# Data Format Description

In the following, a description of an input data format for complex job-shop scheduling problems (CJS) is given. All indices are zero based, i.e the index 0 refers to the first element of a list. The input data is provided in a plain text file with the file ending "**.cjs.input**" that consists of:

- One line containing the following four natural numbers separated by single spaces:

  **nmbJobs** The number of jobs

  **nmbMachines** The number of machines

  **nmbFamilies** The number of operation families

- One line containing the default **objective**. It is given as a string that can be e.g. *Makespan, TWT* or *TWC*.

- **nmbJobs** subsequent lines describing jobs. Each of these lines contains natural numbers separated by single spaces. The first four numbers specify *release date*, *due date*, *weight* and the *number of operations* $|O_j|$ of this job. They are followed by $|O_j|$ natural numbers specifying *family indices*.

- **nmbMachines** subsequent lines describing machines. Each of these lines contains a single natural number specifying the batching capacity of the machine.

- **nmbFamilies** subsequent lines describing operation families. The first number in the line specifies the number $n$ of machines that can process operations of this family. It is followed by $n$ pairs of numbers, specifying *machine indices* and corresponding *processing durations*.

- **nmbFamilies** subsequent lines describing setup times. Each of these lines contains nmbFamilies natural numbers which specify setup times. A number in column $c$ and line $r$ specifies the setup duration needed after an operation of family $r$ that is scheduled right before an operation of family $c$ on the same machine.