PROBLEM 1. A large software development company employs 100 computer programmers. Of them, 45 are proficient in Java, 30 in C++, 20 in Python, six in C++ and Java, one in Java and Python, five in C++ and Python, and just one programmer is proficient in all three languages above. Determine the number of computer programmers that are not proficient in any of these three languages.

PROBLEM 2. How many poker hands (5 cards) from a regular deck (52 cards) have at least one card from each of the four standard suits? *Hint*: Let $N_\spadesuit$ be the collection of hands containing no spades, and similarly define $N_\clubsuit$, $N_\heartsuit$, and $N_\diamondsuit$. What is the relationship between the answer to this question and $|N_\spadesuit \cup N_\clubsuit \cup N_\heartsuit \cup N_\diamondsuit|$?

PROBLEM 3. Let m and n be integers greater or equal to 1. How many surjective functions $f\colon [m] \to [n]$ are there?