C++: A mini tutorial

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A note of caution:

- In the following three **very simple exercises** are proposed to get a "taste" of what C++ and coding means
- They are not exhaustive, nor complete!
- **Since we are all physicists, I have chosen examples from our field,** but the goal is NOT to learn physics, but instead to see what it means "writing programs for physics"
  - The exercises are less than optimal

- In your career, you will have to learn C++ (or some other language), don't be discouraged, and remember: always ask someone more expert if in doubt!
  - Your code will enable you to do fantastic discoveries

Instructions

- Download the examples:

  wget http://cern.ch/adotti/ExercisesC++.tar

  tar -xf ExercisesC++.tar

  cd TutC++
- Read the **README** file
- Exercises are ex1.cpp, ex2.cpp, ex3.cpp
- **The exercises already contain the solution**. The goal is that you understand what is going on: depending on the level of your experience with C++ you can:
  - Write from scratch the solution
  - Modify the solution with your own ideas
  - Read the code and understand what is going on

ex1.cpp: Simple Pendulum

- Write a small program that numerically integrates the equation of motion of a simple pendulum

- Goal:

  - Introduce the concept of a class

  - Show how to use a class

ex2.cpp: Random Numbers

- Write a program that generates "random" numbers
- Goal:
  - The concept of inheritance

ex3.cpp: External Sw

— Write a small program that uses random numbers and performs a simple fit and creates an histogram

— Goal:

- Show how to use external toolkit (in this case ROOT)
- To see the image file type: gthumb in the terminal

— **Important:** due to a problem in installation of ROOT, compile the code with the following line (instead the general one described in the ex file):

```
g++ -I`root-config --incdir` -L/usr/lib/root -lCore -lGpad -lm -ldl -rdynamic ex3.cpp -o random2
```

Additional Material

- Additional material and references can be found at: http://www.ge.infn.it/geant4/training/books.html

- An extensive commented C++ tutorial: http://www.cplusplus.com/doc/tutorial/