Tutorial
Counting

1. Recall that a bit string is an ordered list of characters using only the digits 0 and 1.
   a) How many bit strings of length ten are there?
   b) How many bit strings of length ten have exactly three 1s?
   c) How many bit strings of length ten have exactly three 1s and none of these 1s are adjacent to each other?

2. You have a combination lock with four digits (0 to 9). You set the lock so that you do not use the same digit more than once.
   a) How many ways are there to set the lock?
   b) If you additionally do not use four consecutive digits (ie increasing by 1 in each place; eg 1,2,3,4 or 3,4,5,6), how many ways do you have for setting the lock?
   c) You now think that you will **also** allow for **any** four-digits made from the digits 0 to 4. How many ways are there to set the lock now?

Further practice and homework

Many exercises in Rosen's textbook:-

- For Counting, try exercises in Section 6.1;
- For Permutations and Combinations, try exercises in Section 6.3.