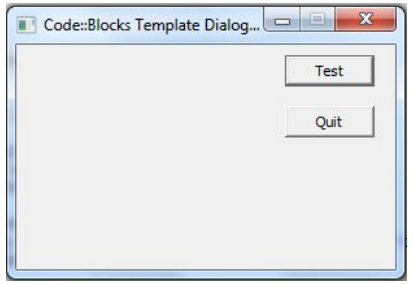
- Source code is a set of text files
- Represent a set of instructions of a program
- May contain libraries
  - **.so** or **.a** files for UNIX
  - **.lib** files for Windows

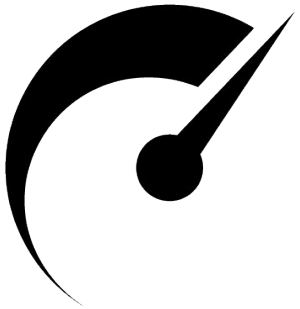
3. Program Creation

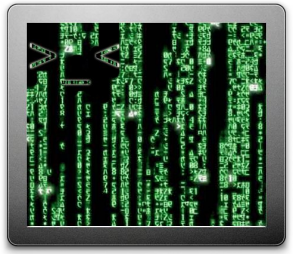
Step 1: Write source code

The C language has a lot of libraries available for:

- Creating games
- Creating GUI applications
- Manipulating environment
- Using specific components
- Saving progamming time
- Creating games







3. Program Creation

Step 1: Write source code

All C programs are composed of **.c** files…

```
#if SDL_VIDEO_DRIVER_WINDOWS
extern int SDL_HelperWindowCreate(void);
extern int SDL_HelperWindowDestroy(void);
#endif


/* The initialized subsystems */
#ifdef SDL_MAIN_NEEDED
static SDL_bool SDL_MainIsReady = SDL_FALSE;
#else
static SDL_bool SDL_MainIsReady = SDL_TRUE;
#endif
static SDL_bool SDL_bInMainQuit = SDL_FALSE;
static Uint8 SDL_SubsystemRefCount[ 32 ];

/* Private helper to increment a subsystem's ref counter. */
static void
SDL_PrivateSubsystemRefCountIncr(Uint32 subsystem)
{
    int subsystem_index = SDL_MostSignificantBitIndex32(subsystem);
    SDL_assert(SDL_SubsystemRefCount[subsystem_index] < 255);
    ++SDL_SubsystemRefCount[subsystem_index];
}
```

