Lecture Introduction to Network Science
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BIONETS

Assignment 6 – Temporal Networks

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Question 1

Answer the following questions:

a) What are characteristics of temporal networks (e.g. in contrast to evolving networks)?

b) What is one main difference of optimal temporal paths in contrast to optimal static paths?

c) Consider Slide 29 from the lecture. Justify why the statement in the third bullet point holds.

Question 2

Consider the temporal network visualized in Figure 1. Edges are labeled in the format $S :: t$ with S denoting the set of the edge's starting times and t the edge's traversal time.

a) Assume John wants to travel from A to D. Which possible paths can he take to arrive at his destination?

b) For each of the possible temporal paths, compute its distance and duration.

c) Which of those paths are earliest-arrival, latest-departure, fastest, and shortest paths?

Question 3

Implement the algorithm for computing fastest paths based on pruning dominated paths (see Slide 32). Your implementation should take the input network as an edge stream with each edge represented as a tuple (u, v, t, λ).

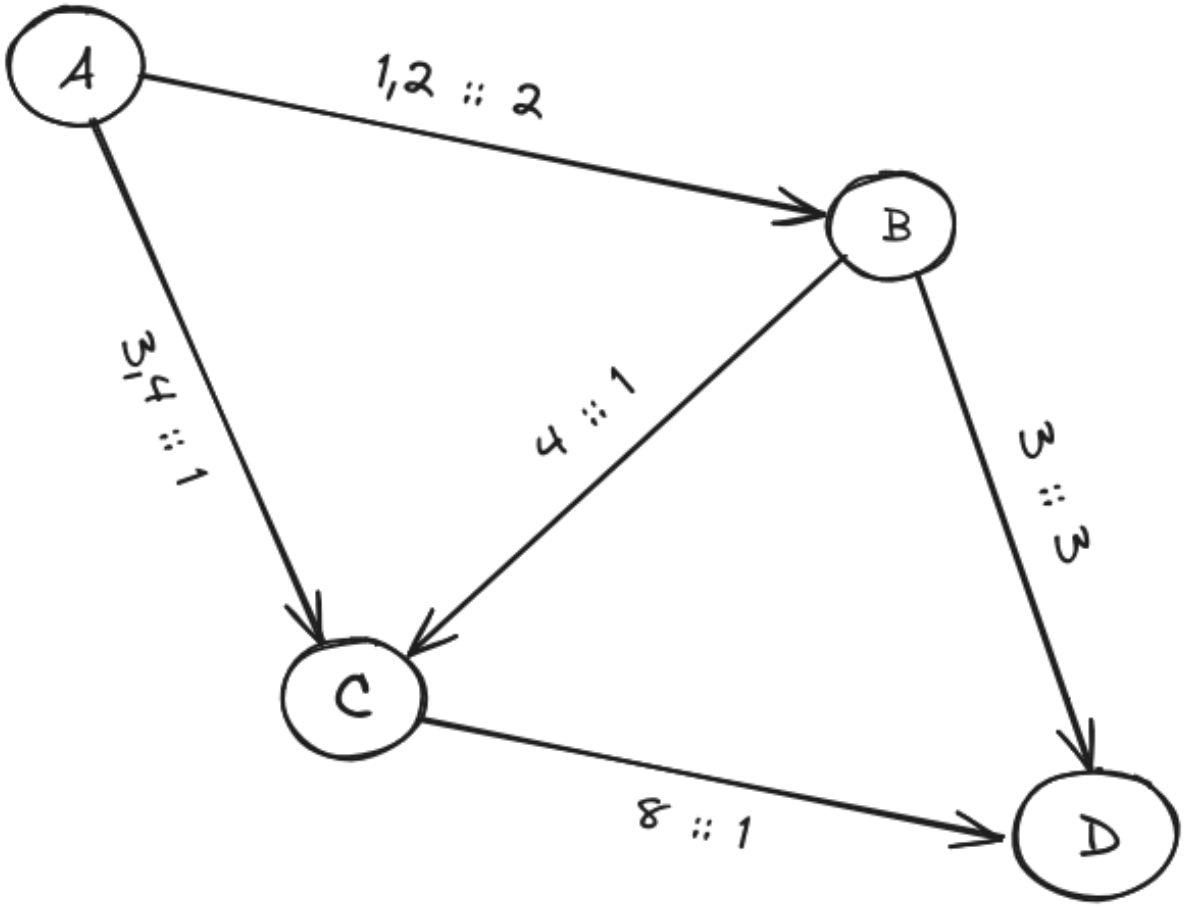

Figure 1: Example temporal network.