CS 499 – Distributed Systems  
Wednesday, October 07, 2009

Lecture Notes:

* Midterm this Friday!
* Chapters 1 – 5
* Chapters 1 and 2:
  + Otte should provide us better notes to cover these subjects.
  + The book did not cover this well enough
* Chapters 3 – 5
  + The book covers these well enough

C lass Notes:

* Chapter 1
  + What is a Distributed System?
  + Autonimity
  + Heterogeneous
  + Motivation for Distributed Systems
    - Resouce sharring
    - modularity
    - scalibilty
    - incremental
  + Parallel Systems
    - multi process system
    - multi parallel system
    - // Def – tightly coupled…
  + // DS (def) – loose coupling of loosely …
  + Classification of Primative
    - sync
      * no real question
      * execution:
        + ratio between working on something that make sense
        + overhead
        + large granularity for Distributed Systems

Why is this so?

* + - async
      * no real question
      * execution:
        + (same as above)
    - blocking
    - non-blocking
  + Challenges
    - From System Perspective
    - Algorithmic Perspective
      * How it challenging for algorithms for DS
    - Network Transparency
      * access transparency
        + internet

powered by URL’s

access is the same as long as you stay in your browser

* + - * location transparency
    - Provide for Transparency
    - Concurrency
    - Synchronization/Asynchronization
    - Consistency
    - Fault Tolerance
    - API for Communications
* Chapter 2
  + Causal Relationships
    - e2 -/-> e1
    - e1 -/-> e2
    - e1 || e2
    - e2 🡪 e3 🡺 e1 🡪 e3
  + Concurrency
    - not interested in physical concurrency
* Chapter 3
  + Taken directly from the book, Chapter 11.1 – 11.4
  + Physical Time
    - know and describe the algorithms for physical time
  + Precision
    - Christian’s Method
  + know when an algorithm is internal/external synchronization
  + When you know your clock is off
    - When the clock is to slow…
      * set clock for future
    - When the clock is to fast…
      * harder to fix
  + Network Time Protocol (NTP)
    - //might see numbers on exam
    - in principle you should know how this is done
  + Subject
    - Lamport’s clock
    - Vector clock
    - Overhead
      * Dimension
      * if you have a lot of processes then you have potentially have overhead
      * but because of today’s technology this is really not that bad
* Chapter 4
  + Global States
  + Terms
  + Snapshot Algorithm
    - allows for conclusion about properties, we only looked at stable properties
    - requirements:
      * garbage collection
    - // instable
      * debugging
  + Process
    - prefix
    - front tier event
    - from the prefix we should know the global state of the process
  + Cut
    - sum of the prefixes
    - //consistent vs insconsistent
    - you can cut anywhere
      * but does it make sense to perform a bad cut
    - Consistent Cuts
      * // linearization
      * talked about
    - Need to explain
      * that it does terminate
      * it is consistent
      * ….
    - You really only need a consistent cut
  + Transactions
    - ACID Properties
    - Serial [Equivalence]
      * how you would order transactions
* Chapter 5
* From book
  + Time
    - 11.1 - 11.4
  + Global State
    - 11.5 – 11.6
  + Transactions & Concurrency Control
    - 13
  + Coordination & Agreement
    - 12.2
    - 12.3
    - 12.5
  + Message ordering & Group Communication
    - 12.4
  + Deadlock Detection
    - 13.4.1

TODO: