Assignment 1

SOFE4790/CSCI4640 Distributed Systems
Total mark: 56

Due: October 11
(11:59PM on Blackboard)

1. Read the use case study in section 1.6 in the text book on the Web and for each of the DS challenges listed below give a brief description of how that challenge is reflected in the Web case study. The challenges are:

   [16]

   Heterogeneity
   Openess
   Security
   Scalability
   Failure Handling
   Concurrency
   Transparency
   Quality of Service

2. Modify the UDP and TCP programs included for the assignment so that you can compare the performance of TCP and UDP with regards to latency, packet loss, and throughput. For the tests you can try have the Client send 100000 messages to server with the size of 25, 30, 35 kilobytes respectively and plot the delay, loss of data, and throughput for both the UDP and TCP connections.

   [15]

3. Describe the serialized form that a serialization algorithm would produce when serializing an instance of the following class   [5]

```
class Couple implements Serializable{
        private Person one;
        private Person two;
        public Couple(Person a, Person b) {
           one = a;
           two = b;
        }
}
```

4. Write a Java client application that creates an instance of Couple and instantiates one Person. It then sends this serialized instance of Couple to a server. The server adds a second Person to Couple and returns the value back to the client. In order to validate your client / server application print out the values of Couple before sending it to the server, after the server received it, and when

the client received the modified value of Couple from the server. [10]

5. Submit a short 1-page essay describing the overlay architecture of Skype. Describe how nodes are addressed; how connections are established and users are discovered. Show an architecture diagram where possible. Use the paper on Skype provided in the course folder. [10]