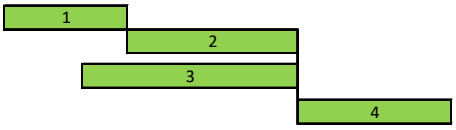
MTO aggregate planning optimization assignment

In this assignment we experiment with given (and modified) MTO aggregate planning optimization OPL-models using CPLEX. Introduction to subject and descriptions of models are in lecture materials in MyCourses.

Model and data:

- Process is a 4 resource job shop for a product family
- Allowed durations and work contents for process steps and due dates and earliest starting times for orders are known
- Each optimization experiment concerns 10 orders, each of which consists of 4 steps as shown below:



- Numbered steps load the four resources correspondingly
- Resource load profile peaks (sum of all 4) are the optimization criterion, which is minimized

1

… assignment

- In the assignment results from 3 different cases are compared (same as in lecture material):
  1. Standard project schedules where steps directly follow each other and work is distributed evenly over allowed duration
  2. Project control method where single process steps may be moved within timing and precedence constraints. Work is distributed evenly over allowed durations
  3. Same as above, but work contents may be freely allocated within process step timing windows
- Assignment steps for example as follows:
  1. OPL-project creation and testing of models
  2. Experiments with group data, which is read directly from Excel data file. Repetitions are not required, tests with given ”order backlog” is sufficient
  3. Do analysis, conclusions and write report

2

…additional instructions

- Excel file ”MTO-AggregatePlanningAssignmentData.xls” contains group specific data
- Copy your data to yellow area so that the models read the data from the right cells (observe references in .dat file)
- Auxiliary variables S[i][t] in the model are written to the same Excel file (green area). With this data drawing of resource profiles is easy, as has been done in the spread sheet. In the file example values are sorted by 1) resource and 2) order (to the right of the green area)
- Solving may take a long time, even a few hours. Engine log / gap % figure shows how far from optimum the incumbent result is. You can limit solving time in the .ops parameter settings.

Extra study

Test forward and backward scheduling (see lecture notes) and compare results with the earlier ones.

3