17. Exercise: Bank tellers

Exercises due May 13, 2020 05:29 IST *Completed*

Exercise: Bank tellers

1/1 point (graded)

When you enter your bank, you find that there are only two tellers, both busy serving other customers, and that there are no other customers in line. Assume that the service times for you and for each of the customers being served are independent identically distributed exponential random variables. Also assume that after a service completion, the next customer in line immediately begins to be served. What is the probability that you will be the last to leave? *Hint:* Think of the situation at the time that you start getting served.

1/2 ✔ **Answer:** 0.5

Solution:

The answer is $1/2$. To see this, focus at the moment when you start service with one of the tellers. Note that the probability that both customers currently being served have their service end at exactly the same time is zero, and so when you start service, there will be another customer still being served. Using the memorylessness property of the exponential, the remaining time of the other customer being served is exponential. The time until your own service will be completed has the same exponential distribution and is independent. By symmetry, you and the other customer have equal probability, $1/2$, of being the last to leave.

Submit You have used 1 of 3 attempts

Answers are displayed within the problem

Discussion

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? Calculation vs intuition: how did you calculate this? — 7
My intiution for memorylessness got me to the correct answer. Reading through the other posts about c...

? Got it right but is Poisson model applicable ? — 3
I got it with memorylessness property, but it is definitely not what we could believe in real world... More...

I got it right but, this is too much hand-waving for my liking. — 4
I understood that, unlike statistics, there is no art component on probability. And if we follow the proces...

Apply simple concept — 1 new — 4
Think memorylessness

What if your observation starts immediately? — 2 new
Wouldn't that change everything? The outcome seems to hinge on the assumption, which seems arbitrar...

this question is so perfectly encapsulates this class — 2
The type of logic and applied theoretical knowledge used to solve this problem is just so on point

Why not compare the time till first and second arrival? — 3
Taking the perspective of the tellers: Would it not make sense to compare the time of first and second ar...

Clarification needed — 3
Why is this the case that "the probability that both customers currently being served have their service e...