Homework #3: Missing planes.

Note:

Please, run your code before submitting. If you get an error, try to fix it before submitting your homework. If you get help from anyone, please, make sure that you actually understand the solution.

Revisit the problem that we discussed during the class work (a number of planes are departing and all but one arriving; each plane has a unique id; identify the missing plane).

Task 1

First, let's fix a possible problem of random.randint() generating the same id for different planes (technically, this is known as making a random draw with replacement). Instead, we need to use random.sample() to generate random values *without* replacement (this way, we will not draw the same value again). You task is to figure out how to use random.sample() to generate a list of departing and arriving planes' ids (similar to what we did in class).

Hint: see https://www.geeksforgeeks.org/python-random-sample-function/ to learn about random.sample()

Task 2

Add an alternative function that uses a dictionary to find the missing plane. Compare which is faster: the list-based function (from classwork) or the dictionary-based function. Test on 20,000 planes. Can you explain the huge difference in speed?

Task 3

Imagine that instead of a list of IDs of the departing and arriving planes, you have objects from a class plane (with unique ID being one of the instance attributes). Can you implement this problem (and a solution) using an object-oriented programming approach? How would this approach compare to the previous model and solutions?