Distributed Algorithms
Jacobs University Bremen
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Course: CA-CS-803
March 4th, 2021

Homework 2

- Submit one ZIP file per homework sheet which contains one PDF file (including pictures, computations, formulas, explanations, etc.) and other files if needed.

Problem 2.1 *Causality of Events and Vector Clocks* (3 points)

Write down all causality chains from the figure in Lecture 6, slide 13. After writing down the causality chains also write down the vector clock values for each of the events. You can consider 1 to be the clock value for the first event.

Problem 2.2 *Network Topologies* (3 points)

Make a table where each row is corresponding to a different topology. The rows should be for: ring, tree, star, clique, hypercube. Each row should have the following additional columns:

1. number of edges given N nodes,
2. advantage of using the particular topology,
3. disadvantage of using the particular topology.

Problem 2.3 *Balanced Sliding-Window Protocol* (4 points)

The balanced sliding-window protocol satisfies the eventual delivery requirement if the following two fairness assumptions are satisfied.

(F1) If the sending of a packet is applicable for an infinitely long time, the packet is sent infinitely often.

(F2) If the same packet is sent infinitely often, it is received infinitely often.

Show that the balanced sliding-window protocol does not satisfy the eventual delivery requirement if, of the fairness assumptions only (F2) holds.

How to submit your solutions

You can submit your solutions via *Grader* at **`https://grader.eecs.jacobs-university.de`** as one generated ZIP file containing one PDF file and other files if needed.
If there are problems with *Grader* (but only then), you can submit the file by sending mail to `k.lipskoch@jacobs-university.de` **with a subject line that starts with CA-CS-803**.

Please note, that after the deadline it will not be possible to submit solutions. It is useless to send solutions by mail, because they will not be graded.

This homework is due by Wednesdays, March 10th, 23:00.