CUED - C++

C++ is the object-oriented development of C with classes, member functions, operator overloading, constructors etc. It's the first language taught to undergraduates at CUED.

Starting C++

Local teaching

- 2015-16 1A C++ Computing
- 2016-17 1B C++ Computing
- Tutorial Guide to C++ Programming (for local 1A/1B students)
- CUED's C++ data book
- Frequently asked C++ questions (CUED)
- A handout on Debugging
- Basic optimising and profiling (CUED)
- More C++ (updated in 2016) (notes).

General Reference

- The list of Frequently Asked Questions is invaluable, but isn't designed for complete beginners.

Tutorials

- Learn C++ Programming (programiz)
- The cplusplus.com tutorial
- LearnCpp tutorial
- FunctionX C++ tutorials
- go4expert's C++ forum

Special topics

- cplusplus.com's iostream library reference
- An Introduction to the Standard Template Library (STL) (Carlos Moreno)
- yolinux STL tutorial

Advanced WWW resources

General

- The Lysator list of C-related docs
- The C++ Source (Journal)
- C/C++ Reference

- C++ resources network
- C++ Internet site list (Robert Davies)
- Scott Meyers' C++ articles
- C++ in the Real World: Advice from the Trenches
- Association of C & C++ Users (see their book reviews, etc.)
- Bjarne Stroustrup's homepage (papers, glossary and FAQs).
- Guru of the Week

Maths

- Techniques for Scientific C++ (Todd Veldhuizen)
- Available C++ Libraries FAQ
- Template Numerical Toolkit
- Graph Template Library
- Blitz++ (library for scientific computing)
- What Every Computer Scientist Should Know About Floating-Point Arithmetic
- Object-Oriented Numerics Page (libraries, articles, etc).
- Netlib's C++ material

Pointers

- Pointers and references
- Pointers (by Todd Gibson)
- A Beginner's Guide to Pointers (by Andrew Peace)
- Smart Pointers - What, Why, Which? (by Yonat Sharon)

Programming

- Function Pointer Tutorials
- How to interpret complex C/C++ declarations (by Vikram A Punathambekar)
- C++ Portable Components
- C++ idioms
- SNIPPETS
- the busy comp.lang.c++ and comp.lang.c++.moderated newsgroups.
- Stackoverflow

Other Topics

- CERT C++ Secure Coding Standard
- MLC++ (Machine Learning Library)
- Boost.org - free, peer-reviewed, C++ libraries
- Technical Report on C++ Performance (ISO/IEC) NEW

Local Information

General

- C++ for C programmers
- A look at some of the newer C++ features
- C++ Notes for intermediate students (especially CUED IIA students)
- C++ and the Standard Library
- C++ course (a crash course for CUED 3rd years and upward)
- C++ objects, containers, complex numbers and maps

Special topics

Types

- C++ and simple type conversion
- Casting in C++ (intermediate level)
- C++ type anomalies and special cases (intermediate level)
- typedef

Variables

- Passing values in C++ (the use of `const`)
- C++ and `static`
- C++ and global variables
- C++ and enumeration

Classes

- C++ - a public/private issue
- C++ constructors
- C++ destructors
- How not to overload C++ operators
- C++: Visibility and Look-up (intermediate level)
- Virtuals and overloading (intermediate level)
- C++ Inheritance, Protection and Friends (intermediate level)
- C++ and Building Classes (a vector arithmetic example)
- C++ and Building Classes (a limited-range integer example)

Generic programming

- C++ vector memory and 2D vectors
- C++ vectors and copy/move constructors
- Bridge: A C++ programming Exercise (using `vectors`)
- Trees, Graphs and C++
- bind1st and bind2nd (intermediate level)
- mem_fun (intermediate level)

Performance

- Faster C++
- C++: Nasty Tricks

Misc

- C++11
- C++ "for" loop teaching aid
- C++ "function" teaching aid
- C++ I/O
- sizeof
- Complex numbers
- Templates
- C++ Templates and Friends (intermediate level)
- Namespaces
- C++ Smart Pointers (intermediate level)
- Mixing Languages on linux
- C++ and the main function

Compilers and libraries

We have various IDEs (Integrated Development Environments) providing easy access to the compiler (which is `g++` on the linux machines). Geany is used in the 1st year course. If you want to work away from CUED see

- Remote 1AC++ Computing
- Installing C++ compilers
- Installing C++ graphics libraries
- Remote access to the Engineering Department machines

- g++ documentation
- g++ standard library documentation

To use C++2011 on the central linux system, type

```
g++5 --std=c++11
```

With that version, the following should compile

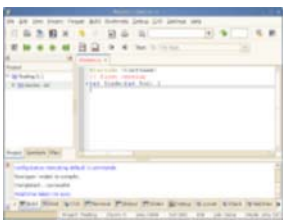
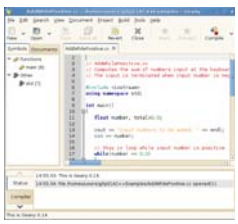
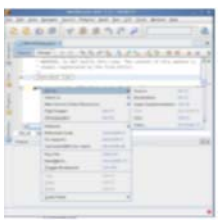
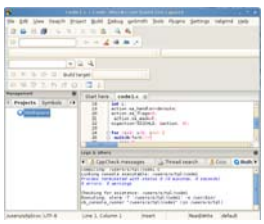
```
#include <iostream>
#include <string>
#include <regex>

int main()
{
    std::string str("1231");
    std::regex r("^(\\d)\\d"); // entire match will be 2 numbers
    std::smatch m;
    std::regex_search(str, m, r);
    for(auto v: m) std::cout << v << std::endl;
}
```

When run, it should produce this output

```
12
1
```

Integrated Development Environments

An Integrated Development Environment (IDE) offers integrated editing, compiling, debugging and project-management facilities. On the teaching system we currently have *Anjuta (version 1)* , *Geany* , *NetBeans* (with a C++ add-on), *Eclipse* and *codeblocks*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FAQ

- CUED C++ Frequently Asked Questions