1. What was the color of the bear?

The only place on Earth where a bear could walk 1 mile south, 1 mile east, and then 1 mile north and end up at the same point is the North Pole.

The only bears found in that region are polar bears, which are white.

Answer: White.

2. Optimal School Location Problem

- This is a weighted average problem where the optimal location should minimize total travel distance.

- The best place to build the school should be in proportion to the number of students in each town.

- Using the formula for weighted division:

  x=(50×3)(100+50)=150150=1 km from town Ax= \frac{(50 \times 3)}{(100 + 50)} = \frac{150}{150} = 1 \text{ km from town A}x=(100+50)(50×3)=150150 =1 km from town A

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

3. Minimum Links to Cut for Payment

- The goal is to break the chain in a way that allows daily payments without breaking more than one link.

- The optimal way to cut a 6-link chain is:

    1. Cut link 1 → Now you have 1 single link and a 5-link chain.

    2. Cut link 2 → You can now form 2, 1, and 4 separate links.

    3. Cut link 4 → You can now form 4, 2, and 1 separate links.

- This pattern follows powers of 2 (1, 2, 4, 8, etc.), allowing any day's payment using a combination of these links.

- For n = 100 days:

    ○ The minimum number of cuts follows the binary representation of 100, meaning cutting 6 links (1, 2, 4, 8, 16, 32).

4. Rearrange the letters in "new door" to make one word

- The correct answer is **"one word"** **Answer: one word.**

5. Divide and Conquer Sorting (Merge Sort)

- Applying Merge Sort to 6, 5, 1, 4, 3, 2:

Step 1: Divide

   ○ Split into: [6, 5, 1] and [4, 3, 2]

Step 2: Recursively Sort
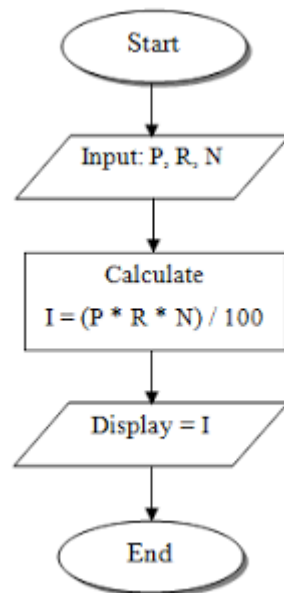
   ○ [6, 5, 1] → [5, 6], then merge with 1 → [1, 5, 6]

- [4, 3, 2] → [3, 4], then merge with 2 → [2, 3, 4]

Step 3: Merge

- Merge [1, 5, 6] and [2, 3, 4] → [1, 2, 3, 4, 5, 6]
-

Answer: Sorted sequence: [1, 2, 3, 4, 5, 6] using Merge Sort.

6. Flow Chart for Simple Intrest

Algorithm:

(i)   Read principal
(ii)   Read years
(iii)   Read rate of interest per year
(iv)   Calculate the interest with formula Interest = Principal x Years x Rate/100