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Sol^n (2) (a) M/G/1

a) $E[\text{service time}] = p(0) + (1-p)\frac{1}{p}$

$= \left(\frac{1}{p} - 1\right)$

Now for stability mean inter arrival time > Mean arrival time.

∴ If inter arrival times are $Exp(\lambda)$.

$\Rightarrow \frac{1}{\lambda} > \frac{1}{p} - 1 \Rightarrow \frac{1}{p} - \frac{1}{\lambda} < 1.$

(b) servic time $\sim Exp(p/1-p)$

$\Rightarrow Var[\text{Service Time}] = \left(\frac{1-p}{p}\right)^2.$

(c) Laplace transformation $\Rightarrow$ $(F_{T_q}(t))$

$\left(F_{T_q}(t)\right)_{\text{Laplace}} = p + \frac{(1-p)p}{(s+p)}$

(d) avg waiting time: $p\delta(x) + (1-p)pe^{-px}$.