Suppose that you are given seven different programs A, C, E, G, I, K, M, each meant to carry out the same task, where programs C, G, K, M are written in Python and programs A, E, I are written in Java. After looking at each program, you think that programs C, E, I, M are likely to be correct and programs A, G, K are likely to be incorrect, but you have been given sample input and output that you can use to test the programs and make sure.

1. Suppose that your assumptions about the correctness of the programs are right. For each statement below, give the *smallest* number of programs that must be tested in order to determine whether the statement is true or false, and justify your answer.

   (a) All Python programs produce correct output.

   (b) Some incorrect program is written in Java.

   (c) No Java program is correct.

   (d) Only programs written in Python produce incorrect output.

2. Let P represent the set of all programs (our "universe"), J represent the set of all **Java** programs, and T represent the set of all correct programs.

   For each statement in the previous question, draw one Venn diagram representing a situation when the statement is true, and another Venn diagram representing a situation when the statement is false—for this question, ignore your assumptions about the correctness of the programs.