CSCI-1380: Distributed Computer Systems
## Homework #3
Assigned: 04/08/2020
Due: 04/14/2020 11:59 PM

1 Transactions

1. Recall that 2PC involves a coordinator and a number of participants that cooperate in a decision procedure. When time comes to decide whether to commit or abort, the coordinator sends vote requests to all participants, who respond either "commit" or "abort". If all respond "commit", the coordinator tells all to commit. Otherwise,the coordinator tells all to abort.

Coordinator   **Participant**
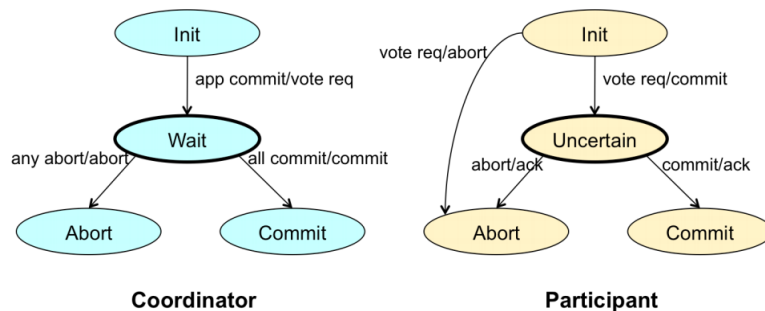
Suppose that you don't want transactions to block for a long time in the case of network partitions. Thus, you implement timeouts in both the coordinator and participants so that a transaction can still progress under faulty network conditions.

What happens when a coordinator times out before obtaining votes from all participants? What happens when a participant times out before obtaining a decision from the coordinator?

2 Gossip

1. Suppose a Gossip client sends the same query to two different replica managers. Will it necessarily get the same response from each? Explain.

2. Suppose two different Gossip clients send the same query to the same replica manager at approximately the same time (the replica manager receives no updates between its receptions of the two queries). Will the two clients necessarily receive the same results? Explain.

3 CAP Theorem

1. A social networking company is working to design an online forum system – wherein different client post topics or respond to topics. The design team worried about network partitions between their data centers: The team has brought you in to explain how their system can be redesigned to tackle partitions

   (a) The company is interested in achieving both "A" and "C" during a partition. What do "A" and "C" mean?

   (b) Is there a replication scheme that will provide your clients with both "A" and "C" during a partition? Explain.

4 Handing In

Once finished, you should hand in a PDF with your answers on Gradescope. Gradescope will allow you to select which pages contain your answers for each part of each question.

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