

# CMPT 371: Data Communications and Networking

## Assignment (2)

Due: Oct 19, 2012

**(P1 - 10 points)** Consider distributing a file of size  $F=20\text{Gbits}$  to  $N$  peers. The server has an upload rate of  $20\text{Mbps}$ , and each peer has a download rate of  $2\text{Mbps}$  and an upload rate of  $u$ . For  $N=10, 100, 1000$  and  $u=300\text{Kbps}, 800\text{Kbps},$  and  $2\text{Mbps}$ , find the minimum distribution time for each of the combinations of  $N$  and  $u$  for both client-server distribution and P2P distribution.

**(P2 - 10 points)** Consider an overlay network with  $N$  active peers where each pair of peers has an active TCP connection. How many nodes and edges are there in the overlay network given the TCP connections pass through a total of  $M$  routers?

**(P3 - 30 points)** Implementing a Reliable Transfer Protocol.

In this assignment, you will implement the basic concepts of reliable data transfer that we learned in the class. Your implementation will be different in many ways from the Internet reliable transfer protocols implemented in the transport layer, but will help you understand them better. We want you to think about those differences while implementing your own reliable data transfer protocol.

### Connection

We need two sides of a connection, we name them A and B. We only want you to implement reliable transfer from A to B, and B just sending ACKs to acknowledge the receipt of the data received in order. You will get extra credit if you implement the reliable transfer both ways.

### Unreliability

You can use UDP socket to implement your connection. You have to simulate unreliability of connection on the network since in a socket connection within a host the probability your UDP segments (datagrams) are lost or received out of order is low. You can write a simple code that drops some UDP segments randomly, and delays some other randomly before passing them to the application, part of your code, that is using them.

**Header Values**

You should define the header values you need to have to implement reliable data transfer and define how (which layer) you should implement it when you are doing it using a UDP socket connection?

**Go Back N or Selective Repeat**

You can select to either implement selective repeat or GBN. You should state your selection.