Summary of Homework Assignments

HW1 – Jump-start Into Interprocess Communication and Resource Sharing

Objectives

- Become familiar with socket communications in an environment of your choice, e.g. C#/.NET or Java/JDK
- Start to become familiar with the basic design issues for distributed system, i.e. concurrency, fault tolerance, etc.

Overview

This assignment involves implementing part a distributed word-guessing game that is based on a client-server architecture. The instructor will provide the server program and you will build a client program.

HW2 – Protocol Design and Implementation

Objectives

- Practice principles related to protocol design
- Explore architectural design choices that will lead to good modularization, encapsulation, abstraction, coupling, and cohesion
- Become familiar with unit-testing techniques

Overview

This assignment focuses on the design and implementation of communication protocols for a non-trivial distributed application. It consists of three parts: protocol design, message implement, and unit testing of the message implementation.

HW3 - Reliable Inter-process Communication

Objectives

- Gain experience with creating reliable inter-process communications from an underlying unreliable communications subsystem
- Master one common client/server architecture
- Become more familiar with unit testing techniques
- Become familiar with some useful logging techniques

Overview

During this assignment, you will implement the reliable inter-process communication for the application started in HW2.

HW4 - Webservices

Objectives

- Gain experience with simple remote objects
- Master the implementation and use of webservices
- Become more familiar with unit testing techniques
- Become familiar with logging techniques and a logging tool

Overview

During this assignment, you will design, implement, and test a simple webservice and then integrate it into the system you built for HW3.

HW5 – Managing Concurrency and Shared Resources

Objectives

- Gain experience in creating a distributed system that provides good access and location transparency
- Gain experience with peer-to-peer communication
- Gain experience with managing concurrency and shared resources

Overview

For HW5 you will begin to address some of the more interesting problems that arise when trying to handle concurrent requests on shared resources, particularly in systems with peer-to-peer communications.

HW6 – Making Distributed Applications Reliable and Efficient

Objectives

- Become more familiar with unit testing techniques
- Become more familiar with logging techniques and a logging tool
- Become familiar with some performance improvement techniques

Overview

For HW6, you will improve the reliability and efficiency of the application built in HW5, by applying additional unit testing, debugging, and performance-improvement techniques.