STAT 2857A – Lecture 1 Examples and Exercises

Example 1.1: Happy Birthmonth!

Consider the month of birth for three students selected randomly from the class (call them Alexandria, Braden, and Chen).

a) Describe the outcomes.
b) How many outcomes are in the sample space?
c) Identify one simple event?
d) Identify one compound event?

Example 1.1 part 2

Let A_i denote the event that Alexandria is born in month i. Let B_i denote the event that Braden is born in month i. Let C_i denote the event that Chen is born in month i.

Describe each of the following events in words?

a) $E_1 = A_1 \bigcap B_1 \bigcap C_1$
b) $E_2 = \bigcup_{i=1}^{12} (A_i \bigcap B_i \bigcap C_i)$
c) $E_3 = \bigcup_{i=1}^{12} (A_i \bigcap B_i \bigcap C_i')$

Example 1.1 part 3

a) Identify two events that are disjoint/mutually exclusive.
b) Identify two events that are *not* disjoint/mutually exclusive.

Example 1.1 part 4

Consider the events E_1, E_2, and E_3 from part 2.

a) What is the probability of each event?
b) What do these probabilities mean?

Exercise 1.1

An unfortunate student has tests in biology, chemistry, and statistics all in one day (a cruel experiment). Thankfully, each test is graded on a pass/fail basis.

a) List all of the outcomes in the sample space.
b) Write the sample space in set builder notation.
c) Identify i) two events that are mutually exclusive and ii) two events that are not mutually exclusive.
d) Let E_1 be the event the student passes one test and E_2 the event they pass two test. List the outcomes in and describe the event $(E_1 \cup E_2)'$.