

## ENEE324-03 Spring 2019. Problem set 2

Date due February 14, 2019

**Problem 1:** The sample space consists of sequences of  $n$  coin tosses.

- (a) What is the size of the sample space?
- (b) Consider the event  $A$  that the number of  $H$  is even. What is the size of  $A$ ?
- (c) Consider the event  $B_m$  that exactly  $m$  outcomes are  $T$ . What is the size of  $B_m$ ? What is the size of the union  $\cup_{m=1}^k B_m$ , where  $k, 0 < k < n$  is a fixed number?
- (d) Now consider the event  $C_i$  that the first  $k$  tosses contain  $i$  outcomes  $T$  and the last  $n - k$  tosses contain  $m - i$  outcomes  $T$ . What is the size of the event  $C_i$ ? What is the size of the event  $\cup_{i=0}^k C_i$ ?

(Whenever possible, give the answer in closed form, not involving any sums or other operations)

**Problem 2:** A box contains 5 red balls, 12 blue balls, and 9 white balls. Five balls are selected at random without replacement.

What is the probability that we will observe (a) at least 4 blue balls? (b) 5 balls of the same color? (c) at most 3 white balls?

**Textbook**, p. 52, Problems 2, 4.

**Textbook**, pp.113–119: Problems 6, 20, 26.