Mathematics 1550H – Introduction to Probability

Trent University, Summer 2015

Assignment #3

Due on Wednesday, 15 July, 2015.

Do or fake. There is no try![†]

You have been shipwrecked on an uninhabited planet and are so bored that you want nothing more than to toss a coin for fun. Sadly, you were unable to salvage any coins from the wreckage and the nearest approximation you have been able to find or make is a single fair standard six-sided die.

1. How could you simulate a fair coin using the die? *[1]*

Having gotten bored with a fair coin ...

2. How could you simulate a biased coin that has $P(H) = \frac{2}{3}$ and $P(T) = \frac{1}{3}$ using the die? *[1]*

... and then with an easy-to-handle bias ...

3. How could you simulate a biased coin that has $P(H) = \frac{2}{5}$ and $P(T) = \frac{3}{5}$ using the die? *[4]*

... you eventually fall to the Irrational Side.

4. How could you simulate a biased coin that has $P(H) = \frac{1}{\pi}$ and $P(T) = 1 - \frac{1}{\pi}$ using the die? *[4]*

[†] With apologies to Yoda ...