16. Exercise: Splitting

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

Exercise: Splitting

1/1 point (graded)

For each exam, Ariadne studies with probability $1/2$ and does not study with probability $1/2$, independently of any other exams. On any exam for which she has not studied, she still has a 0.20 probability of passing, independently of whatever happens on other exams. What is the expected number of total exams taken until she has had 3 exams for which she did not study but which she still passed?

30 ✔ **Answer:** 30

Solution:

The sequence of exams for which she does not study and passes can be modeled as follows. We look at the exams for which she has not studied (a Bernoulli process with parameter $1/2$) and "split" it according to whether she passes or not. This creates a new Bernoulli process for the exams for which she does not study and passes, with parameter $(1/2) \cdot 0.20 = 0.10$. The expected time until 3 successes in this process is $3/0.10 = 30$.

Submit You have used 1 of 3 attempts

Answers are displayed within the problem

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Yet another hint Recall the third exercise from Exam 1. While the line of thought is not exactly the same, it is similar.	2
Advice in case you are stuck The key to this proplem is setting a proper spliting model. That means, choosing whith care what exactly...	1
Geometric Distribution Doesn't the geometric distribution give you the distribution for the number of trials until the first succes...	2
Another Hint To calculate the probability, think with a probability tree diagram. And then use the expectation formula ...	2
[STAFF] If those 3 exams are continuous Hi staff, If those 3 exams are continuous, will the answer be 1000?	10
Hint - The length of the original sequence which is asked is equal to the length of the split sequence. - At first ...	4