$E[X] = \bar{X} = \int x f_X(x)dx$	$E[X] = \sum x p_X(x)$	$Var(X) = E[X^2] - (\bar{X})^2$	$E[g(x)] = \int g(x) f_X(x)dx$
$p_X(x) = \frac{e^{-\lambda}(\lambda)^x}{x!}, E[X] = \lambda, Var(X) = \lambda$		$f_X(x) = \lambda e^{-\lambda x}, E[X] = \frac{1}{\lambda}, Var(X) = \frac{1}{\lambda^2}$	
$p_X(x) = p(1-p)^{x-1}, E[X] = \frac{1}{p}, Var[X] = \frac{1-p}{p^2}$			$N = \lambda T, N_Q = \lambda W$
$\rho = \frac{\lambda}{\mu}$	$\pi_n = \rho^n(1-\rho), n = 0,1,..$	$N = \frac{\rho}{1-\rho}$	$T = \frac{1}{\mu - \lambda}$
$\rho = \frac{\lambda}{m\mu}$	$P_Q = \frac{\pi_0 (m\rho)^m}{m!\,(1-\rho)}$	$N_Q = \frac{\rho P_Q}{1-\rho}$	$T = \frac{1}{\mu} + W$
$\pi_0 = \left[\sum_{n=0}^{m} \left(\frac{\lambda}{\mu}\right)^n \frac{1}{n!}\right]^{-1}$		$\pi_n = \pi_0 \left(\frac{\lambda}{\mu}\right)^n \frac{1}{n!}$	$\pi_m = \frac{\left(\frac{\lambda}{\mu}\right)^m / m!}{\sum_{n=0}^{m} \left(\frac{\lambda}{\mu}\right)^n / n!}$
$\rho = \frac{\lambda}{\mu}$	$R = \frac{\lambda \overline{X^2}}{2}$	$W = \frac{R}{1-\rho}$	$W = \frac{\lambda \overline{X^2}}{2(1-\rho)} + \frac{\overline{V^2}}{2\overline{V}}$
nonpreemptive $W_k = \frac{\sum_{i=1}^{n} \lambda_i \overline{X_i^2}}{2(1-\rho_1 - \cdots - \rho_{k-1})(1-\rho_1 - \cdots - \rho_k)}$			
preemptive $T_k = \frac{(1/\mu_k)(1-\rho_1 - \cdots - \rho_k) + R_k}{2(1-\rho_1 - \cdots - \rho_{k-1})(1-\rho_1 - \cdots - \rho_k)}$		$R_k = \frac{\sum_{i=1}^{k} \lambda_i \overline{X_i^2}}{2}$	$W \le \frac{\lambda(\sigma_a^2 + \sigma_b^2)}{2(1-\rho)}$
$N = \sum_{(i,j)} \frac{\lambda_{ij}}{\mu_{ij} - \lambda_{ij}}$		Time reversible $\pi_i P_{ij} = \pi_j P_{ji}$	
Burke's theorem MM1,MMm etc. : 1) Departure Poisson process, 2) At each time t number of customers in the system is independent of the sequence of departure times prior to t			
$\lambda_j = r_j + \sum_{i=1}^{K} \lambda_i P_{ij}$ Jackson' theorem : $P(n) = P_1(n_1)P_2(n_2) \dots P_K(n_K)$, $P_j(n_j) = \rho_j^{n_j}(1-\rho_j)$			
Closed net: $\lambda_j = \sum_{i=1}^{K} \lambda_i P_{ij}$, $\widehat{P_j}(n_j) = \begin{cases} 1 & if\ n_j = 0 \\ \rho_j(1)\rho_j(2) \dots \rho_j(n_j) & if\ n_j > 0 \end{cases}$, $P_n = \frac{\widehat{P_1}(n_1)\widehat{P_2}(n_2) \dots \widehat{P_K}(n_K)}{G(M)}$			
Global Balance eq. : $\pi_j \sum_{i=0}^{\infty} q_{ji} = \sum_{i=0}^{\infty} \pi_i q_{ij}$		Birth death type: $\pi_j q_{ji} = \pi_i q_{ij}, i,j = 0,1,..$	