

# MBT Experiments

October 6, 2020

This text contains a description of how to perform experiments with MBT ILP models.

## 1 Structure of the folder experiments/

- `ampldata/` - input files for the ILP models. The CPLEX solver is fed with these data files
- `javaprograms/` - procedures written in java
- `logs/` - log files for elapsed time (`timelog.txt`) and objective function value (`objlog.txt`)
- `manual/` - this manual
- `models/` - ILP models coded in AMPL

## 2 Running the experiment

The main script for running the experiments is `iterfiles.sh`. It is run by typing

```
bash ./iterfiles.sh [parameters]
```

from the experiments directory (where `iterfiles.sh` is located). There are three different modes in which `iterfiles.sh` can be executed.

## 2.1 Input data from AMPL

This option allows to process multiple AMPL files (with \*.dat extension).

```
bash ./iterfiles.sh ampl location_of_AMPL_data_files
```

The first parameter specifies that the mode is AMPL and the second one points to the folder in which the data files are stored. Typically it is the folder experiments/ampldata.

## 2.2 Input data from 'raw' files

A common way of how to store a graph in a file is shown in the following example:

```
4 5
0 1 1.00
0 2 1.00
0 3 1.00
1 2 1.00
2 3 1.00
```

This example encodes that the graph has 4 nodes and 5 edges, each of unit weight. The edges are (0,1), (0,2), (0, 3), (1,2) and (2,3). In order to run experiments on files with raw format, use the command

```
bash ./iterfiles.sh raw num_of_sources location_of_raw_data_files
```

## 2.3 Randomly generated instances

The last option allows to run randomly generated instances with given parameters. This option will probably not be used again, so it is only briefly described. More details will be added in case they are needed. Type

```
bash ./iterfiles.sh rand num_of_generated_instances num_of_nodes num_of_sources
density location_of_generated_ampl_files
```

and the program will generate desired number of random graphs with given

number of nodes, sources and edge density. Resulting AMPL files are then stored in the specified location.

### 3 How it works

The purpose of `iterfiles.sh` is to prepare AMPL data files and generate AMPL runfile that defines experimental settings and calls the solver which executes the computation. Once the AMPL data files are prepared, the function `makeAMPLrun` is called. This function generates the AMPL run file with an AMPL data file as an input.

The file `iterfiles.sh` is very ad-hoc and contains several hard coded parameters (location of the cplex solver, log files, etc.), which should be adjusted according to the machine on which it is executed. Which AMPL model is used is specified inside the body of the function `makeAMPLrun`. Elapsed time and objective function value of individual methods are stored in files `timelog.txt` and `objlog.txt`.