Assignment 4, AI1110

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***Abstract*—This document provides a solution to NCERT Class 10 Probability 15.2 Example 1.**

Example 1: Find the probability of getting a head when a coin is tossed once. Also find the probability of getting a tail.

Solution: Let the random variable $X \in \{0, 1\}$ represent the number of heads obtained from a single coin toss. Total number of outcomes is 2. Classical probability:

$$\Pr(X = 0) = \frac{1}{2} \tag{1}$$

$$\Pr(X = 1) = \frac{1}{2} \tag{2}$$

Empirical probability: n is the frequency of an outcome, from a trial simulated by code/verify.py.

Outcome	X	n
Tails	0	493
Heads	1	507

TABLE I
FREQUENCIES OF OUTCOMES FROM TRIALS

$$\Pr(X = 0) = \frac{493}{1000} = 0.493 \tag{3}$$

$$\Pr(X = 1) = \frac{507}{1000} = 0.507 \tag{4}$$

The two outcomes are mutually exclusive and exhaustive. This is verified by

$$\Pr(X = 0) + \Pr(X = 1) = 1 \tag{5}$$