Directed Work Series No. 5
(Probabilities)

Exercise 1 In a school, students have the option to enroll in French, Spanish, or both languages. Below are the statistics for the enrollment:

- 60% of the students are enrolled in French.

- 40% of the students are enrolled in Spanish.

- 20% of the students are enrolled in both languages.

A student is randomly selected from the school.
   Questions:

1. What is the probability that a student is enrolled in French given that they are enrolled in Spanish?

2. What is the probability that a student is enrolled in Spanish given that they are enrolled in French?

Exercise 2 Suppose we have three cards that are identical in form but differ in color:

- The first card is colored red on both sides.

- The second card is colored black on both sides.

- The third card has one side colored red and the other side colored black.

These cards are mixed up in a hat. One card is randomly selected and placed on the ground.
   Question: If the upper side of the chosen card is colored red, what is the probability that the other side of the card is also colored black?

Exercise 3 It is estimated that 50% of emails are spam emails. Some software has been applied to filter these spam emails before they reach your inbox. A certain brand of software claims that it can detect 99% of spam emails, and the probability for a non-spam email detected as spam is 5%.
Now if an email is detected as spam, then what is the probability that it is in fact a non-spam email?