Performance indices of an M/M/2 queue

Consider a dual-core server that executes jobs arriving according to a Poisson process of rate λ = *0.95 job/s*, and serves them with an average service time D = *1.8 s*.

Determine:

- Compute the average utilization
- Compute the probability of having 4 jobs in the system
- Compute the average number of jobs in the system
- Compute the average response time and the average time spend in the queue
- Compare the previous results with the ones of an M/M/1 system, with average service D = 0.9 s.

1. $\overline{U}$ = *0.855*
2. $p_4 = 0.0846$
3. $N = 6.3575$
4. $R = 6.6921\ s, \quad \Theta = 4.8921\ s$
5.
    1. U = *0.855*
    2. $p_4 = 0.0775$
    3. $N = 5.8966$
    4. $R = 6.2069\ s, \quad \Theta = 5.309\ s$

Performance indices of an M/M/c queue

Consider an M/M/3 system, with arrival rate λ = *0.95 j/s*, and average service D = 2.7 s.

1. Compute the average utilization
2. Compute the probability of having 4 jobs in the system
3. Compute the average number of jobs in the system
4. Compute the average response time time and the average time spend in the queue
5. Compare the previous results with the ones of an M/M/1 system, with average service D = 0.9 s, and the ones of an M/M/2 system, with D = 1.8 s.

1. $\overline{U}$ = *0.855*
2. $p_4 = 0.0916$
3. $N = 6.9219$
4. $R = 7.2862\ s, \quad \Theta = 4.5862\ s$
5. *see above*

Performance indices of an M/M/oo queue

Consider an M/M/oo system, with arrival rate $\lambda = 0.95\ j/s$, and average service D = 2.7 s.

1. Compute the probability of having 4 jobs in the system
2. Compute the average number of jobs in the system
3. Compute the average response time and the average time spent in the queue
4. Compare the previous results with the ones of an M/M/1 system, with average service D = 0.9 s, the ones of an M/M/2 system, with D = 1.8 s, and the one of an M/M/3 with D = 2.7 s.

1. $p_4 = \frac{2.7^4}{24} e^{-2.7} = 0.1387$
2. $N = 2.565$
3. $R = 2.7\ s, \quad \Theta = 0$
4. See above