

Classification of queues

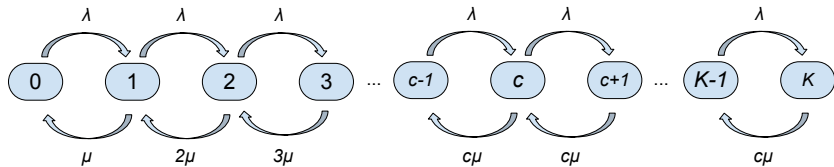
There is a classification scheme for commonly encountered queues (originally devised by David Kendall). A general queue is denoted:

$$A/B/c/K$$

where we make the following assumptions:

1. Inter-arrival times are independent and give by some distribution A .
2. Service times are independent and given by some distribution B .
3. There are c servers.
4. There is a buffer of size K .

$M/M/c/K$



$$M/M/c/K$$

Probability that we have $0 \leq i \leq K$ customers in system: π_i .

$$\pi_i = \begin{cases} \frac{\left(\frac{\lambda}{\mu}\right)^i}{i!} \pi_0 & \text{for } i \leq c \\ \frac{\left(\frac{\lambda}{\mu}\right)^i}{c!c^{i-c}} \pi_0 & \text{for } i > c \end{cases}$$

We then set $\sum_{i=0}^K \pi_i = 1$ to get π_0 .