Programming basics on C

Lecture 1

Schedule

- About me
- About the course
- About the exams
- Programming - how to start
- First program

About me

- Martin Kuvandzhiev
- Studied in High school of mechanics and electronics - Burgas
- Technical university of Sofia
- Worked in:
  - TAO-Wellness - startup, successful
  - Playground energy - startup, successful
  - Valkyrie - project, won many awards
  - Broadsoft - enterprise company
  - Phyre - startup
  - more

About the course

- 7 lectures
- 1 exam preparation
- 2 exams

Requirements

- Laptop
- Basic math knowledge
- Imagination
- Will

What you are going to learn

- Basics of programming
- Writing programs in C
- debugging

Evaluation

- Exam - 80 %
  - Test - 30%
  - Practical task(s) - 50%
- Homework - 20 %
  - Solutions - 10%
  - Evauation - 10%

Exam test

- 30 questions
- Single and multiple choice
- 45 minutes

Practical task(s)

- One or few problems that have difficulty of homework tasks
- Evaluation is based on both functionality and quality code

Homework evaluation

- Solutions
  - Must be submitted before the deadline
  - Evaluated by the others
- Evaluation
  - Deadline is set to 3 days after the submission deadline

Questions ?

Programming - how to start

What is the programing

The process of programing

The process of programing

- Find the problem(s)
- Analyze the problem(s)
- Explore possibilities
- Implement the solution

Terms

Computer program

- Specific executable file(s) that has a purpose to provide a certain functionality

Executable

- Specific file that can be executed (started)

IDE

- Integrated development environment - Text editor with functionality to compile, execute and debug programs
- E.g. - Visual Studio, Xcode, Atom, Eclipse, CodeBlocks

Compiling

- A process that is “translating” programing code to an executable file

Debugging

- A process when a software developer spend thousand of hours to find mistakenly written symbol (like “=” or “,”)

Debugging

- A process when you find anomalies in the execution of the program.
- For example you expect a program to return a certain result, but it returns something different.

Library

- The libraries in programing are files that are providing certain functionalities.
- For example if you want to calculate square root, you need a function that is doing that for you. This function is not provided by default, but is provided by a library called “math.h”

Task

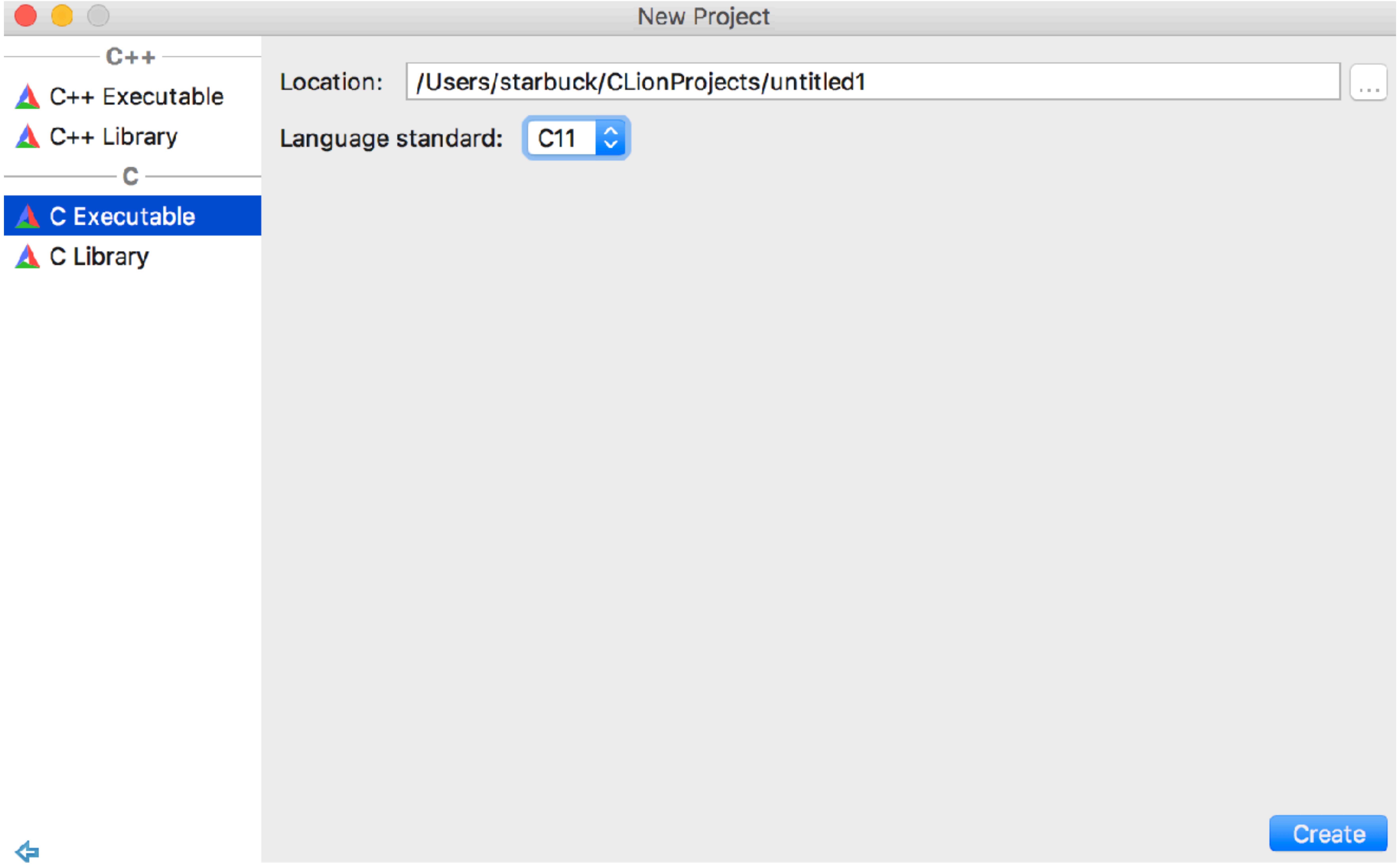
- Download and install CLion IDE
- https://www.jetbrains.com/clion/specials/clion/clion.html?&gclid=Cj0KEQjwwoLHBRDD0beVheu3lt0BEiQAvU4CKvbeAkoauOF5oeoA1ffz2Rxp_ZWjZPG4aiHvnK3tYQsaAmxT8P8HAQ&gclsrc=aw.ds.ds&dclid=CIXU6cOBhtMCFUEg0wodUJkOfQ

