Home work

M/M/1 : 2

$\lambda = 8/hr$

$\mu = 9/hr$

$N = 2$

$$P_0 = \frac{1-\rho}{1-\rho^{N+1}} \qquad \rho = \lambda/\mu$$

$$= \frac{1-8/9}{1-(8/9)^3} = \frac{1-0.888}{1-(0.888)^3}$$

$$= \frac{0.1112}{0.2971} = 0.3732$$

$$P_1 = \rho P_0 = 8/9 \times 0.3732 = 0.3317$$

$$P_2 = \rho^2 P_0 = (0.888)^2 \times 0.3732$$

$$= 0.7899 \times 0.3732$$

$$= 0.2948$$

Probability of joining the system

$= 1 - 0.2948 = 0.7052$

effective arrival rate

$$\lambda_e = \lambda \times 0.7052$$
$$= 8 \times 0.7052$$
$$= 5.646$$

Load of system

$$L_S = \frac{\rho [1 + N\rho^{(N+1)} - (N+1)\rho^N]}{(1-\rho)(1-\rho^{N+1})}$$

$$= \frac{0.8888 [1 + 2 \times (0.8888)^3 - 3 \times (0.8888}{(1-0.8888)(1-0.8888^3)}$$

$$= \frac{0.8888 (1 + 1.404 - 2.3656}{0.112 \times 0.2978}$$

$$= \frac{0.888 \times 0.0384}{0.0331}$$

$$= 1.019 //$$

$$W_S = L_S / \lambda_e$$

$$= \frac{1.019}{5.641} = 0.1806$$