The Theory of Computation

Bernard M.E. Moret

Addison-Wesley-Longman, 1998

Solution Manual
Chapter 2, Problem 2.3

The infinite number of tour buses, each of infinite size, is just the same as the infinite number of rows, each of infinite size, in our table of rationals. The solution is thus to use the dovetailing technique used for the rational numbers.

Basically, we will conceptually order all tourists on the buses (assign them numbers 1, 2, 3, etc.), then we will be in the situation described in Example 2.1, where we have a full *Infinite Hotel* and an infinite number of new guests and simply move each existing guest in room i to room $2i$ and assign new guest j to room $2j - 1$. Dovetailing on the buses is exactly like dovetailing on rows: we take the first tourist on the first bus, then the second tourist on the first bus and the first tourist on the second bus, then the third tourist on the first bus, the second tourist on the second bus, and the first tourist on the third bus, etc.