Enumeration Complexity of Problems in P

Proving upper and lower time bounds on the runtime complexity of partial solution computation

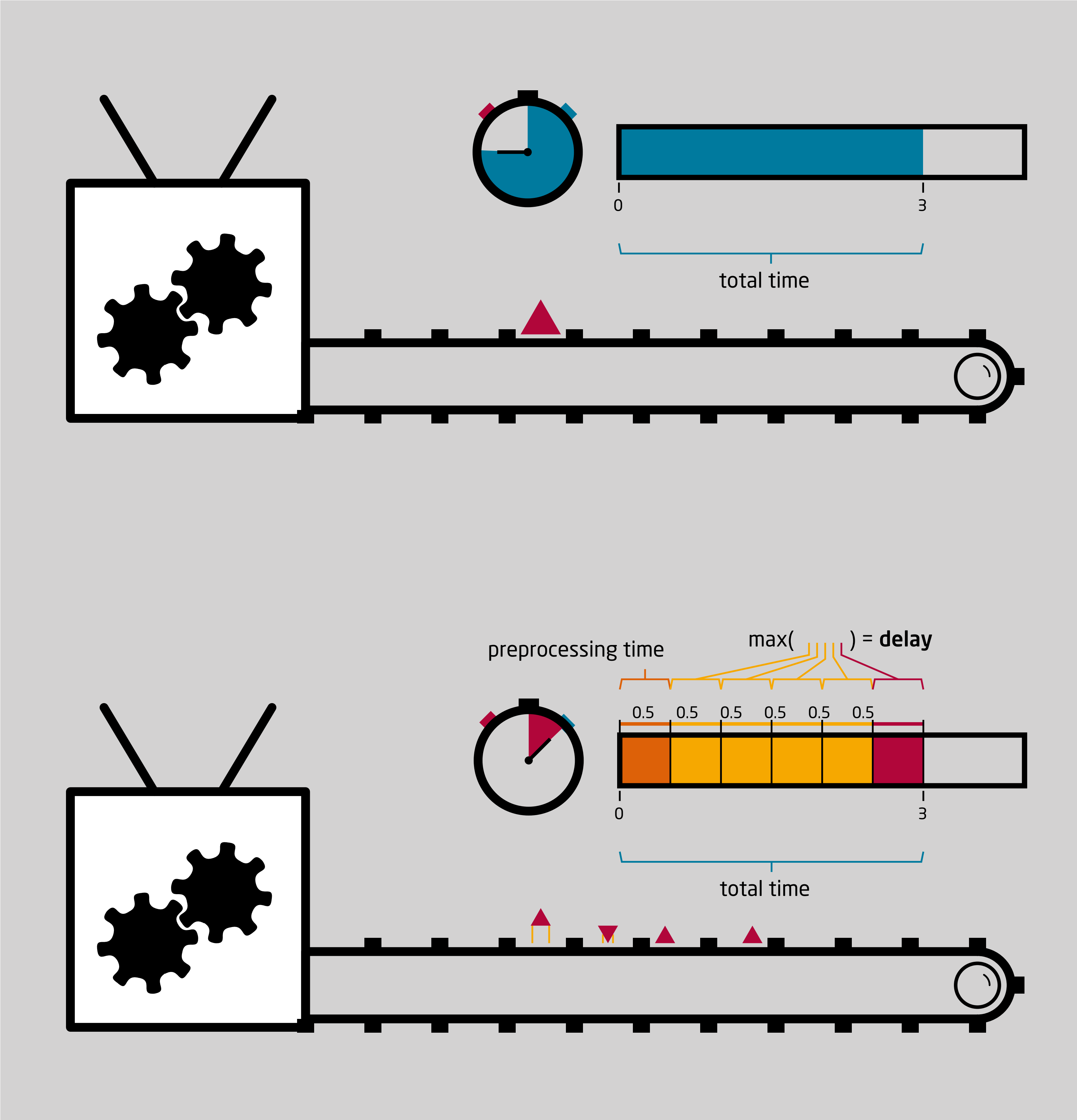
Waiting for algorithms to finish waists time and resources

