COMP 431 Internet Protocols & Services

Fall 2018  
Kevin Jeffay

Worksheet 1, August 27

1) What’s the difference between flow control and congestion control?

Note that an application can’t tell the difference between its packets being loss at a router in the network versus packets being lost at the receiver (in the receiver’s operating system). Nonetheless, it’s often said that packet loss that occurs at the receiver is a worse event than packet loss that occurs at device in the network. Why is this?

**Flow control makes sure that the receiver isn’t overloaded by too much information. Congestion control makes sure that there aren’t any traffic jams in the data transfer.**

**It’s worse for packet loss to occur at the receiver than in the network because it’s using the most resources possible. Because this data traveled the whole way to the receiver and then was lost rather than being lost earlier, this process consumed way more resources than it otherwise would have.**

2) Suppose users share a 3 Mbps link. Also suppose each user requires 150 kbps when transmitting, but each user transmits only 10 percent of the time.

*a*. When circuit switching is used, how many users can be supported?

**20**

*b*. Suppose packet switching is used. What is the probability that a given user is transmitting?

**Still 10%**

*c*. Suppose there are 120 users (and still assuming packet switching is used). Use the binomial distribution



to compute the probability that at any given time, exactly *k* users are transmitting simultaneously (where *n* is the size of the population (*e.g*., the total number of users) and *k* is the size of the subset of interest (*e.g*., the number of active users) and *p* is the probability a user is active).

Find a “binomial distribution calculator” on-line to compute the probability for some interesting values of *k*. A reasonable one is the University of Iowa calculator developed by Matt Bognar (Google it). These calculators (not the Iowa calculator) will call *n* something like the “number of events,” and *k* “the number of successes.”

**0 (Idle): .0003%**

**10: 11%**

**20: .7%**

**60: <.0001%**

# Submitting Your Worksheet

At the end of every class you will copy your worksheet to a Linux directory under your account. But first you need to setup this directory.

Connect to *classroom.cs.unc.edu* via *ssh* and create the directory “worksheets” in your *comp431/submissions* directory. If you haven’t yet created the *comp431* directory do this first by following the instructions in HW 1 *exactly*.

If you are using a Mac running OS X, open the Terminal app and upload your worksheet to this directory using the command (typed all on one line):

scp <local path to worksheet file> <your Linux login id>@classroom.cs.unc.edu:   
 comp431/submissions/worksheets/<login id>-x.docx

where *x* is the number of the worksheet. For example, if I were submitting worksheet 1, and the worksheet were stored on the desktop on my Mac in a file named “Wrksht1.docx”, then I’d copy the worksheet to my Linux account using the command (typed as a single line):

scp ~/Desktop/Wrksht1.docx jeffay@classroom.cs.unc.edu:   
 comp431/submissions/worksheets/jeffay-1.docx

If you use a Windows machine you’ll have to use an sftp client to copy your worksheet file to your Linux account. See the instructor or the LA if you need help with this.

You should upload your worksheet *before* 5PM. Be sure to name your worksheet with your login name, a hyphen, and the worksheet number. You are free to keep working on the worksheets after class (and encouraged to do so) but you must submit whatever you have by 5PM on the day of the class. Remember that the worksheets are not graded so don’t be nervous about submitting an incomplete solution. (Just keep working on it until you have a good solution!) If you don’t submit your worksheet by 5PM I’ll assume you weren’t in class and you’ll get docked for attendance.