

EE3009 Tutorial 1 (Solution)

Question 1

a) Four telephone lines are needed.

b)

i. $\binom{4}{n} 0.2^n 0.8^{4-n}$

N	0	1	2	3	4
Probability	0.4096	0.4096	0.1536	0.0256	0.0016

ii. Two telephone lines are enough because the probability that more than two users want to use the telephone at the same time is $0.0256 + 0.0016 = 0.0272 < 0.03$.

It is not possible to further reduce the number of telephone lines. It is easy to check that one telephone line is not enough, since the probability that more than one users want to use the telephone at the same time is $0.1536 + 0.0256 + 0.0016$, which is clearly greater than 0.03.

c) Statistical multiplexing

Question 3

Cross over cable should be used.