

Exercise for the lecture

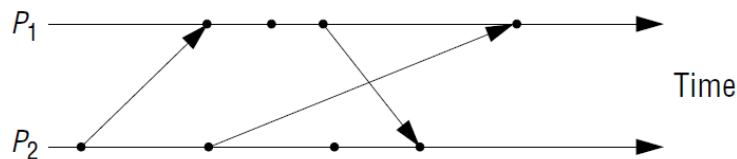
Distributed Systems

Summer 2013

Sheet 2

EXERCISE 1:

1. Global States for the Execution



The figure above shows events occurring for each of two processes, p_1 and p_2 . Arrows between processes denote message transmission. Draw and label the lattice of consistent states $(p_1 - state, p_2 - state)$, beginning with the initial state $(0, 0)$.

2. Synchronous System

You are running a collection of processes p_1, p_2, \dots, p_N . Each process p_i contains a variable v_i . You wish to determine whether all the variables v_1, v_2, \dots, v_N were ever equal in the course of the execution.

- a) Your processes run in a synchronous system, meaning there are known bounds on the drift rate of the local clocks, message transmission time and execution time for each step of a process.

You use a monitor process to determine whether the variables were ever equal. When should the application processes communicate with the monitor process, and what should their messages contain?

- b) Explain the statement *possibly* $(v_1 = v_2 = \dots = v_N)$. How can you determine whether this statement is true of your execution?