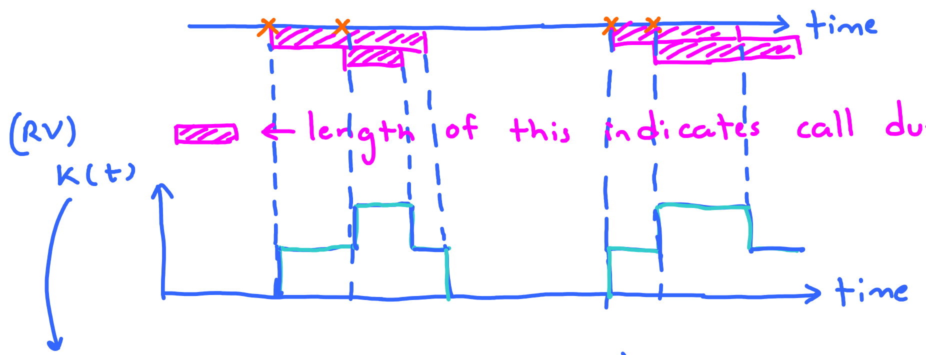
3.1-3.2 Summary

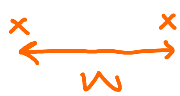
Tuesday, January 01, 2013 8:41 PM

Population of infinite size. Total call request rate $= \lambda$.
(very large)
(The rate for each user is very small.)

"x" = call request time



Inter-request time = time between two adjacent call request is $\mathcal{E}(\lambda)$



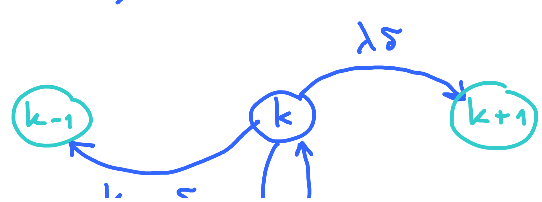
new call is generated at rate λ.

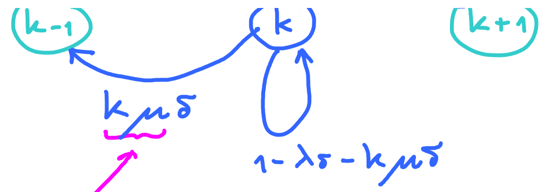
Call duration is $\mathcal{E}(\mu)$
(each) old call ends at "rate" μ

Small-slot analysis (discrete time approximation)

Suppose $K(t) = k$. Describe $K(t+\delta)$.
small time increment.
at time t, there are k ongoing calls.

At time $t+\delta$, only three events can happen (if δ is small):

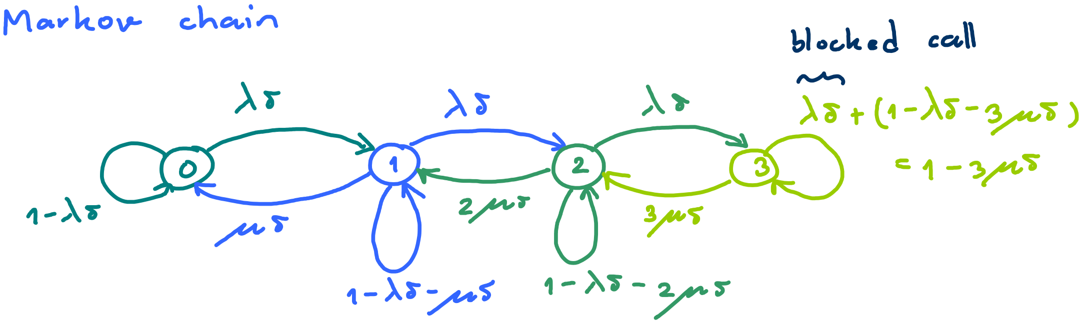




the ending rate is μ for each call.

So, for k calls, the total ending rate is $k\mu$

⇒ Markov chain



Next step: Study how systems characterized by Markov chains behave.