Questions ?

First program

- Start CLion
- New Project

First program

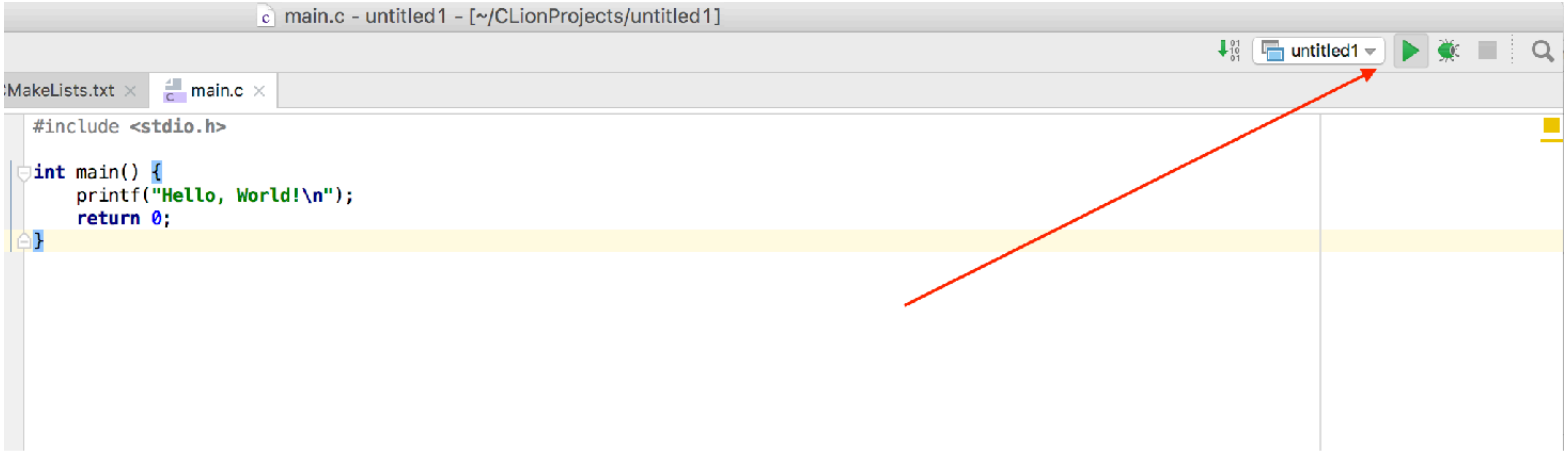


Location: /Users/starbuck/CLionProjects/untitled1

Language standard: C11

First program

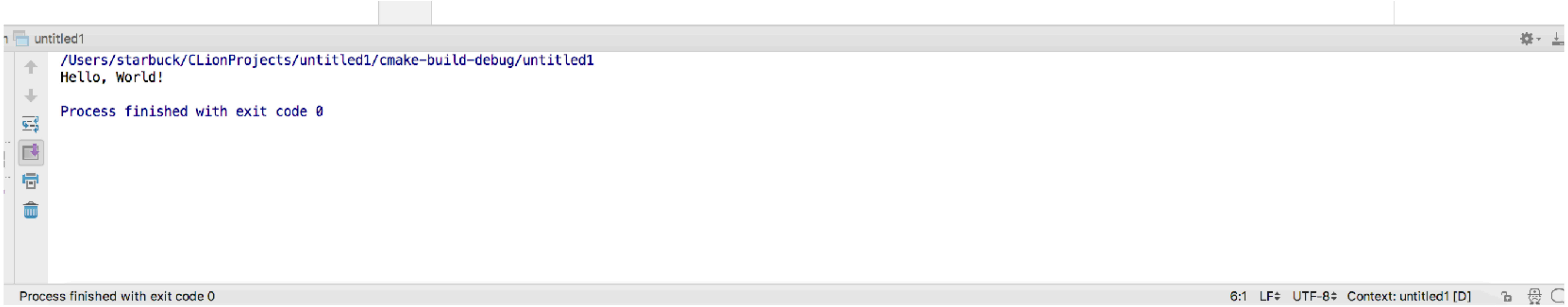
- Run the program with Ctrl + R or



```c
#include <stdio.h>

int main() {
    printf("Hello, World!\n");
    return 0;
}
```

