Problem Solutions and Algorithms

1. Bear Problem

Solution: The bear is white because it is near the North Pole.

Algorithm:

1. Start at point P.
2. Walk one mile south.
3. Walk one mile east.
4. Walk one mile north.
5. If you reach the starting point, you are near the North Pole -> Bear is white.

2. Town Problem

Solution: The school should be built 1 km from town A.

Algorithm:

1. Let distance from town A = d
2. Minimize total travel distance = 100d + 50(3 - d)
3. Solve for d
4. Result = 1 km from town A

3. Silver Chain Problem

Solution: Minimum cuts needed = 4 (divide into powers of 2).

Algorithm:

1. Divide chain into parts of size powers of 2.
2. Make minimum number of cuts to cover each day's payment.
3. Result = log2(n) cuts (rounded up).

4. Rearrange Letters

Solution: Rearranging 'new door' gives 'one word'.

Algorithm:

1. Input 'new door'
2. Rearrange the letters
3. Result = 'one word'

5. Divide and Conquer

Solution: Sorted list = 1, 2, 3, 4, 5, 6

Algorithm:

1. Divide list into two halves.
2. Recursively sort each half.
3. Merge sorted halves.
4. Result = sorted list.

6. Simple Interest

Algorithm:

1. Start
2. Input Principal (P), Rate (R), Time (T)
3. Calculate SI = (P * R * T) / 100
4. Display SI
5. End