

Data files: The RCMP format

The datasets with instances for the resource constrained multi-project scheduling problem (RCMPSP) make use of the .rcmp format to represent an activity-on-the-node network with renewable resource use. This is an extension of the Patterson format for single-project. It is a simple text file and its structure is explained on the illustrative portfolio of figure 1. There are two projects, each node has a label X.Y where X is the project number and Y the activity number in that project. Each integer above the node is assumed to be the activity duration.

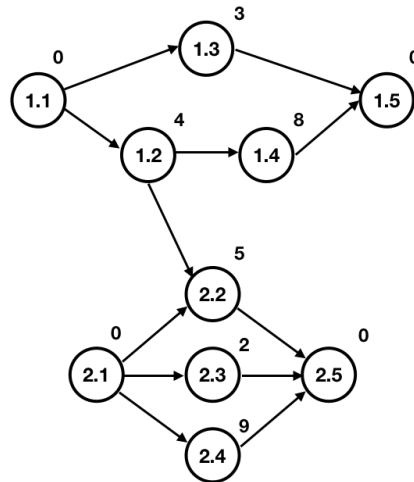


Figure 1. An illustrative activity-on-the-node multi-project network

Each project in figure 1 has two dummy activities, i.e. dummy start nodes 1.1 and 2.1 and dummy end nodes 1.5 and 2.5. The portfolio contains 10 activities in total, dummies inclusive. The .rcmp format allows precedence relations between activities of different projects (from 1.2 to 2.2 in the example). The format is structured as follows: The first three lines contain the overarching portfolio information and are followed by blocks of information per project.

Portfolio lines

Line 1: Number of projects (starting with project 1)

Line 2: Number of renewable resources

Line 3: (one number for each resource)

- Availability for each renewable resource

Project blocks (one block per project)

The next lines are grouped in blocks, each containing the information about one project. We will now discuss the structure of one project block:

Line 1:

- Number of activities in the project (including dummies)
- Release date of the project

Line 2: (one number for each resource)

- 1 if the project uses that resource, 0 otherwise

Next lines from (one line for each activity, starting with a dummy start activity and ending with a dummy end activity)

- Activity duration
- Resource requirements for each resource type
- Number of successors
- Activity ID for each successor (in the format X:Y, where X is the project number and Y the activity number)

It is assumed that the portfolio of figure 1 needs four renewable resource types, that project 1 requires resource types 1, 2 and 3 and that project 2 requires types 1, 2 and 4. Consequently, the .rcmp text file for the network of the figure is as follows:

```

2
4
10 10 10 10

5 0
1 1 1 0

0 0 0 0 0 2 1:2 1:3
4 8 6 3 0 2 1:4 2:2
3 1 8 9 0 1 1:5
8 3 4 2 0 1 1:5
0 0 0 0 0 0

5 0
1 1 0 1

0 0 0 0 0 3 2:2 2:3 2:4
5 7 5 0 3 1 2:5
2 3 4 0 1 1 2:5
9 1 1 0 8 1 2:5
0 0 0 0 0 0

```

As an example, activity 1.2 of needs 8, 6, 3 and 0 units of resource 1, 2, 3 and 4, respectively. The availability of these resources is set at maximum 10 units. Furthermore, activity 1.2 has two successors: activity 1.4 and 2.2.