Introduction to Programming and Computing for Scientists

Introductory meeting

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Introductory meeting outline

1. Learning outcomes
2. Required knowledge
3. Course plan and schedule
4. Assessment (projects)
5. Course literature
6. Conclusion

1. Learning outcomes

- Knowledge of computing and programming is **essential** in physics, astronomy and other sciences
- Acquired knowledge and understanding:
  - Understanding and use of the concept of program libraries
  - Knowledge of processing, analysing and modelling scientific data using custom software
  - Basic understanding of code optimisation issues, implications of machine accuracy
  - Awareness of frameworks that use programmatic interface
- Acquired skills and abilities:
  - Ability to work in UNIX-based operating systems, particularly Linux
  - Ability to write computer programs using C++
  - Ability to compile from source, build and debug computing programs
  - Ability to develop and document program code in a collaborative environment

2. Required knowledge

- The course is aimed towards **beginners** who have little or no knowledge of computers
  - For those who already know programming some parts will still be interesting
- Some essential knowledge is still required:
  - Good knowledge of mathematics, including basic calculus
  - Basic knowledge of statistics is a bonus
  - Good knowledge of English

3. Course plan and schedule

- The course consists of theoretical lectures and practical tutorials
  - Lectures every Wednesday
    - **Except** the first one on November 2 (Monday)
  - Tutorials on Thursdays and Fridays, in the “big” computer class (H321)
    - **Except** November 11,12 and December 2,3 – Wednesday and Thursday late afternoon (clash with another course)
  - **MAKE SURE** that you have **login** for the computers! (Check with Naomi)
- In total, 7 lectures and 14 tutorials
  - Presented by 5 teachers (best experts!)
- It is important not to miss tutorials!
- Practical homework will be assigned to complement tutorials

4. Assessment

- Projects will be assigned in order to assess the knowledge at the end of the course
  - Will consist of programming tasks, similar to those performed during the course
  - A project is a team work of 2-3 students
- Students will have to hand in projects in January (graded during week 3)
- The projects will be evaluated and graded by the course teachers

5. Course literature

- Main material: hand-outs and references therein
  - Referred manuals are available on-line for free
- Official textbook: *“Problem solving with C++”, W. Savitch*, any edition
  - Covers ~50% of the course

6. Conclusion

- The course is still new, and it is the first time we give it to so many students
  - Technical or logistical glitches are to be expected
- We brought best experts to teach you
- The best result is achieved if you try what you learn at home!
  - Daring students are welcomed to use their notebooks for the tutorials