

## Workshop 8: Counting

1. Consider rolling one red dice and one green dice (each with the numbers 1 to 6).
  - a. How many ways are there to get the sum of the dice equal to 7?
  - b. How many ways are there to get a 6 on either dice?
  - c. How many ways are there to get the sum of 7 or to get a 6 on either dice?
  - d. How many ways are there in which the difference of the two dice is at least 3?
2. A byte is a sequence of 8 bits (e.g. 01100101).
  - a. How many different bytes are there?
  - b. How many different bytes are there that start with 101?
  - c. How many different bytes are there that start with 11 or end with 00?
  - d. How many different bytes are there that have exactly four zeros?
3. Consider a class containing 14 first year students, 10 second year students and 6 third year students.
  - a. How many ways can you put all the students in a line?
  - b. How many ways can you put all the students in a line such that the first years are before the second years and the second years are before the third years?
  - c. How many ways can you make a group of 8 students?
  - d. How many ways can you make a group of 7 students if 4 are first years, 2 are second years and 1 is third year?
  - e. How many ways can you make a group of 6 if at least 3 students must be first years?
4. A 'word' is any string of 6 letters from the English alphabet (A-Z).
  - a. How many words are there?
  - b. How many words end in the letter X?
  - c. How many words start with the letter M, N, or O?
  - d. How many words contain no vowels (A, E, I, O, U)?
  - e. How many words contain the letter G exactly three times?
  - f. How many words are palindromes (e.g. HELLEH)?