



# SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai

Accredited by NAAC-UGC with 'A++' Grade (Cycle III) &

Reaccredited by NBA (B.E - CSE, EEE, ECE, Mech&B.Tech.IT)

COIMBATORE-641 035, TAMIL NADU



## Puzzle 1: The Handshake Problem

### Puzzle:

In a room with  $n$  people, everyone shakes hands with everyone else exactly once. How many handshakes occur?

### Solution:

Each handshake involves two people, and no pair of people can shake hands more than once. Therefore, the problem is asking for the number of ways to choose 2 people from  $n$  people. This is a combination problem, which can be solved using the binomial coefficient:

$$\text{Number of handshakes} = \binom{n}{2} = \frac{n(n-1)}{2}$$

For example, if there are 5 people in the room:

$$\text{Number of handshakes} = \binom{5}{2} = \frac{5(5-1)}{2} = \frac{5 \times 4}{2} = 10$$

### Answer:

The total number of handshakes is  $\frac{n(n-1)}{2}$ .



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## Puzzle 2: The Committee Selection Problem

### Puzzle:

A company needs to form a committee of 4 members from a group of 8 employees. How many different committees can be formed if:

1. There are no restrictions?
2. One specific employee must be included in the committee?

### Solution:

1.

#### No Restrictions:

To select 4 members out of 8, the number of ways to do this is a combination, calculated as:

$$2. \binom{8}{4} = \frac{8 \times 7 \times 6 \times 5}{4 \times 3 \times 2 \times 1} = 70$$

3.

#### One Specific Employee Must Be Included:

If one specific employee must be in the committee, then you need to select 3 more members from the remaining 7 employees. The number of ways to do this is:

$$4. \binom{7}{3} = \frac{7 \times 6 \times 5}{3 \times 2 \times 1} = 35$$

### Answer:

1. The number of different committees that can be formed with no restrictions is 70.
2. The number of different committees that can be formed when one specific employee must be included is 35.