22C:16 Quiz 10

The two problems in this quiz involve writing a little bit of code - 4-6 lines each. If you see yourself writing too much, it is time to stop and think. Turn the page for the second problem.

1. You are given a dictionary, whose keys are points in the plane expressed as tuples and whose values are positive integers. You may think of the keys as latitude-longitude pairs and the associated values as the current population at that location. Here is an example dictionary - let us call this `D`:

   {`(12, 100):10022, (-9, 19):1111, (0, 5):1001, (19, 2):80, (22, 9):100`}.

   Write a function called `getPopulation` that takes such a dictionary and a tuple (x, y) and returns the total population to the northeast of (x, y). A point (x', y') is said to be to the northeast of (x, y) if $x' \geq x$ and $y' \geq y$. For example, the call `getPopulation(D, (9,9))` would return 10122 (10022 + 100) because the only points that lie to the northeast of (9, 9) in the dictionary are (12, 100) and (22, 9).

2. You are given a dictionary whose keys are strings and whose values are positive integers. You may think of the keys as words in English and the associated values as corresponding frequencies. Here is an example dictionary - let us call this `D`:

   {`"hello":10, "hi":11, "good":10, "bye":8, "ciao":10`}.

   Write a function called `invertDictionary` that takes such a dictionary and constructs from it a new dictionary whose keys are the values in the given dictionary and whose values are lists of words that have the corresponding frequency. For example, the call `invertDictionary(D)` should return the dictionary:

   {`11:["hi'], 8:["bye"], 10:["hello", "good", "ciao"]`}.