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CS 225: Discrete Structures in CS

Homework 7, Part 2

Set 9.4

#6a.

7 pigeons, 6 holes, 7/6 = 1.16 = 2 so **yes**, two must have the same remainder

b.

7 pigeons, 8 holes, 7/8 = .87 = 1 so **no** since integers 1-6 all have different remainders when divided by 8

#7.

If you partition S into pairs with the largest and smallest distinct integers, then **yes**, two of them has the sum of 15 since in this case, the number of pigeons is larger than the number of holes.

#16.

There are 20 integers from 1 to 100 that are divisible by 5, meaning 80 are not. We must pick at least 81 to ensure we get one divisible by 5.

#27.

Since there are 2,000 people and 365 days in a year, then 2000/365 = 5.47 = 6 so **yes**, at least 5 people would share a birthday. This also works for a leap year with 366 days.