3. Program Creation

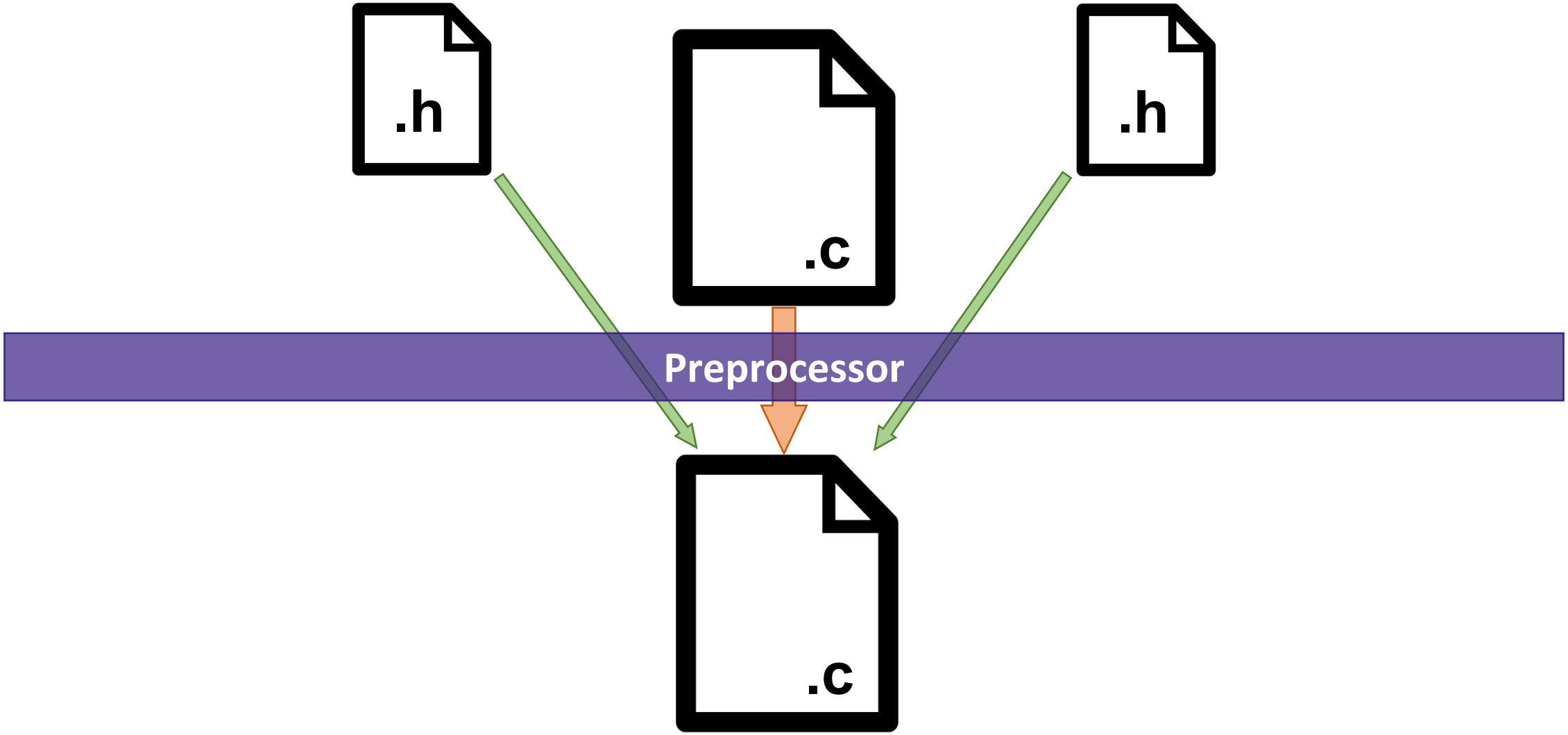
Step 1: Write source code

… and **.h** files

```
#if (defined(__GNUC__) && (__GNUC__ <= 2)) || defined(__CC_ARM)
#define SDL_VARIABLE_LENGTH_ARRAY 1
#else
#define SDL_VARIABLE_LENGTH_ARRAY
#endif

#include "dynapi/SDL_dynapi.h"

#if SDL_DYNAMIC_API
#include "dynapi/SDL_dynapi_overrides.h"
/* force DECLSPEC and SDLCALL off...it's all internal symbols now.
   These will have actual #defines during SDL_dynapi.c only */
#define DECLSPEC
#define SDLCALL
#endif
```