The result of the program



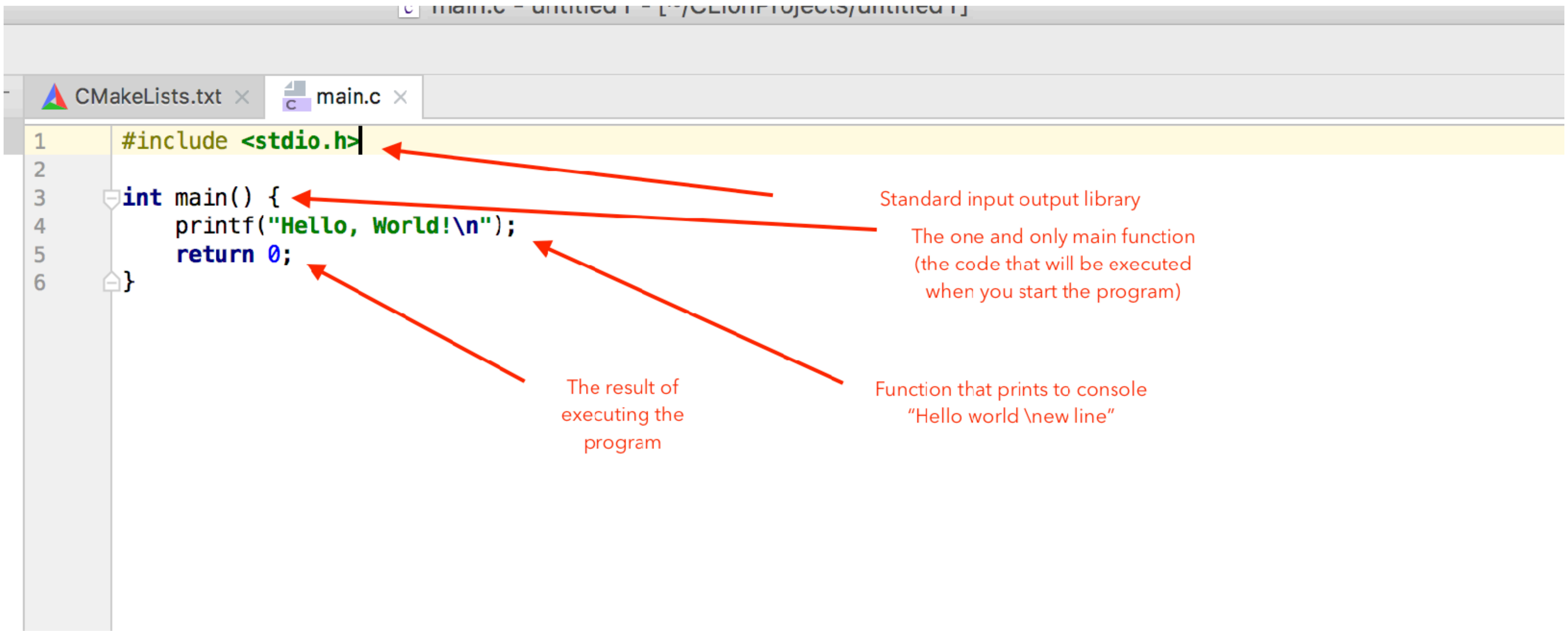
untitled1

```
/Users/starbuck/CLionProjects/untitled1/cmake-build-debug/untitled1
Hello, World!

Process finished with exit code 0
```

Process finished with exit code 0

Our first program structure



```c
#include <stdio.h>

int main() {
    printf("Hello, World!\n");
    return 0;
}
```

Standard input output library

The one and only main function (the code that will be executed when you start the program)

The result of executing the program

Function that prints to console “Hello world \new line”

The C programing language

- General purpose programing language
- Compiles to binary (the code is run directly on the processor)
- Multiplatform (runs on macOS, Windows, Linux, natively)
- Extremely fast

Task

- Make a program that prints in the console
- $Your name
  $Your age
  $City of Birth

Printing with format

- Printing strings is useful, but in most of the cases you will want to print things with format.

- For example if you want to print “22”, not as a string but as a decimal number you must use: `printf("%d\n", 22);`

- “%d” defines that we are working with decimal

- then we put ‘,’ and write the number that we want to print.

Printing everything with one function

```
printf("%s\n%d\n%s\n", "Martin Kuvandzhiev", 22, “Burgas”);

 %s stands for string, %d - decimal
```

Task

- Now make a program that is printing the numbers from the lottery and the output must be something like:
- “Loterry numbers:4,8,15,16,23,42”