Coursework 1

Distributions and simulation
Worth 7% of final grade
Network Performance—DJW—2011/12

The `wischik.com` webserver has a single link connecting it to the Internet, and this link is the bottleneck for nearly all requests. I want to choose the link capacity so as to achieve a reasonable balance between utilization and response times—choose it too low and the response times are excessively high, choose it too high and the utilization is poor. In order to come to a decision, I have gathered web server logs (available on Moodle). These logs tell me the timestamp of each request, and the size of the file that was served in response.

Question 1. Devise a random number generator that produces request sizes that are in line with the data. Devise another random number generator that produces interarrival times that are in line with the data. Explain how you analysed the data to achieve this, and why you believe your random number generators are in line with the data.

Question 2. Simulate the bottleneck link, and measure the average utilization and the response times. Present your findings in a way that will allow me to make an informed decision about link capacity. Explain how you ran your simulations. Explain carefully what you are measuring and how you are measuring it.

This coursework has no single correct answer. The purpose of this coursework is to test your ability to make an evidence-based argument: your mark will reflect how well you persuade me that you have considered everything that needs to be considered. 60% of the marks are for reasoning and explanation of what you did and why, 40% of the marks are for programming and execution. If your answer is full of red herrings, e.g. analyses and plots which are irrelevant to your conclusion, you will lose marks.

You can use any programming language you like. You should submit your code. The total length of your report (including plots but not including code) need be no longer than 10 pages, though there is no penalty if it is longer.

Example sheet 2 questions 2, 6, 7 and 8 are all relevant to this coursework. You are welcome to attempt these (and any other) questions and hand them in, and get help and feedback.