MAT 147
Homework

Exercises Corresponding to Chapter 2

1. Write out the sample space for each of the following experiments:

(a) A coin is tossed 3 times in a row and for each toss, you record H or T.

(b) A basketball player shoots 3 consecutive free throws, and you record either s for success or f for failure.

(c) A student randomly guesses the answers to a four-question true (T) or false (F) quiz, and you record their answers.

(d) You roll two dice and record the absolute value of the difference of the two numbers that appear.

2. A login password consists of 5 letters followed by 2 numbers. Assume that the password is not case-sensitive.

(a) How many different passwords are there that end with 2?

(b) How many different passwords are there that do not contain a J?

(c) What is the probability that a randomly chosen password begins with the letters AB?

3. A standard deck contains 52 cards (4 suits: spades, hearts, diamonds, clubs; 13 cards in each suit). A flush is a five card hand in which all of the cards are the same suit.
(a) Determine how many flushes are possible.

(b) Determine the probability of being dealt a flush.

(c) A royal flush is a five card hand consisting of 10, J, Q, K, A, all of the same suit. Determine the probability of being dealt a royal flush.

4. Let $S = \{0,1\}^{128}$. Define two events:

$$E_1 = \{b \in S \ : \ msb_2(b) = 11\}$$

$$E_2 = \{b \in S \ : \ lsb_2(b) = 11\}.$$

Verify that the events E_1 and E_2 are independent.