CS 499 – Distributed Systems  
Monday, September 14, 2009

Class Notes:

* Last time we talked about Causal Relationships
  + model for the execution of a distributed systems
  + events can be whatever you want them to be
    - single machine instructions
    - multiple machine instructions
  + Last time we pinned down what concurrency is
* Quiz 1
  + Question 1:
    - Answer: example: e11 || e12
  + Question 2
    - Answer: no, only if ei <-> ej
  + Question 3
    - Answer: example: e11 , e31

Lecture Notes:

* What communication channels do we have?
* Model of DS
  + Models of Communication Networks
    - FIFO, Causal Ordering (CO), non-FIFO
      * FIFO – first in first out
      * non-FIFO
        + acts like a set and receiver, no succession is implied
        + just picks out messages from the set
      * Causal Ordering
        + two messages: m(i, j)& m(k, j) iff

send( m(i, j) 🡪 send( m(k, j)) =>

rec( m(i, j)) 🡪 rec( m(k, j))

* Time
  + In our minds we think of time in a physical sense, but this is pretty much useless
  + So we need to break this mentality and go more for Logical Time
  + but we will cover physical time because it is still used in the real world
  + Physical Time:
    - What is it?
      * depended on pulses
      * need to scale these pulses
      * example: Hardware clock
        + alpha \* Hi(t) + beta = Ci(t)

H – Hardware Clock

alpha – speed(?)

beta – unknown

* + - Example:
      * satellites in space have to have a slower tick
  + There exists Drift and Drift rate
  + We need to have some correctness
    - => make assumption concerning some bound D.
    - Montinicity Requirement
  + Logical Time
    - break stuff into events