

# COMP 4704 – Spring 2009

## HW#7

### **Instructor:**

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### **Due by:**

5pm on May 28, 2009

## **1 Instructions**

Please answer the following questions as briefly and precisely as possible. I am expecting answers ranging from one word to a short sentence.

## **2 Communication**

**In the domain of TCP/IP, TCP and UDP are the common transport protocols in use. Do all distributed systems exist above the transport layer? (Yes or No)**

**If you use a professional-grade RPC Middleware layer, will you ever have to deal with byte-ordering?**

**What is the biggest issue with communication in overlay networks?**

**What shortcoming with basic epidemic protocols are gossip-based protocols designed to address?**

### **3 Naming**

**In Chord, do all processes need to be using the same number length identifiers?**

**What is the main benefit of recursive lookups over iterative lookups?**

**What is the “closure mechanism” for DNS?**

**Are name spaces always hierarchical? (Yes or No)**

**What is the DNS equivalent of a file-system symbolic link?**

### **4 Synchronization**

**What is the fundamental difference between the Network Time Protocol and the Berkeley Algorithm for time synchronization?**

**Consider a system of  $N$  processes in which multicast is not available. How many point-to-point messages must pass across the network in order to execute one operation when using logical clocks to achieve a total ordering on operations?**

**What is the problem with only capturing “potential causality” when using causal communication?**

**Would the Bully Leader Election algorithm work equally well if the node with the lowest identifier was elected leader (and all comparisons were reversed)?**

## **5 Replication and Consistency**

**If operations are executed according to their vector clock timestamp, will messages originating at processes that send fewer messages always wind up at the top of the list?**

**How can causal consistency result in values that are not computed correctly?**

**Which is more efficient, “synchronous replication” or “sequential consistency”?**

**What is the perfect size for a “conit”?**