# EE5600 Assignment 2

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***Abstract*—This document contains the solution to a probability question.**

Download all python codes from

https://github.com/Jayanth9969/EE5600/blob/master/Assignment2/code.py

## 1 Problem

A die is thrown twice and the sum of the numbers appearing is observed to be 6. What is the probability that the number 4 has appeared at least once?

## 2 Solution

Let A represent of all possible pairs from the die that makes sum 6.
n(A) represents Number of elements in set A.

$$A = \{(1,5),(2,4),(3,3),(4,2),(5,1)\} \tag{2.0.1}$$

$$n(A) = 5 \tag{2.0.2}$$

Let B represent all possible pairs from the die that have atleast one 4
n(B) represents Number of elements in set B.

$$B = \{(1,4),(4,1),(2,4),(4,2),(3,4),(4,3),(4,4),(4,5),(5,4),(4,6),(6,4)\} \tag{2.0.3}$$

$$n(B) = 11 \tag{2.0.4}$$

Now, Let C represent all possible pairs from the die that makes sum 6 and having atleast one 4 in each pair.So,
n(C) represents Number of elements in C.then,

$$C = A \cap B \tag{2.0.5}$$

$$C = \{(4,2),(2,4\} \tag{2.0.6}$$

$$n(C) = 2 \tag{2.0.7}$$

Probabilty that number 4 appearing atleast once given condition that sum of numbers is 6 is given by $Pr(B|A)$

$$Pr(B|A) = \frac{Pr(A \cap B)}{Pr(A)} \tag{2.0.8}$$

$$= \frac{Pr(C)}{Pr(A)} \tag{2.0.9}$$

$$= \frac{\frac{n(C)}{36}}{\frac{n(A)}{36}} \tag{2.0.10}$$

$$= \frac{n(C)}{n(A)} \tag{2.0.11}$$

$$= \frac{2}{5} \tag{2.0.12}$$

$$= 0.4 \tag{2.0.13}$$

Thus probability that the number 4 has appeared at least once when a die is thrown is twice and sum of numbers Observed is 6 is 0.4.