

B(E)3M33UI — Exercise K: Critical Path Method

Radek Mařík

May 9, 2017

1 Critical Path Method (CPM)

The goal of this task is to become familiar with scheduling, specifically with Critical Path Method (CPM) used heavily to schedule project activities.

The goal is to use CPM (<https://github.com/dhenderson/criticalpy>) or, alternatively, implement your own CPM.

Task 1: Schedule a non-trivial process and compute its critical path using CPM.

Constraints on the process:

- The process is non-trivial.
- Contains at least 20 activities.
- The sequence of activities is not linear.

Examples:

- Bike, PC, building construction
- Rock climbing
- Cooking recipe
- Software development plan.
- Soldier's operation schedule

Task 2: Plot a graph of the project plan

Hints:

- Use the `graph.py` to write a graph using the dot language
- Use the `dot` command to convert dot file to png file
- `dot -Tpng project.dot -o project.png`

A very simple example is shown in test.csv. There are five tasks (A, B, B2, C, D), each task j with specified duration, p_j , and predecessors $\{ \text{all } k \rightarrow j \}$.

```
id,name,duration,predecessors
10,A,7,
20,B,10,10
25,B2,3,10
30,C,5,10
40,D,5,"20,30,25"
```

The project and its critical path is shown in Figure 1. Each task has the following attributes:

- first column:
 - S'_j - earliest possible start
 - S''_j - latest possible start
- second column:
 - p_j - task duration
 - name
 - slack = $S''_j - S'_j$
- third column:
 - C'_j - earliest possible completion time
 - C''_j - latest possible completion time

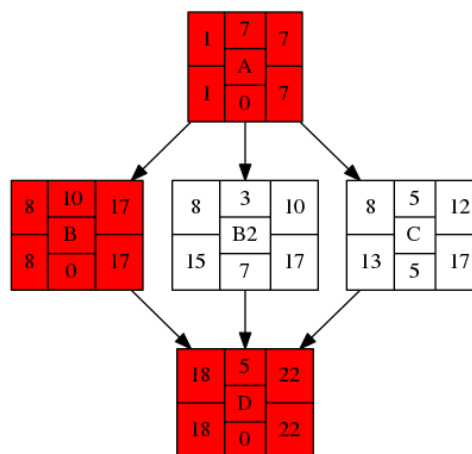


Figure 1: Project visualization with critical path in red.

2 Have fun!

Complete the exercise as a homework, ask questions on the forum, and upload the solution via Upload system!