1. Written Assignment 3

1.1. Problem 1.
On the red line, 25% of inbound passengers arriving at the JFK/UMass station are from the Braintree branch, while 75% are from the Mattapan branch. 22% of the passengers from the Braintree branch leave the train at JFK/UMass, and 16% of passengers from the Mattapan branch exit at JFK/UMass.

a) What is the probability that a randomly chosen inbound passenger exits the train at JFK/UMass?

b) What is the probability that a randomly chosen inbound passenger who exits the train at JFK/UMass arrived on the Braintree branch?

1.2. Problem 2.
A car manufacturer has three sources, A, B, and C for fuel injectors. A supplies 45% of the fuel injectors used, while B supplies 35% and C supplies the remainder. The fuel injectors are covered under a 50,000 mile waranty program, and warranty records indicate 3% of injectors made by A, 2% of those made by B, and 1% of those made by C fail in the first 50,000 miles.

a) What is the probability that a randomly chosen injector does not fail in the first 50,000 miles?

b) An injector is chosen at random from the injectors that failed in the first 50,000 miles. What is the probability that it was made by A?

c) An injector is chosen at random from the injectors that failed in the first 50,000 miles. What is the probability that it was made by B?

1.3. Problem 3.
Urn 1 contains one green, two blue, and three red chips. Urn 2 contains two green, two red, and one blue chip. An urn is chosen at random, with Urn 1 having a 40% chance of being chosen, and a single chip is drawn from the chosen urn.

a) What is the probability that a green chip is chosen?

b) What is the probability that a red chip is chosen?

c) If a green chip is chosen, what is the probability that it came from Urn 1?

d) If a red chip is chosen, what is the probability that it came from Urn 2?

1.4. **Problem 4.** Urn 1 contains two blue, and four red chips. Urn 2 contains three blue, and three red chips. A coin is tossed and if the result is heads, a chip is drawn from Urn 1 and placed in Urn 2. If the result is tails, a chip is drawn from Urn 2 and placed in Urn 1. Next, a single chip is drawn from the urn that received the selected chip.

a) What is the probability that second chip drawn is red?

b) If the second draw results in a red chip, what is the probability that it was originally in Urn 1?