The resource-constrained project scheduling problem with discounted cash flows (RCPSP-DC)

Reference: Vanhoucke, M., Demeulemeester, E. and Herroelen, W., 2001, "On maximizing the net present value of a project under renewable resource constraints", *Management Science*, Vol. 47, 1113-1121.

1. Run the executables

Case 1: Solve a set of instances

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Problem name : mv

Number of first problem : 1

Number of last problem : 1800

Percentage negative cash flows (see paper. E.g. 60) : 25

Startdeadline: how much above the makespan? (0 = deadline=makespan) : 4

Interest rate (e.g. 0.01) : 0.01

Time limit in seconds : 100_
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Case 2: Solve 1 instance: put number of first problem equal to number of last problem

2. Input Files

The procedure needs the following inputs:
- A network: The input files can be downloaded from our website (see mv.zip)
- The percentage negative cash flows: This is a number between 0% (all positive cash flows) and 100% (all negative cash flows). The specific cash flows will be automatically generated by the program from the interval [-500,+500]. For more information, see section "output files"
- The deadline of the project: This deadline is equal to the number of time units above the resource-constrained minimal makespan. This minimal duration can be found in the file "deadline.mv"
- An interest rate: This interest rate is expressed as a fractional number, e.g. 0.01
- A time limit (in seconds)

3. Output Files
1. Output.out: File with the results containing
   a. The number of the problem instance
   b. The number of created nodes
   c. The number of branched nodes
   d. The solution value (net present value)
   e. The required CPU-time (in seconds)
   f. Optimal or heuristic solution?
2. Info.out: File with the extra inputs, cash flows, generated by the program. These cash flows can be used to compare other procedures (in order to generate the same instance sets). Each line contains a number, denoting the number of the problem instance, followed by a sequence of numbers, denoting the (positive or negative) cash flows for each activity

4. Remarks

The programs use the networks of Vanhoucke et al. (2001). Copy the input networks (mv.zip) and the deadline file (deadline.mv) in the same directory as the executables to run the programs. Other networks can be used to run the programs, under the conditions that they have a similar format to express an activity network with minimal precedence relations with a zero time-lag.