COMPSCI 677: Distributed and Operating Systems
Homework 1

Due: *One week from release date as posted on course page. Submit your solutions via gradescope*

Answer each question in brief (i.e., a few sentences).

1. Why is the Shared data-space architecture also called a bulletin board architecture?

2. Why are global values or pass-by-reference parameter passing not allowed on RPCs?

3. A distributed hash table can be created by having N nodes and a hash function that maps *k* keys to the ids of the N nodes. What is the advantage of using Chord's consistent hashing scheme over this simple scheme? (Hint: think about what needs to happen when a node leaves the system)

4. You are about to build an instant messaging application that needs to deliver messages to other users in a low latency when the receiver is connected to the network. IF you had a choice of architectures such as object-oriented, event-based, shared-data space and resource-oriented, which architecture would you choose? Explain why you chose this architecture.

5. Suppose that you are planning to watch your favorite show that is on Netflix servers in California. Since you live in Amherst, why might a proxy server (also known as edge server) architecture be helpful in delivering this content to your device?

6. Explain the difference between a distributed operating system and a network operating system. List at least one advantage and one disadvantage of each type of OS.

7. In RPCs or RMIs, why is marshalling and demarshalling of arguments needed when there is more than one hardware architecture involved?

8. In RPCs, why it is not a good idea to pass a raw pointer to remote server or return a raw pointer to the client?