Simulation, Modelling and Analysis Course
Assignment 1

Of interest in telephony are models of the following type. Between two large cities, A and B, are a fixed number, n, of long distance lines or circuits. Each line can operate in either direction (i.e. can carry calls originating in A or B), but can carry only one call at a time; see figure1 below.

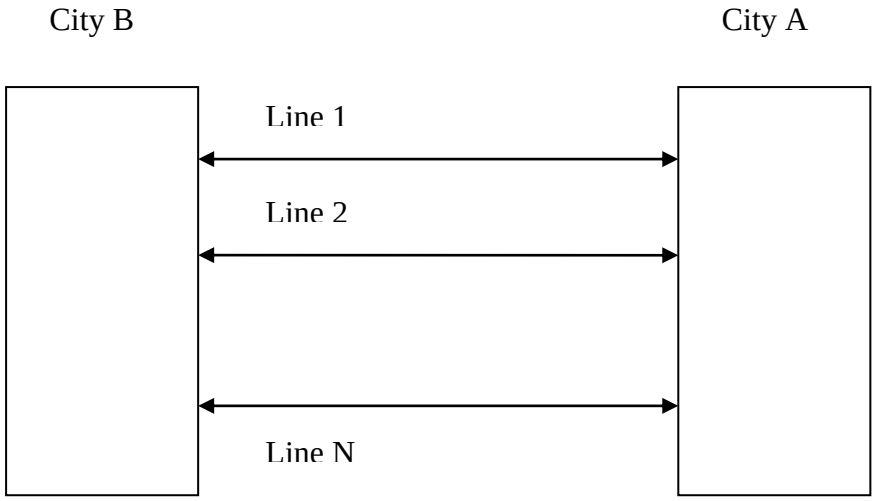

Figure 1

If a person in A and B wants to place a call to the other city and a line is open (i.e., idle), the call goes through immediately on one of the open lines. If all n lines are busy, the person gets a recording saying that he/she must hang up and try later; there are no facilities for queuing for the next open line, so these blocked callers just go away. The times between attempted calls from A to B are IID with mean 10 seconds, and the times between attempted calls from B to A are IID with mean 12 seconds. The length of a conversation is IID with mean 4 minutes, regardless of the city of origin. Initially all lines are open, and the simulation is to run for 12 hours;

1. Assume that you have an infinite number of lines, and plot a graph of number of lines as a function of time.
2. The %age of time a line is busy versus free.

Formulate and solve the problem for a single telephone line, validate and then move onto 2,3…N lines.

Report MUST have the following structure:

1. Validation of conceptual model.
2. Data flow diagram.
3. Validation of single line system.
4. Appendix with of source code.

5. Source code to be documented sufficiently to illustrate performance to non programmers.