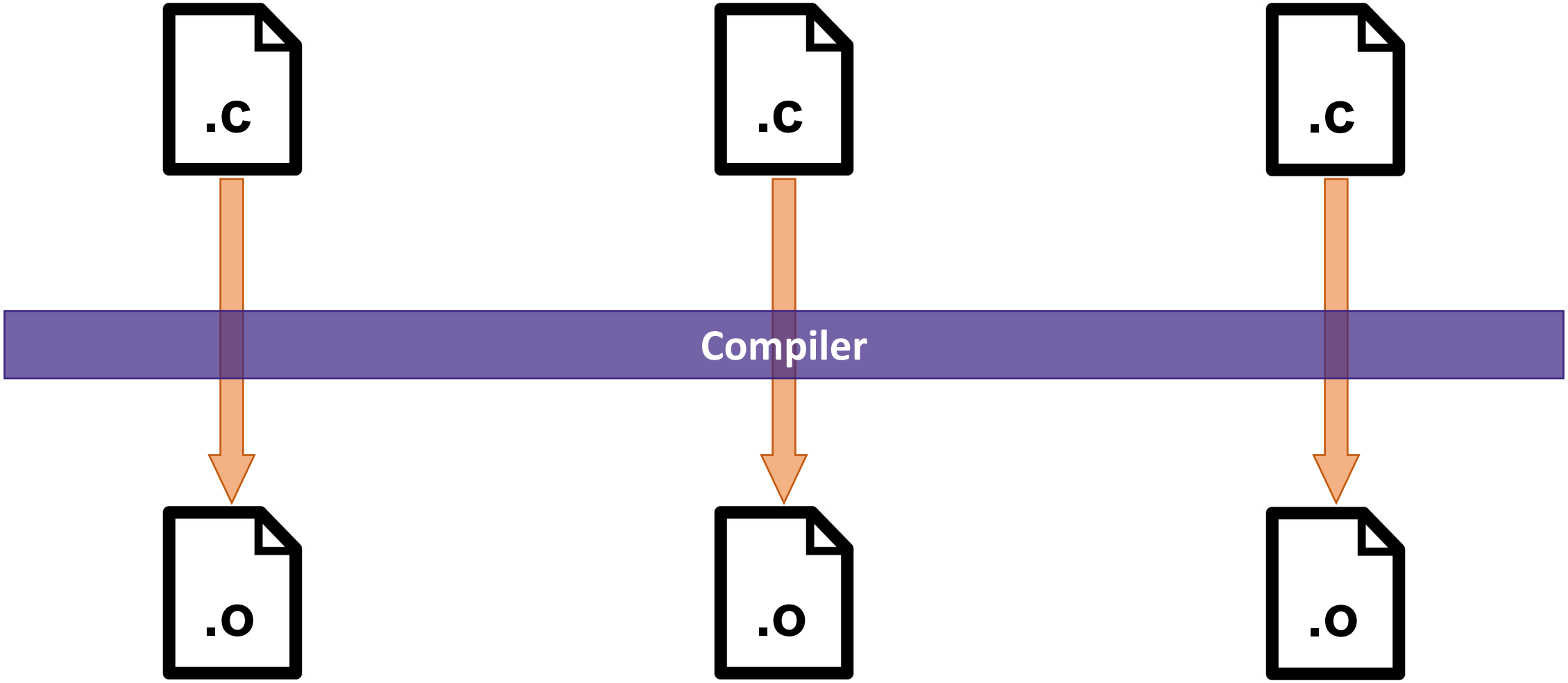
3. Program Creation

Step 2: Compilation



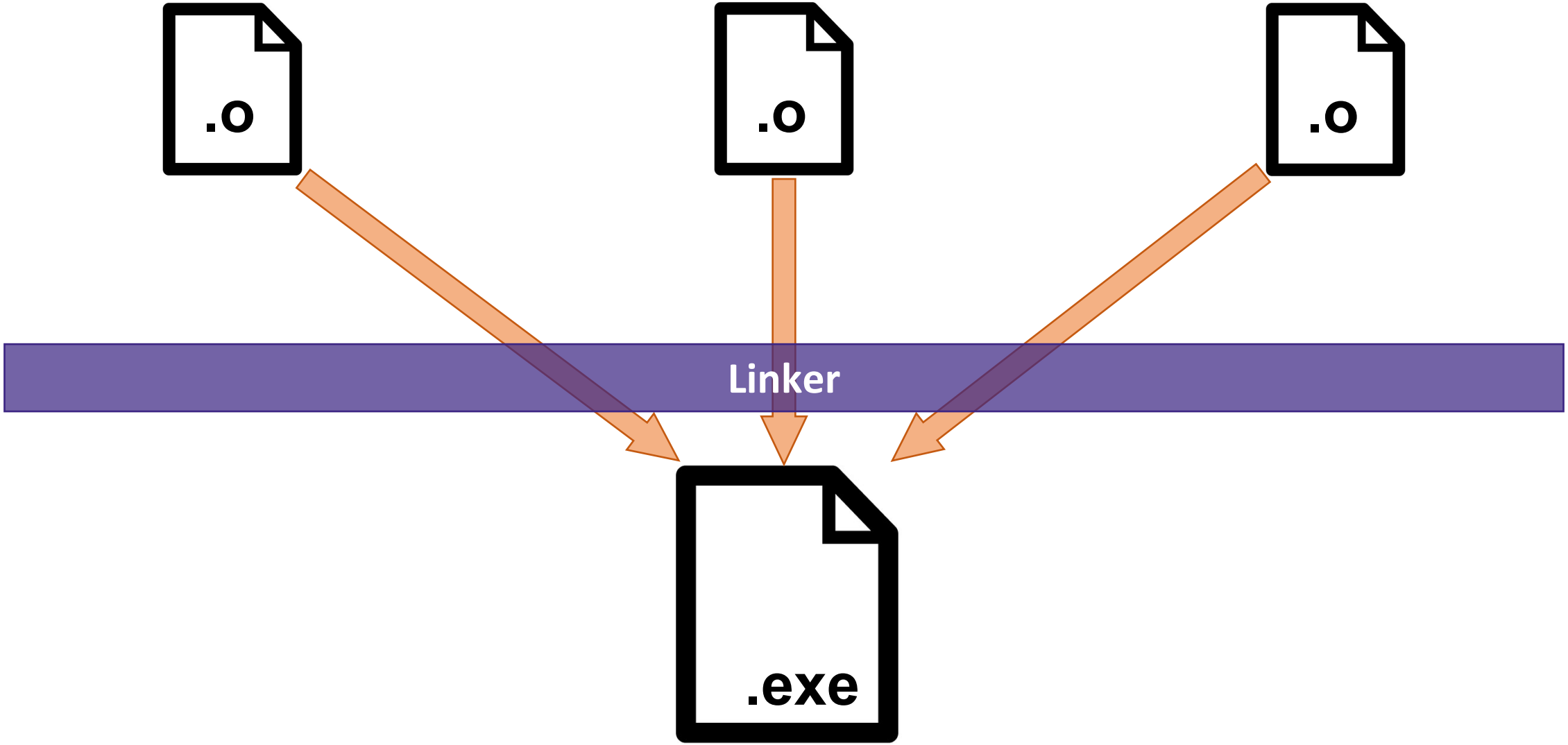
3. Program Creation

Step 2: Compilation



3. Program Creation

Step 3: Link Editing



3. Program Creation

Execute/Run

- Linux or Mac

```
./Useless
```

- Windows

```
Useless.exe
```

- Using the IDE **Run** button that opens the console

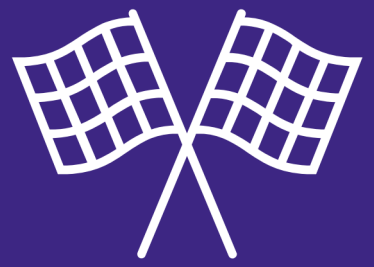
```
C:\Users\blaba\Documents\C\Useless\bin\Debug\Useless.exe
Hello world!

Process returned 0 (0x0)   execution time : 0.050 s
Press any key to continue.
```

3. Program Creation

Questions

C Developer

Foundation and First Steps



Thank you for your attention

SUPINFO