Tutorial Sheet 20
(Permutations and Combinations)

1. On a shelf there are 3 different mathematics books and 5 different computer science books.
    (a) Find the possible number of arrangements of the books on the shelf.
    (b) In how many ways the books are arranged so that all the mathematics books are together?
    (c) Find the number of ways that all the computer science books will not be together.

2. If the letters of the word PRO**B**AB**I**LITY are arranged at random, find the number of arrangements that two B's are separated.

3. A six-digit number is formed from the digits 0 to 9 and repetitions are not allowed. How many these six-digit numbers are divisible by 5?

*4. How many even numbers can be formed from the figures 1, 2, 4 and 6 if repetitions are not allowed?

5. A computer science society has 50 members.
    (a) How many ways are there to choose four members of the society to serve on an executive committee?
    (b) How many ways are there to choose a chairman, vice chairman, secretary, and treasurer of the society?

6. Five persons are chosen at random from a group of eleven persons consisting of four men and seven women.   Three of the women are sisters.   Find the number of ways that the five persons chosen (a) without any restrictions, (b) consist of five women, (c) consist of three women and two men, (d) include the three sisters.

*7. A group consisting of ten boys and twelve girls attends a training course.
    (a) Five boys are selected for basketball and six girls for netball.   Find the number of different possible selections for each of these.
    (b) Three particular boys and three particular girls are selected and placed in mixed pairs for tennis.   Find the total number of different mixed pairs which can be made using these six children.
    (c) If six children are chosen at random from the whole group find the number of ways that there is a majority of girls in the six selected.

    *Optional