Final

- When: May 10 (M) 4-6pm

- Where: Zoom meeting

  - Meeting link same as the class meeting link

  - camera on during the entire exam period

  - your exam will not be graded if you do not join the Zoom meeting

- Open-book and open-notes

  - You are NOT allowed to communicate with each other or search solutions online

- Office hours: May 5 (W) 2-3pm

Topics

- Topics before midterm:
  http://www.cs.tulane.edu/~zzheng3/teaching/cmps6760/spring21/midterm-review.pdf

- Group communication (15.4,18.2)

- Consensus (15.5)

- Transactions and concurrency control (16.1-16.2,16.4,17.3)

Group Communication (15.4, 18.2)

- Multicast vs. Unicast

- Programming model: open vs. closed groups, overlapping vs. non-overlapping groups, membership management (JGroups not required)

- Reliable multicast

  - Assumptions, correctness requirements

  - Reliable multicast via reliable unicast, reliable multicast over IP multicast

- Ordered multicast

  - FIFO ordering, Total ordering using a sequencer, Causal ordering

  - Hybrids of reliable and ordered multicast in synchronous and asynchronous systems

  - Global ordering in overlapping groups

- View-synchronous group communication

  - Views, totally ordered view delivery, VSync multicasts

Consensus (15.5)

- Overview
  - definition and correctness requirements
  - consensus and byzantine generals
  - consensus and reliable totally ordered multicast

- Consensus in synchronous systems
  - Consensus under crash failures
  - Byzantine generals problem: impossibility with three processes, solution with one faulty process

- Consensus in asynchronous systems
  - Know the FLP impossibility result (proof not required)

- Paxos algorithm not required

- Blockchain: know the concept of repeated consensus

Transactions and Concurrency Control (16.1-16.2,16.4,17.3)

- Transactions (16.1-16.2)

  - definition, transaction life histories, ACID properties

  - lost update, inconsistent retrievals => serial equivalence

  - dirty reads, premature writes => strict execution of transactions

- Concurrency control via locking (16.4)

  - exclusive locking, read-write lock

  - two-phase locking => serial equivalence; strict two-phase locking

  - deadlocks

- Distributed transactions: two-phase commit protocol (17.3.1)