# ST3009: Statistical Methods for Computer Science

## Week 1 Assignment - Senán d'Art - 17329580

**Question 1**

**(a)**

No restrictions so letters can be in any order. To generate all possible results: $$ \binom{10}{1} \binom{9}{1} \binom{8}{1} \binom{7}{1} \binom{6}{1} \binom{5}{1} \binom{4}{1} \binom{3}{1} \binom{2}{1} \binom{1}{1} $$ As every time we choose a letter it is removed from the pool of available letters.
This becomes: $$ 10***9***8***7***6***5***4***3***2*1 $$ Which is: $$ 10! = 3,628,800 $$

**(b)**

Restrictions of ***E*** and ***F*** being next to each other but in any order means we can treat it as a pool of 9 characters. $$ 9! $$ But since ***E*** and ***F*** can be in the order ***EF*** or ***FE*** we need to multiply this by 2. $$ 9! * 2 = 725,760 $$

**(c)**

Word 'BANANA' contains 6 letters but ***A*** is repeated 3 times and ***N*** 2 times.