# Computer Networks I

## Programming Assignment 1

Due: 28 September 2020

You are to write a program which takes as inputs (1) the bandwidth of the link, (2) the bandwidth requirement of each user, (3) the total number of users n, (4) the probability that any particular user is idle at a given time p, and (5) a "target" number of users x; in return, it should output the probability that x or more users are online at any time.

## Requirements

- Use either C or C++ for this assignment.
- Your code must compile and run on the machines in the CS department labs.
- Code should be well-documented and modular, and must follow the .h/.c standards and naming conventions discussed in class.
- Include a Readme which describes how to use your program, and a Makefile to compile your code.
- You will have to compute factorials and binomial coefficients of relatively large numbers. You must implement your own methods for dealing with the large integers in these computations.
- You should be able to handle values of n up to at least 100.
- Do not use any external libraries in your implementation (only the standard libraries).
- You are required to write a report to demonstrate how you design your calculator (i.e., theoretical formulas on how to calculate the probability that x or more users are online at any time) and show your experiments results.
- You are to submit a tarball (.tar, .tgz) to Canvas including your code, the Readme, the Makefile and the report. Name the file using your own full name and the suffix Assignment1 (e.g. TaoWang Assignment1.tgz).
- Do not include the executable in your submission.
- The assignment is to be completed individually, not in groups.