Project Description

Linear programming is a mathematical method for determining a way to achieve the best outcome (such as maximum profit or lowest cost) in a given mathematical model for some list of requirements represented as linear relationships. An example linear programming job is given as follows:

```
minimize      3 x1   - x2
subject to    -x1 + 6 x2 - x3 +   x4 >= -3
                    7 x2       + 2 x4  =   5
              x1 +   x2 + x3            =   1
                          x3 +   x4 <=  2
```

lp_solve (http://lpsolve.sourceforge.net/5.5/) is a widely used linear programming library. It can be used either as a command line tool or through its C API. In this project, your task is to build an Eiffel linear programming library which delegates the solving job to the lp_solve library. The project must contain the following functionalities:

- Class representation of the linear problem to solve (both minimization and maximization jobs)
- Class representation of the solution or in case of no solution exists, an indication to the client
- A time measurement for each of the performed solving job
- Caching of already solved jobs, so new duplicated jobs can read results directly from the cache
- Choose either the command line tool or the C API to perform the solving. Using the C API will yield better time performance, however, it is more difficult to implement. Projects using the C API will receive an additional 5 points.
- A test suite showing the major functionalities
- Use void-safety
- A final presentation demonstrating the design and performance of the delivered library
- Project should be finished by a single student