Introduction

P. Ronchese
Dipartimento di Fisica e Astronomia “G.Galilei”

Università di Padova

“Object oriented programming and C++” course

References

paolo.ronchese@pd.infn.it
room 145 - via Marzolo
phone 049 827 7050

http://www.pd.infn.it/~ronchese/cxx/y2526

https://stem.elearning.unipd.it/course/view.php?id=13041

Aims and topics

main topics

- The C++ programming language:
  - standard C++98/03 as basis (that's already enough...)
  - new features in C++11 (a.k.a. C++0x), when relevant
  - no details about C++11/14/17/... standard differences
  - no multi-thread (but for some basic concepts and examples)
- The object-oriented programming

I cannot expect a 6-CFU course is enough to become expert programmers, but my aim is that at the end you have a rather precise idea of what can be done with C++ and a fairly good skill in exploiting C++ capabilities in the programs you write.

I hope you can have a bit of fun, too...

Outline

- A review of C/C++ basics
- A bit of C/C++ preprocessor
- Storage and linkage specifiers
- Composite objects
- Templates
- A few STL elements
- Inheritance and polymorphism
- C++ patterns
- Extra topic: temporary objects and r-value references
- Extra topic: threads examples

Examples will be shown for (almost) all the specific topics

Books

- S.Prata. *C++ Primer Plus*. Sams Publishing
- S.B.Lippman, J.Lajoie, B.E.Moo. *C++ Primer*. Addison Wesley
- S.Berretti, L.Carnevali, E.Vicario. *Fondamenti di Programmazione*. Esculapio
- M.Bertini.*Programmazione Object Oriented in C++*. Esculapio
- S.Meyers. *Effective C++*. Addison Wesley
- S.Meyers. *More Effective C++*. Addison Wesley
- S.Meyers. *Effective Modern C++*. O'Reilly
- B.Stroustrup. *The C++ Programming Language*. Addison Wesley

WEB sites

- https://www.parashift.com/c++-faq/
  FAQ with useful explanations
- https://cplusplus.com/
  Fairly explanatory, not always fully detailed
- https://en.cppreference.com
  Quite precise, but difficult;
  replace `en` with `it` for an italian version
- Google
  Or whichever else search engine...
  (but be critical about the informations you find, and do not take this advice for other courses, anyway)

Organization

- Description of functionalities
- Demonstration with examples
- Exercises

Examples will be taken, when possible, from:

- nuclear-physics lab course
- subnuclear physics experiment

Exercises will become parts of an unique program doing a specific job

Prerequisites

A very basic knowledge of Linux and its most used commands is required

The C/C++ basics will be revisited, quite shortly

Exercises and examinations

Examples and exercises will be available by web

For each topic, on the web pages you will find:

- Copy of the “slides” (PDF format)
- Copy of the shown examples
- Exercises with suggestions

The exercises will be part of the examination:

- Collection of files (readable!)
- Discussion
- Questions (including some code writing and/or analysis)

On your side?

Questions?

Comments?