COMP9334 Revision Questions Week02B

Question 1

In the lecture, we used queueing analysis to study two call centre problems. In this revision question, you will apply queueing analysis to a call centre with 2 operators and no holding slots. Calls arriving at the call centre are Poisson distributed with a mean arrival rate of λ. Each call requires the processing of one operator. If a call arrives when both operators are idle, the call will be directed to any one of the two operators. If a call arrives when exactly one operator is idle, the call will be directed to the idle operator. If both operators are busy, then the call will me rejected. The mean time of processing a call by any one of the operators is exponentially distributed with rate μ.

You can model this call centre as a system with 3 states: S_0, S_1, S_2 where in state S_k, the number of calls in the system is k.

(a) Draw the state transition diagram for this system. Also, label the arcs with the appropriate state transition rate.

In particular, we ask you to pay attention to the transition rate from State 2 to State 1. You can find the answer at the bottom of Page 2 but we ask you to try to find it first. If your answer is different from the correct answer you may want to reconsider your mathematical argument.

(b) Write down the state balance equations for States 1, 2 and 3.

The transition rate from State 2 to State 1 is 2μ, not μ.