

$$f(x; \lambda) = \frac{e^{-\lambda} \lambda^x}{x!}$$

$$E\{X\} = \sum_{x=0}^{\infty} x f(x; \lambda)$$

$$= \sum_{x=0}^{\infty} x \frac{e^{-\lambda} \lambda^x}{x!}$$

$$= \sum_{x=1}^{\infty} \frac{e^{-\lambda} \lambda^x}{(x-1)!}$$

$$= \lambda \sum_{x=1}^{\infty} \frac{e^{-\lambda} \lambda^{x-1}}{(x-1)!}$$

$$= \lambda$$