

Homework Assignment 2

Due Date: 6th May, 2009

- 1) In the uncoordinated checkpointing, each process takes its local checkpoint as well as record the checkpoint index and checkpoint interval as discussed in Section 13.4.1 (pages 464-465) of the text book. On failure, the recovering process initiates rollback by broadcasting a dependency request message to collect all the dependency information maintained by each process. When a process receives this message, it stops its execution, and replies with its dependency information. The initiator then calculates the recovery line based on all the replies. Develop an algorithm to calculate the recovery line from all the dependency requests.
- 2) The coordinated checkpoint algorithm as outlined in the class runs in two phases. In the first phase all processes take a tentative checkpoint on receiving the initiation message from the coordinator. Discuss if there are some conditions at a process when tentative checkpoint is not necessary.
- 3) In the coordinated checkpoint algorithm, the coordinator computes the rollback point to each process and requires that the process be rolled back to their respective checkpoint. Once again are there cases in which a process need not rollback to its requested checkpoint.
- 4) Consider the following simple checkpointing algorithm. A process takes a local checkpoint right after sending a message. Show that the last checkpoint at all processes will always be consistent. What are the trade-offs with this method?
- 5) Show by example that, in the Koo-Toueg checkpointing algorithm, if processes do not block after taking a tentative checkpoint, then global checkpoint taken by all processes may not be consistent.