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# Computer Lab I

## Datasets and BIOGEME

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# Outline

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- Course website
- Case studies
  - Organization of the labs
  - Available datasets
- BIOGEME: step-by-step example

# Course website

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- Site available:

<http://transp-or.epfl.ch/courses/decisionAid2012/index.php>

# Organisation of the labs

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- Case Studies
  - Choice of dataset
  - Testing and interpretation of example models
  - Workbook: results and possible interpretations of the examples
  - Material available on website

<http://transp-or.epfl.ch/courses/decisionAid2012/labs.php>

# Organisation of the labs

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- **Your lab participation**
  - Form groups (2 or 3 maximum)
  - Work on exercises given every week (e.g., exercise-session1.pdf)
  - Hand in the exercise of lab 2.

# Case Studies

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- Study models
- Datasets
  - Netherlands mode choice
  - Optima (Mode choice in Switzerland)

# Case Studies

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- Problem statement

*Can the observed pattern of choice be explained in terms of basic economic variables, such as relative prices, income, and underlying individual characteristics (gender, age, etc.)?*

# Datasets

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- Netherlands mode choice

Data on intercity travelers' choices between the transport modes of rail and car.



# Datasets

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- Optima

Data on Swiss inhabitants' mode choice among public transport, private modes and soft modes (walk, bike, etc)

# BIOGEME

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- Created by Michel Bierlaire
- State of the art software for estimating models in the field of discrete choice
- Open source
- All models presented in this course can be estimated with BIOGEME

# BIOGEME

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- Two versions are available for Windows
  - GUI
  - DOS
- We recommend the DOS version

# Lab 1

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- Today
  - Read data descriptions available on the course web page
  - Step-by-step example with BIOGEME using the Netherlands Mode Choice dataset.

# How to install Biogeme?

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- `biogeme.exe` should be in `C:\Program Files`.
- Open a DOS window (from the Start menu, select Run. In the dialog box, type `cmd` and select OK).
- In order to use BIOGEME from any directory on your computer, the above directory has to be in your “path” (environment variable).
- Type `path=%path%;C:\Program Files` (in the DOS window).
  - Has to be typed every time the DOS window is opened
- To check if the installation has been successful, just type `biogeme` in the DOS window. A message displaying the version of BIOGEME should then appear.

# How to invoke Biogeme?

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- BIOGEME is invoked in a DOS command window under Windows using the following statement structure:

```
biogeme model_file sample_file.dat
```

- 2 types of file invoked: .mod & .dat
- The graphical version of Biogeme `winbiogeme.exe` (also available in `C:\Program Files`) is invoked by a double-click on the executable file.

# DOS Command Window

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Here are some useful commands

- To select a drive (e.g. C), just type `C:` at the prompt.
- To connect to a directory (e.g. `C:\biogeme`), just type `cd C:\biogeme`.
- To see the content of a directory, use Windows Explorer, or type `dir`.
- In order to return to the previous (top) directory, type `cd ..`

# How does BIOGEME work?

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- BIOGEME reads:
  - a file containing the model specification  
`model_file.mod`
  - a file containing the data `sample_file.dat`
  - Both are text documents (open with wordpad)
- `biogeme model_file sample_file.dat`
- BIOGEME automatically generates:
  - A file containing the results of the maximum likelihood estimation: `model_file.rep.`
  - The same file in HTML format: `model_file.html.`



# Example

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- Netherlands mode choice
- Choice between rail and car
- 223 observations
- Travel times and travel costs are used as explanatory variables for the model, and the deterministic utility specifications are

$$V_{\text{car}} = \text{ASC}_{\text{car}} + \beta_{\text{cost}} \text{car}_{\text{cost}} + \beta_{\text{time}} \text{car}_{\text{time}}$$

$$V_{\text{rail}} = \beta_{\text{cost}} \text{rail}_{\text{cost}} + \beta_{\text{time}} \text{rail}_{\text{time}}.$$



Model is specified in `model_file.mod`

# Example

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Extract from the file containing the data `sample_file.dat`

id	choice	rail_cost	rail_time	car_cost	car_time
1	0	40	2.5	5	1.167
2	0	35	2.016	9	1.517
3	0	24	2.017	11.5	1.966
4	0	7.8	1.75	8.333	2
5	0	28	2.034	5	1.267
...	...	...	...	...	...
219	1	35	2.416	6.4	1.283
220	1	30	2.334	2.083	1.667
221	1	35.7	1.834	16.667	2.017
222	1	47	1.833	72	1.533
223	1	30	1.967	30	1.267

- 1 row = 1 observation
- 1 column = 1 variable

# Estimate your first model

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- Download the two files from the course web page to the directory of your choice (e.g. Desktop).
- In the DOS window, move to this directory using the `cd` command.
- Invoke BIOGEME:

```
biogeme model_file sample_file.dat
```

- Open the HTML file `model_file.html`.
- We briefly discuss it.