

# Workshop: High-performance computing for economists

Lars Vilhuber<sup>1</sup> John M. Abowd<sup>1</sup> Richard Mansfield<sup>1</sup>  
Kevin L. McKinney

<sup>1</sup>Cornell University, Economics Department,

August 20-22, 2013: Day 1

What do you learn in a Ph.D. program?

What do you learn in a Ph.D. program?

How to learn...

## Goal of this class

## Goal of this class

To open new doors, to be able to conceive of problems that you didn't think had a feasible solution.

## Goal of this class

To open new doors, to be able to conceive of problems that you didn't think had a feasible solution.

To broaden your knowledge about what you do NOT know

# Overview

## Day 1

- ▶ Programming basics (Lars)

# Overview

## Day 1

- ▶ Programming basics (Lars)
  - ▶ Choosing an editor



# Overview

## Day 1

- ▶ Programming basics (Lars)
  - ▶ Choosing an editor
  - ▶ How to structure programs, texts, etc.

# Overview

## Day 1

- ▶ Programming basics (Lars)
  - ▶ Choosing an editor
  - ▶ How to structure programs, texts, etc.
  - ▶ A clean sequence of programs

# Overview

## Day 1

- ▶ Programming basics (Lars)
  - ▶ Choosing an editor
  - ▶ How to structure programs, texts, etc.
  - ▶ A clean sequence of programs
  - ▶ NX, SSH, Linux, request an account on cluster

# Overview

## Day 1

- ▶ Programming basics (Lars)
  - ▶ Choosing an editor
  - ▶ How to structure programs, texts, etc.
  - ▶ A clean sequence of programs
  - ▶ NX, SSH, Linux, request an account on cluster
  - ▶ Basic scripting

# Overview

## Day 1

- ▶ Programming basics (Lars)
  - ▶ Choosing an editor
  - ▶ How to structure programs, texts, etc.
  - ▶ A clean sequence of programs
  - ▶ NX, SSH, Linux, request an account on cluster
  - ▶ Basic scripting
- ▶ Basics of version control (Lars)

# Overview

## Day 1

- ▶ Programming basics (Lars)
  - ▶ Choosing an editor
  - ▶ How to structure programs, texts, etc.
  - ▶ A clean sequence of programs
  - ▶ NX, SSH, Linux, request an account on cluster
  - ▶ Basic scripting
- ▶ Basics of version control (Lars)
  - ▶ File-system based version control

# Overview

## Day 1

- ▶ Programming basics (Lars)
  - ▶ Choosing an editor
  - ▶ How to structure programs, texts, etc.
  - ▶ A clean sequence of programs
  - ▶ NX, SSH, Linux, request an account on cluster
  - ▶ Basic scripting
- ▶ Basics of version control (Lars)
  - ▶ File-system based version control
  - ▶ More formal version control (Subversion, Git)

# Overview

## Day 1

- ▶ Programming basics (Lars)
  - ▶ Choosing an editor
  - ▶ How to structure programs, texts, etc.
  - ▶ A clean sequence of programs
  - ▶ NX, SSH, Linux, request an account on cluster
  - ▶ Basic scripting
- ▶ Basics of version control (Lars)
  - ▶ File-system based version control
  - ▶ More formal version control (Subversion, Git)
  - ▶ Working with servers



# Overview

## Day 1

- ▶ Programming basics (Lars)
  - ▶ Choosing an editor
  - ▶ How to structure programs, texts, etc.
  - ▶ A clean sequence of programs
  - ▶ NX, SSH, Linux, request an account on cluster
  - ▶ Basic scripting
- ▶ Basics of version control (Lars)
  - ▶ File-system based version control
  - ▶ More formal version control (Subversion, Git)
  - ▶ Working with servers
  - ▶ Setting up infrastructure at Cornell

# Overview

## Day 1

- ▶ Programming basics (Lars)
  - ▶ Choosing an editor
  - ▶ How to structure programs, texts, etc.
  - ▶ A clean sequence of programs
  - ▶ NX, SSH, Linux, request an account on cluster
  - ▶ Basic scripting
- ▶ Basics of version control (Lars)
  - ▶ File-system based version control
  - ▶ More formal version control (Subversion, Git)
  - ▶ Working with servers
  - ▶ Setting up infrastructure at Cornell
- ▶ Subroutines: the example of function programming in R (Lars)

# Overview

Day 2

# Overview

Day 3

# Choosing an editor

... or system

## Separate editors and systems

- ▶ MS Word and math editor
- ▶ LibreOffice
- ▶  $\text{\LaTeX}$  (TeXstudio, TeXMaker, Scientific Workplace, TeXWorks+Miktex, etc.)
- ▶ NotePad++ (Windows)
- ▶ Gedit, (X)Emacs (Linux)

## Integrating programming and running

- ▶ IDE ( Eclipse, ActiveState Komodo, etc.)
- ▶ Native programming GUIs (SAS, Matlab, Stata)
- ▶ Gedit, (X)Emacs

## Integrating programs and text/results

- ▶ SWeave (integrates  $\text{\LaTeX}$  and R)
- ▶ RStudio (GUI to R and SWeave)

# Basic scripting in Linux

## A basic loop on the command line

```
for (( i; i<10; i++ ))  
do  
    echo $i  
done  
for i in 1 3 7 99  
do  
    echo $i  
done
```

Source: [1]

Now let's try it out



Next section

Next section