IS 1006 – Discrete Mathematics

Counting Techniques

1. What is the total number of possible outcomes when a pair of coins is tossed?

2. You have 4 t-shirts and 2 pairs of jeans. How many different combinations can you choose?

3. There are 3 different roads from city A to city B and 2 different roads from city B to city C. In how many ways can someone go from city A to city C passing by city B?

4. A man has 3 different suits, 4 different shirts and 5 different pairs of shoes. In how many different ways can this man wear a suit, a shirt and a pair of shoes?

5. In a company, ID cards have 5 digit numbers.
   a) How many ID cards can be formed if repetion of the digit is allowed?
   b) How many ID cards can be formed if repetion of the digit is not allowed?

6. In a certain country, license plate numbers have 3 letters followed by 4 digits. How many different license plate numbers can be formed? (Letters and digits may be repeated).

7. Using the digits 1, 2, 3 and 5, how many 4 digit numbers can be formed if
   a) The first digit must be 1 and repetition of the digits is allowed?
   b) The first digit must be 1 and repetition of the digits is not allowed?
   c) The number must be divisible by 2 and repetion is allowed?
   d) The number must be divisible by 2 and repetion is not allowed?

8. Shirt Mart sells shirt in size S,M,L and XL. Each size comes in five colours red, yellow, orange, blue and white. The shirt come in short sleeve and long sleve. How many kind of shirts are there?

9. In how many ways can the six letters of the word "mammal" be arranged in a row?

10. In how many ways can 6 girls and 2 boys be arranged in a row

    (a) without restriction?

    (b) such that the 2 boys are together?

    (c) such that the 2 boys are not together?

11. How many different ways can 3 red, 4 yellow and 2 blue bulbs be arranged in a string of Christmas tree lights with 9sockets?

12. In how many ways can a group of 4 boys be selected from 10 if

(a) The eldest boy is included in each group?

(b) The eldest boy is excluded?

(c) What proportion of all possible groups contain the eldest boy?

13. A class consists of 15 boys of whom 5are prefects.How many committees of 8 can be formed if each consists of

(a) exactly 2 prefects?

(b) at least 2 prefects?

14. How many ways can be arrange 6 people in a circle?

15. In how many ways 10 boys and 5 girls can sit around a circular table, so that no two girls sit together?

16. In how many ways can five people A, B, C, D, and E be seated around a circular table if:

    a) A and B must sit next to each other?

    b) A and B must not sit next to each other?

    c) A and B must be together and C and D must be together?