## Software installation instructions

- The software that we will use for the NMO labs consists of **AMPL** (an algebraic modelling language) and **CPLEX** (a solver for linear programming, integer linear programming etc.).

- You can download *a free demo version*[1] of AMPL and CPLEX[2] from the here: **https://ampl.com/try-ampl/download-a-free-demo/**

- The above website also contains all necessary information to install the software. First determine the Operating System (OS) and distribution of your personal computer (e.g., 32 bit Windows, 64 bit Linux etc.). For any combination of OS and distribution there are two versions of the software: the IDE (Integrated Developer's Environment) version and the terminal version. Once you have determined your OS+distribution and selected the software version you prefer (IDE/terminal), download the corresponding software package and follow its instructions for installing and running the software. When you enter the ampl shell, that is, when you see the command prompt ***ampl:*** in the AMPL IDE or your terminal, you can test the installation as follows:
  1. Go to the **Beep** page of the course, click on the **Documents and Media** tab and download the zipped folder **test** which you can find under **NMO/LABS/software.**
  2. Unzip **test**, move the two files within the extracted **test** folder (**test.mod** and **test.dat**) inside your **ampl folder** (folder you obtained from unzipping the software zipped package, e.g., if you installed the terminal version for 32 bit Windows, your ampl folder should be named **ampl.mswin32**).
  3. Go back to the AMPL IDE/your terminal and type in the following commands (**text in grey**) after ***ampl:***

  • **Windows:**

```
ampl: model test.mod;
ampl: data test.dat;
ampl: option solver cplex;
ampl: solve;
```

  • **Linux & macOS:**

```
ampl: model test.mod;
ampl: data test.dat;
ampl: option solver ./cplex;
ampl: solve;
```

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[1] The terms and conditions for using this software are available here: **https://ampl.com/try-ampl/free-ampl-trial-demo-terms/**

[2] The free demo packages contains CPLEX but also other solvers. During these labs we will use only CPLEX since we will deal only with three types of problems: linear programming (LP), integer linear programming (ILP) and mixed integer linear programming (MILP), which can all be solved by CPLEX.

- Remember to terminate each command with a semi-colon (`;`) ! In case of **Linux** and **macOS,** if typing **`./ampl`** does not work, try **`"./ampl"`** instead (i.e., surround the command by " "). Similarly, for **`./cplex`**, try **`"./cplex"`** if the former command fails to work. You may have to flag the files **ampl** and **cplex** in your **ampl folder** (folder you obtained from extracting the software zipped package) as executables.

- During these labs you will learn the essentials of the AMPL syntax. A reference manual for AMPL and the complete AMPL book can be obtained from the following links:
  **https://ampl.com/BOOK/CHAPTERS/24-refman.pdf**
  **https://ampl.com/resources/the-ampl-book/**