

Numerical Computing in C++ - CBL International

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July 2019

- Course Git repository at <https://github.com/fcooper8472/cpp-cbl-2019>
 - Contains lecture notes and exercises
- Combination of lectures and practical sessions
 - Practical exercises (practical*.pdf) give you practice on the material covered in the lectures
- Those with prior C++ experience, here are a few suggestions:
 - C++ has changed a lot in the last few years. Have a look at and try out some new features, e.g. Parallel STL, constexpr, structured bindings, variadic templates, filesystem library, concepts, ranges, modules. . .
 - Something else. . . ?

This training course covers the following topics:

1. basic types, flow control, `std::array`, input/output
2. pointers, references, functions, templates, `std::vector`
3. classes and object-oriented programming

This course gives you a practical toolbox of C++ programming up to C++14. *This is a small part of C++ as a whole!*

Timetable

Monday to Wednesday:

- 09:00-10:30 Lecture & practical session
- 10:30-10:45 Break
- 10:45-12:15 Lecture & practical session

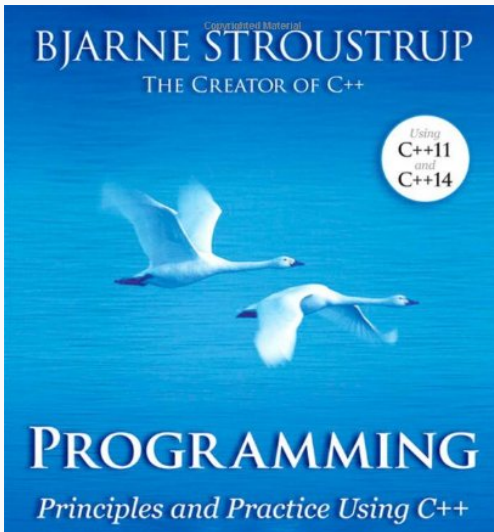
Thursday

- 09:00-12:15 Work on project for assessment

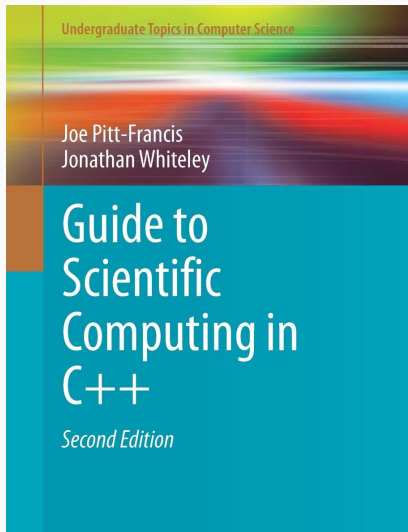
Friday

- 09:00-10:30 Assessment

- Programming: Principles and Practice Using C++



- Guide to Scientific Computing in C++



Software for the course

■ Compiler explorer

The screenshot shows the Compiler Explorer interface in a Mozilla Firefox browser. The address bar displays <https://gcc.godbolt.org>. The main interface is divided into several panels:

- Source Editor:** Contains a C++ source file named "C++ source #1". The code is as follows:

```
1 #include <iostream>
2
3 int main() {
4     std::cout << "Hello, World!" << std::endl;
5     return 0;
6 }
```
- Compiler Selection:** The compiler is set to "x86-64 gcc (trunk)".
- Compiler Options:** A dropdown menu is open, showing various options with checkboxes: 11010, .a.out, .LX0:, lib.f, .text, //, \s+, Intel, and Demangle. The "Compiler options..." dropdown is also visible.
- Libraries and Tools:** A section for "Libraries" and "Add tool..." is present.
- Assembly View:** A panel showing the generated assembly code for the program:

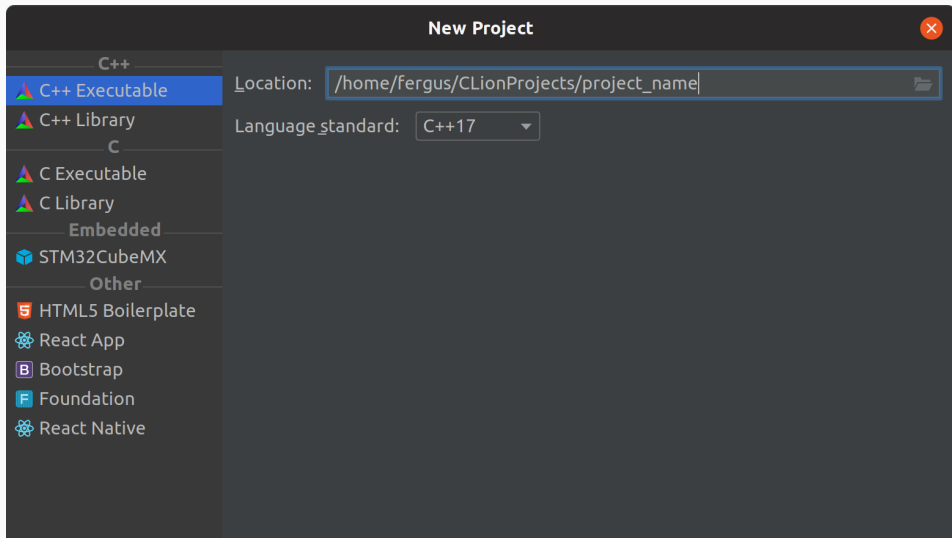
```
1 .LC0:
2     .string "Hello, World!"
```
- Output:** A panel showing the output of the program: "Output (0/0) x86-64 gcc (trunk) - 3130ms (110537B)".
- Execution Results:** A panel at the bottom showing the results of the compilation and execution:

```
#1 with x86-64 gcc (trunk) X
A- [ ] Wrap lines

ASM generation compiler returned: 0
Execution build compiler returned: 0
Program returned: 0
Hello, World!
```

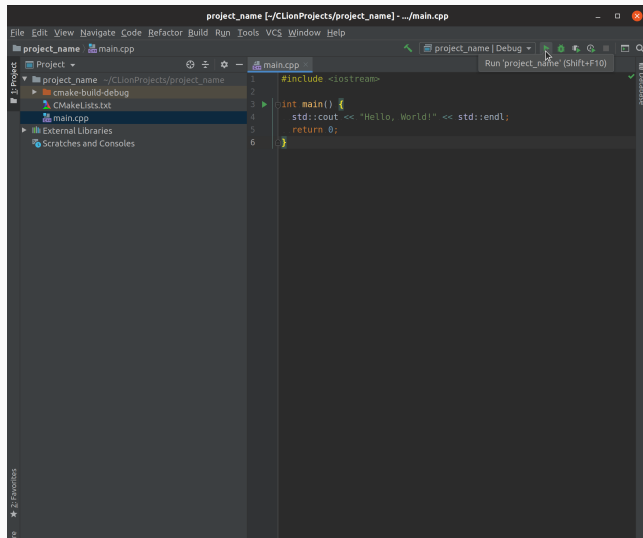
Software for the course

- CLion



Software for the course

- CLion



Acknowledgements

Material for this course adapted from:

- Pitt–Francis & Whiteley: Guide to Scientific Computing in C++
- C++ for Scientific Computing course by Joe Pitt–Francis:
<http://www.cs.ox.ac.uk/people/joe.pitt-francis/C++ScientificComputing/>