CMSC 621, Advanced Operating Systems. Spring 2022
Computer Science & Electrical Engineering Department
University of Maryland Baltimore County

Homework 2

Due March 2 (11:59pm EST)

- **Problem 1. (10 points)**
  Write a critique of the Chord: A Scalable Peer-to-peer Lookup Protocol for Internet Applications paper by Stoica et al (2001)

  Follow the critique guidelines and the Review form (feel free to refer to the source).

- **Problem 2. (20 points)**
  Study Chapter 1 and sections 4.1 and 4.2 of our textbook (DSPP), Introduction to Distributed Systems design, and teh slide-decks Introduction and Communication and provide (short) answers to the following questions:

  1. What are six main reasons for building distributed systems?
  2. How do Moore's law and Metcalfe's law impact distributed systems?
  3. What are three main aspects that characterize open distributed systems?
  4. What is the expected number of requests in a server (behaving as an M/M/1 queuing system) with utilization 0.9? What is the probability that there are 3 queued requests?
  5. What are main different failure types? what makes guarding against each one challenging?
  6. Contrast TCP and UDP. Under what circumstances would you choose one over the other?
  7. What are the main diferrences between caching and replication?
  8. Why each one of the eight pitfalls/falacies of designing distributed systems identified by Deutsch is a pitfall/falacy?
  9. What are the main issues facing RPCs with respect to parameter passing and mitigating failures?
  10. Which degree of distribution transparency will you do away with first in a distributed wireless sensor network to maximize its availability and why?

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