

One-to-many routing for integrated timetabling (topic presentation)

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31.10.2025

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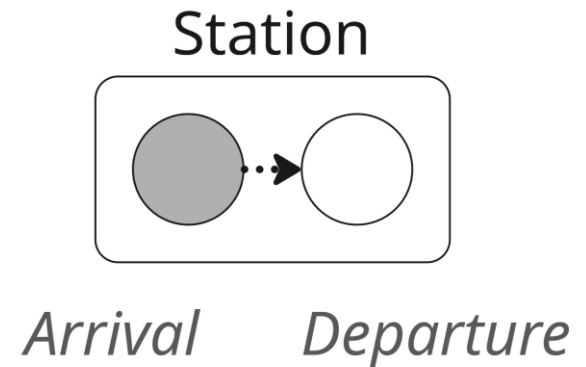
Työn saa tallentaa ja julkistaa Aalto-yliopiston avoimilla verkkosivuilla. Muilta osin kaikki oikeudet pidätetään.

Timetabling in public transportation

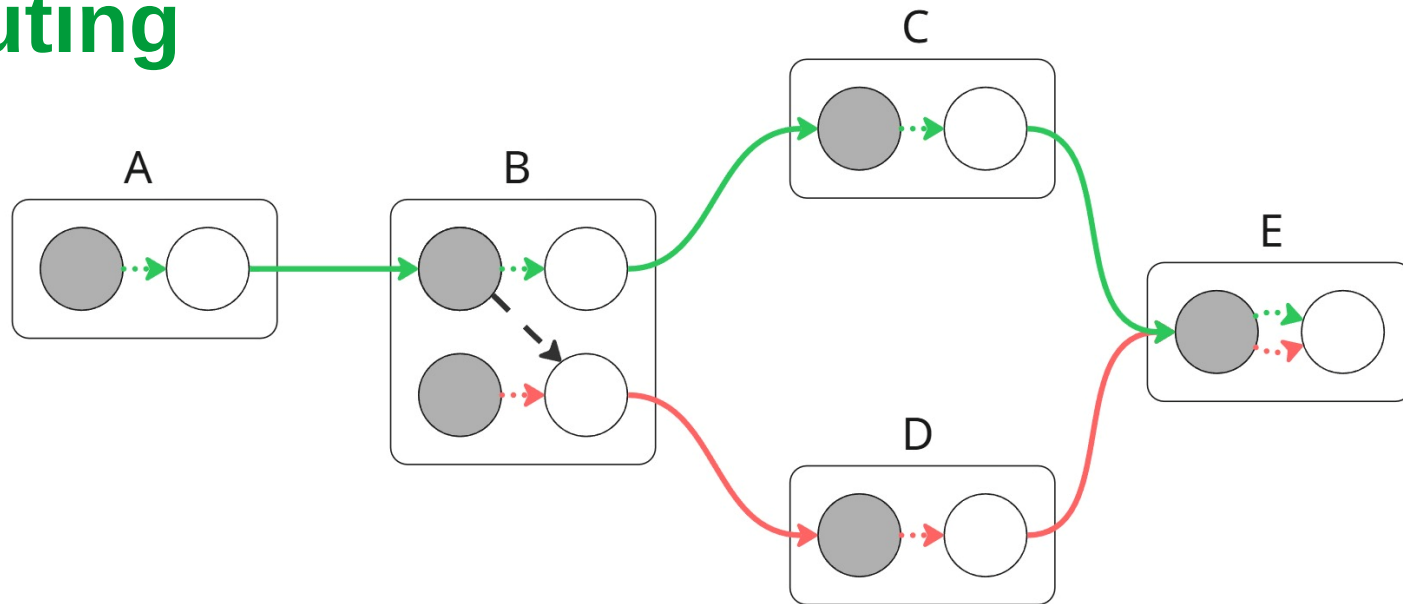
The goal is to find optimal arrival and departure times for each transportation line on each station.

Things to consider:

- Passenger volume on each route
- Minimum and maximum travel times between stations
- Passengers transferring between different lines



Integrated timetabling and passenger routing



A simple transportation event-activity network graph. The named boxes represent stations, between which there are two transportation lines, a green and a red line. The circles are events, gray is arrival and white is departure from a station, while the arrows are activities: solid line for driving, dotted for waiting and dashed for transferring to another line.

Objectives

1. Reformulating the existing problem as a one-to-many routing problem.
2. Implementing the new model to the existing lineplanning and timetabling project using Python.

Literature and references

Schiewe P. and Schöbel A. (2020). Periodic Timetabling with Integrated Routing: Toward Applicable Approaches. *Transportation Science*, 54(06), pp. 1714-1731.

Korte B. and Vygen J. (2012). *Combinatorial Optimization: Theory and Algorithms*. 5th edition. Heidelberg: Springer.

Schedule

- Topic presentation (31.10.2025)
- Timetable modelling (Nov-Dec 2025)
- Implementation with Python (Dec 2025-Jan 2026)
- Thesis ready (Jan 2026)
- Results presentation (Jan-Feb 2026)