Review.

Binomial Process:

$p = \lambda \cdot \Delta$.

$E(T) = \frac{1}{\lambda}$.

$\boxed{Var(T) = \frac{1-p}{\lambda^2}}$. deviation of time between request.

Possion Process:

$E(T) = \frac{1}{\lambda}$, $Var(T) = \frac{1}{\lambda^2}$, $\delta = \frac{1}{\lambda}$

$E(T_k) = \frac{k}{\lambda}$, $Var(T) = \frac{k}{\lambda^2}$, $\delta = \frac{\sqrt{k}}{\lambda}$

$P\{X(t) = x\} = e^{-\lambda t} \cdot \frac{(\lambda t)^x}{x!}$

$P\{T \leq t\} = 1 - e^{-\lambda t}$

$P\{T > t\} = e^{-\lambda t}$

Final Review.

$(a^x)' = a^x \cdot \ln a$

Chapter 6.

$p = \lambda \cdot \Delta$, $n = \frac{t}{\Delta}$.

1. Binomial Process: $P(x) = C(n, x) \cdot p^x \cdot (1-p)^{n-x}$

$E(T) = \frac{1}{\lambda}$ Expect time between request. $\quad Var(T) = \frac{1-p}{\lambda^2}$. ~~for inter~~

when $n \geq 30$, $0.05 \leq p \leq 0.95$,

i). $Binomial(n, p) \approx Normal(u = np, \delta = \sqrt{npq})$

ii). Continuity correction:

$$P\{x(t) < \bar{x}\} = P\{-0.5 < x(t) < \underbrace{\bar{x} + 0.5}_{x}\} = P\{\frac{-0.5 - u}{\delta} < z < \frac{x - u}{\sigma}\}$$

2. Poisson Process:

$$P\{x(t) = x\} = e^{-\lambda t} \cdot \frac{(\lambda t)^x}{x!}$$

$$P\{T \leq t\} = 1 - e^{-\lambda t}$$

$$P\{T > t\} = e^{-\lambda t}.$$

$$\left\{\begin{array}{l} P\{T_k > t\} = P\{x(t) < k\} \\ P\{T_k < t\} = P\{x(t) \geq k\}. \end{array}\right\} \Rightarrow \text{Then Apply } P\{x(t) = \cancel{k}^{\,x}\} = e^{-\lambda t} \cdot \frac{(\lambda t)^x}{x!}$$

Chapter 7.

In a unlimited BSS QP system, if currently there are x jobs in the system, and in a course of n frames, then the number can change by n at most.

Therefore, we only need to deal with $0 \sim x+n$

Chapter 8.9.

1. $\delta(\bar{x}) = \frac{\delta}{\sqrt{n}}$ $\rightarrow \sqrt{p \cdot (1-p)}$, if Bernoulli

2. Method of moments:

$u_1 = E(x) = \int x \cdot f(x) dx$ to find the relationship between $E(\bar{x})$ and θ.

For Binomial : $E(x) = n \cdot p$.　　Exponential : λ

Poisson : $E(x) = \lambda$.

Geometric : $E(x) = \frac{1}{p}$.