3. Three tosses of a fair coin

Problem Set due Feb 5, 2020 05:29 IST *Completed*

Problem 3. Three tosses of a fair coin

4/4 points (graded)

You flip a fair coin (i.e., the probability of obtaining Heads is $1/2$) three times. Assume that all sequences of coin flip results, of length 3, are equally likely. Determine the probability of each of the following events.

1. $\{HHH\}$: 3 Heads

   1/8 ✔ **Answer:** 0.125

2. $\{HTH\}$: the sequence Heads, Tails, Heads

   1/8 ✔ **Answer:** 0.125

3. Any sequence with 2 Heads and 1 Tail (in any order):

   3/8 ✔ **Answer:** 0.375

4. Any sequence in which the number of Heads is greater than or equal to the number of Tails:

   1/2 ✔ **Answer:** 0.5

Solution:

Since all outcomes are equally likely, we are dealing with a discrete uniform probability law. To obtain the probability of an event, we simply count the number of elements in the event and divide by the total number of elements in the sample space.

There are 3 flips, with 2 possible results for each flip. Thus there are $2^3 = 8$ elements (distinct sequences) in the sample space.

1. Any particular sequence has probability $1/8$. Therefore, $\mathbf{P}(\{HHH\}) = \boxed{1/8}$.
2. This event again consists of a single sequence, and so $\mathbf{P}(\{HTH\}) = \boxed{1/8}$.
3. The event of interest is $\{HHT, HTH, THH\}$. Since it consists of 3 elements, its probability is $\boxed{3/8}$.
4. The set of sequences that have at least as many Heads as Tails is $\{HHH, HHT, HTH, THH\}$. Its probability is $\boxed{4/8}$.

Submit You have used 1 of 3 attempts

Answers are displayed within the problem

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? No. 4 won't accept a reduced fraction as an answer 2
In case anyone else runs into the same issue as me, remember not to reduce the fraction into a "simpler...

This is bonus question! 2 new 8
This question is straight forward :)

Are the bounds initially implied in the question applicable to part 4? 6
Silly question but if we only have three coin tosses then isn't part 4 of the question the same as part 3?

Toss a coin to your Witcher 6
Just saying. Witcher certainly knows probability theory, so must we then! All is about coins, really ... Oh a

Do not be intimidated!

It is good that there are people who find these questions easy. I am not one of them. All questions requi...

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