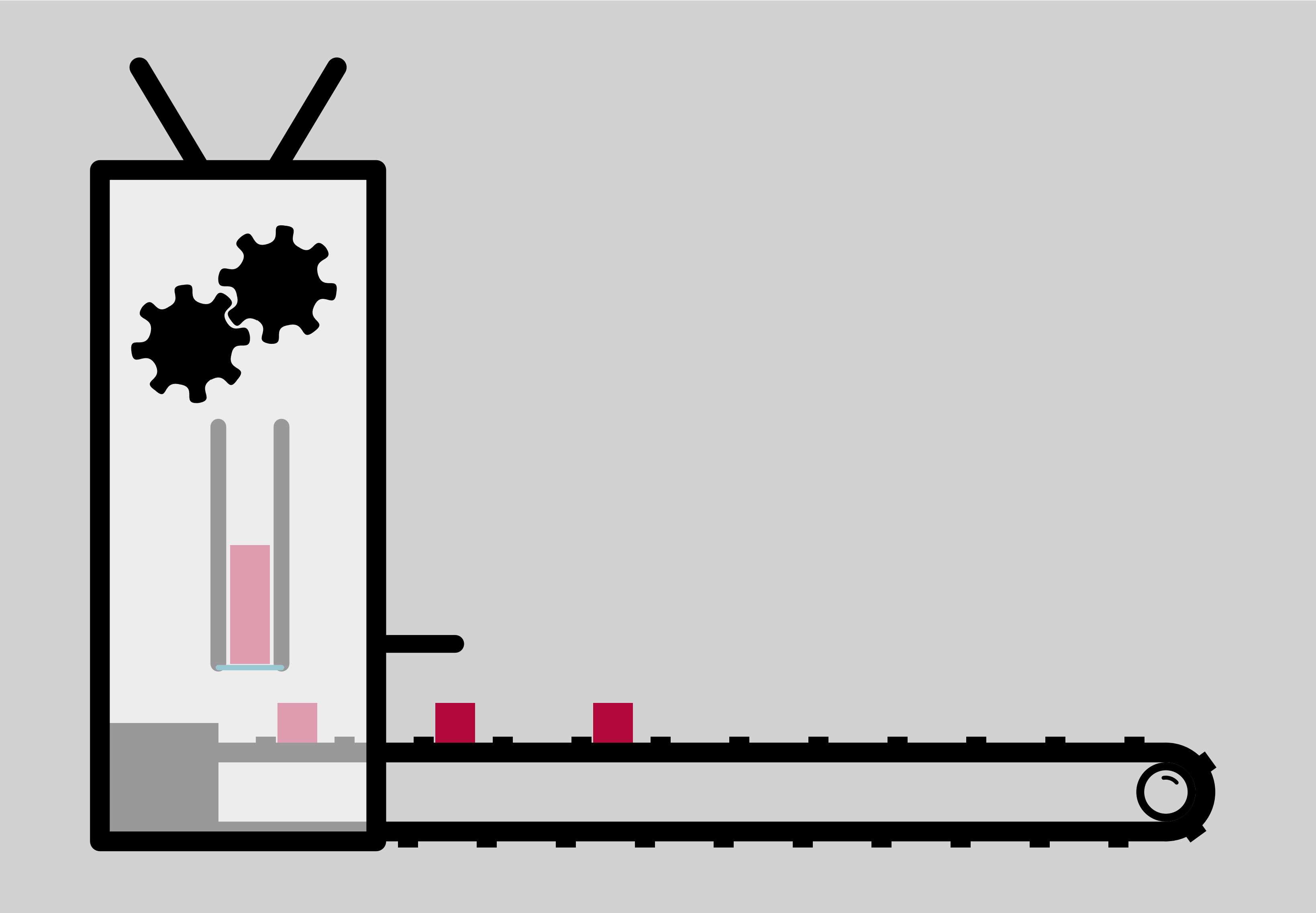
A problem's complexity is usually analyzed in terms of the total time of algorithms that solve the problem. However, systems rarely consist of a single data processing step, but run multiple algorithms in series.

- Waiting for complete results of one step stalls subsequent pipeline steps.
- Computation power of stalled machines is unused.

We analyze algorithms that enumerate partial solutions to a problem.

- Subsequent algorithms can start to work on partial results of a previous pipeline step.
- The total time of single steps remains unchanged, the overall runtime of the pipeline can improve.





Towards a fine-grained complexity theory for enumeration problems

We aim to complement the known fine-grained complexity classes of total-time problems with new results from their enumeration counterparts.

- Analyze amortized delay of enumeration variants of well-known problems in P such as sorting, computing shortest paths, job scheduling, ...
- Develop a formal framework for problem analysis in our enumeration setting.
- Compare problem complexities with reductions.

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