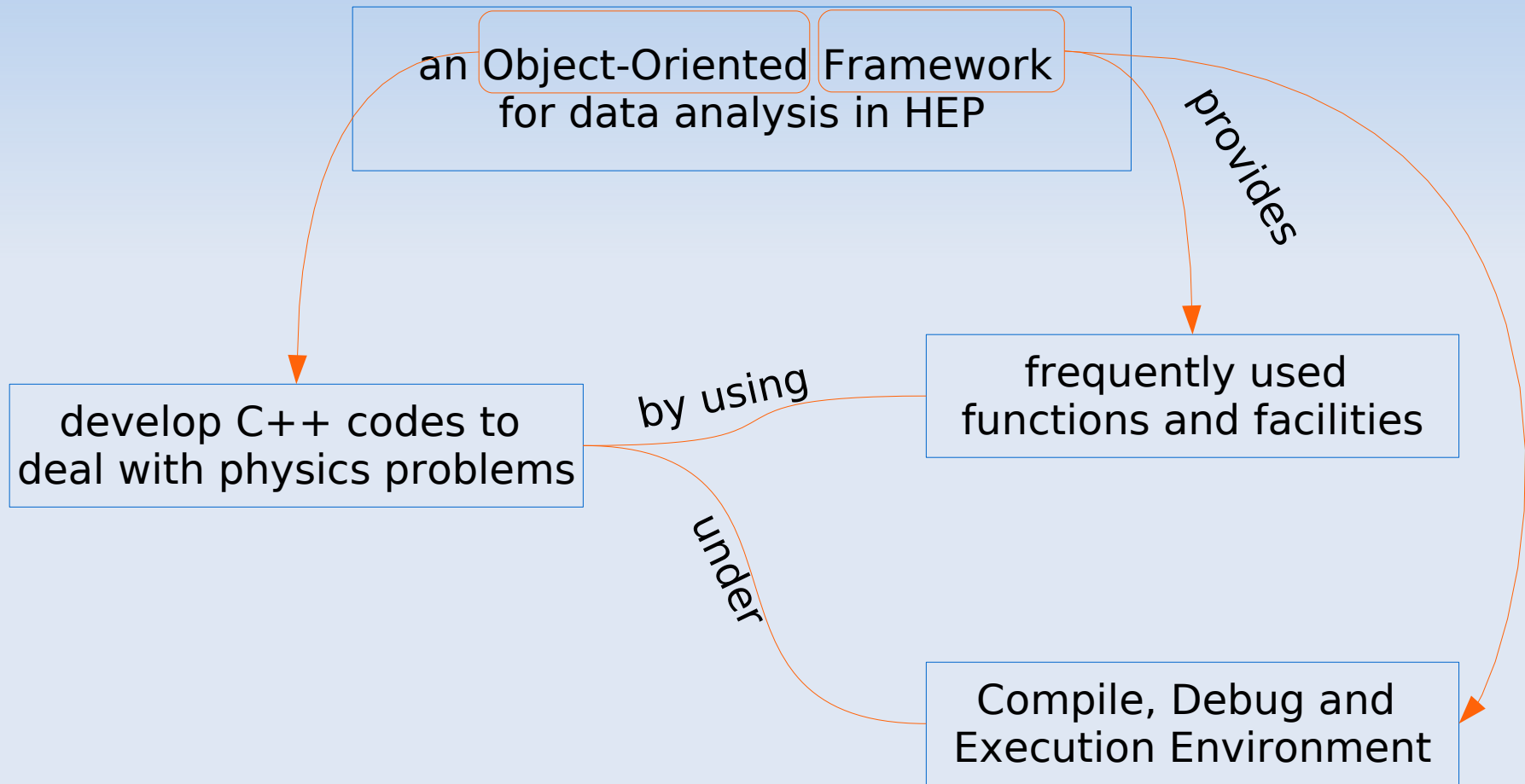# Exercise One
for Computational Physics

Manuela Jelen
Jing Liu

17.10.2006

Course Description

- Prof. Allen Caldwell gives the physics ideas in his lectures

- We help you to realize the ideas by using a set of software packages used in High Energy Physics analysis, named ROOT

What's ROOT

an Object-Oriented Framework
for data analysis in HEP

develop C++ codes to
deal with physics problems

by using

provides

frequently used
functions and facilities

under

Compile, Debug and
Execution Environment

Why ROOT

- Good framework for physics analysis
  - useful functions provided
  - development environment provided

- widely used, well documented, easy to get help

- free, open source

Other Tools

- Ideas are the most important thing, you can choose any other tools to realize them

- You might need to find helps elsewhere

- You are welcome to show your own solutions

Teaching Method

- provide information so that you can learn by yourselves

- keep examples simple to make sure everybody can understand and learn from it

More Info about ROOT

- Homepage: http://root.cern.ch

- Users' Guide:
  http://root.cern.ch/root/doc/RootDoc.html

- HowTo's:
  http://root.cern.ch/root/HowTo.html

- Examples: $ROOTSYS/tutorials

- Reference:
  http://root.cern.ch/root/Reference.html

- Forum: http://root.cern.ch/phpBB2/

Run Demos

- ➢ cd $ROOTSYS/tutorials
- ➢ root demos.C
- ➢ play around by pressing the buttons
- ➢ Help on Demos -> File -> Quit ROOT

Free Falling Example

- http://www.mppmu.mpg.de/~mjelen/freefalling.C
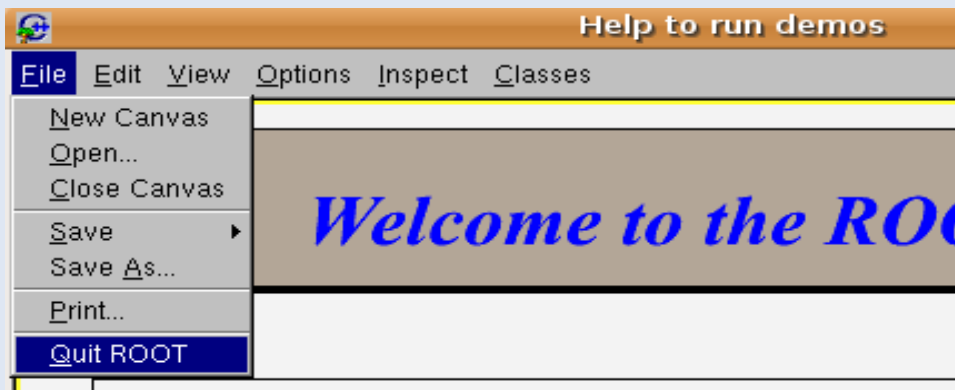
- root

- .x freefalling.C

- .x freefalling.C(300, 20)

- .q

Home Work

I. Read something about ROOT

II. Try to write your own ROOT macro to solve the equation of pendulum motion:

$$\frac{d^2\theta}{dt^2} = -\frac{g}{l}\theta$$

Reference:

- *Computational Physics* Page 48-53

- http://www.mppmu.mpg.de/~jingliu/ECPI/pendulum.C