Arrival Processes

Typical Questions

- How many customers arrive between 12:00 and 1:00?

- How long until the first customer arrives?

- How many widgets are produced in a day?

Possible Information Given

One of

- λ : rate of arrivals

- β : avg time between arrivals

- t : time duration of observation

Pay attention to units!!!

Am I being asked about a **Number** of arrivals

yes → $$\begin{array}{c} X \sim Pois(\mu) \\ \mu = \lambda t \end{array}$$

no

Am I being asked about **time** until something happens

yes

first time → $$\begin{array}{c} T \sim Exp(\beta) \\ \beta = 1/\lambda \end{array}$$

k^{th} time → $$\begin{array}{c} T \sim Gamma(k, \beta) \\ (\text{not required} \\ \text{in } 7230) \end{array}$$

Big Picture →

Discrete time		Continuous Time
Geometric	::	Exponential
Neg Binom	::	Gamma

S. McK 10/22