Università della Svizzera italiana

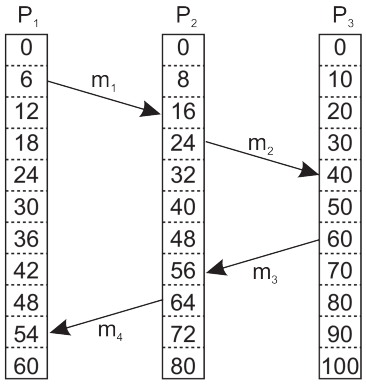
Faculty of Informatics

Distributed Systems **Autumn 2024/25**

Theory Assignment 6 — Coordination

Exercise 1 -

Add a new message to the figure below whose send and receive events are concurrent with message m1, that is, they neither happen before m1 nor happen after m1.



Exercise 2 -

When a node synchronizes its clock to that of another node, it is generally a good idea to take previous measurements into account as well. Explain why and give an example of how such past readings could be taken into account.

Exercise 3 -

Many distributed algorithms require the use of a coordinating process. To what extent can such algorithms actually be considered distributed?

Exercise 4 -

In the centralized approach to mutual exclusion, upon receiving a message from a process releasing its exclusive access to the resources it was using, the coordinator normally grants permission to the first process on the queue. Give another possible algorithm for the coordinator. What could drive the choice for such algorithm?

Exercise 5 -

In the figure below we have two ELECTION messages circulating simultaneously. While it does no harm to have two of them, it would be more elegant if one could be killed off. Devise an algorithm for doing this without affecting the operation of the basic election algorithm.