



# Counting Methods (Part 3-Pigeonhole principle)

# Exercise

1. There are 400 students in a programming class. Show that at least 2 of them were born on the same day of a month.
2. Let  $A = \{a_1, a_2, a_3, a_4, a_5, a_6, a_7\}$  be a set of seven integers. Show that if these numbers are divided by 6, then at least two of them must have the same remainder.
3. Let  $A = \{1, 2, 3, 4, 5, 6, 7, 8\}$ . Show that if you choose any five distinct members of  $A$ , then there will be two integers such that their sum is 9.
4. From the integers in the set  $\{1, 2, 3, \dots, 19, 20\}$ , what is the least number of integers that must be chosen so that at least one of them is divisible by 4?