**1. Bear Color Problem (Heuristic Approach)**

**Solution:**

The problem describes a path that returns to the starting point. This is only possible on a spherical surface near the North Pole. Since polar bears live in the Arctic (which is at the North Pole), the color of the bear must be white.

**Algorithm (Heuristic Approach)**

1. Identify the movement pattern: South → East → North → Back to Start.
2. Recognize that such movement is only possible at the North Pole due to Earth's curvature.
3. Conclude that the bear is a polar bear, which is white.

**2. School Location Problem (Greedy Approach)**

**Solution:**

The school should be built such that the total travel distance for all 150 students is minimized. A weighted median approach is used, where we consider the total number of students in each town.

* Town A: 100 students
* Town B: 50 students
* Distance between A and B: 3 km

Using a weighted median, the school should be built closer to the town with more students.

((100 × 0) + (50 × 3)) / (100 + 50) = 150 / 150 = 1 km from A

Thus, the school should be 1 km from A and 2 km from B.

**Algorithm (Greedy Approach)**

1. Compute the total number of students in each town.
2. Use the weighted median formula to determine the optimal school location.
3. Place the school at that calculated position.

**3. Traveller’s Chain Payment Problem (Divide and Conquer Approach)**

**Solution:**

The traveller needs to make daily payments using a chain of 6 links (or 100 links for a general case). Using divide and conquer, we minimize the number of links cut.

To pay n days, cut links as follows:

* Cut 1st link → Give it on Day 1
* Cut 2nd link → Exchange the 1st link and give the 2nd (Day 2)
* Cut 4th link → Exchange links to achieve all values (Days 3-6)

For 100 days, cut links in powers of 2: 1, 2, 4, 8, 16, 32, 37 (total 7 cuts).

**Algorithm (Divide and Conquer Approach)**

1. Identify the **largest power of 2** that sums to the number of days.
2. Cut links at those positions.
3. Exchange links daily to make payments.

**4. Rearrange "new door" to make one word (Heuristic Approach)**

**Solution:**

By heuristic pattern recognition, "new door" can be rearranged to **"one word"**.

**Algorithm (Heuristic Approach)**

1. Convert "new door" into a list of characters: **[n, e, w, d, o, o, r]**
2. Generate valid word combinations using known heuristics (e.g., common prefixes, word patterns).
3. Check against a dictionary for meaningful words.

**Possible Anagrams:**

* **one word**
* **woodern**
* **rod new**
* **word one**

These anagrams use heuristic techniques like breaking words into smaller known segments and verifying their validity in English.

**5. Sorting (Divide and Conquer Approach - Merge Sort)**

**Solution:**

Sorting the numbers **6 5 1 4 3 2** using **Merge Sort** (Divide and Conquer).

**Algorithm (Merge Sort)**

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MergeSort(arr):

1. If the list has 1 element, return.

2. Divide the list into two halves.

3. Recursively call MergeSort on both halves.

4. Merge the two sorted halves.

5. Return the final sorted list.

**Sorted Output:**

**1 2 3 4 5 6**

**6. Simple Interest Flowchart (Greedy Approach)**

Start

Start

│

▼

Read P,n,r

Input P, R, T

│

▼

SI=(pnr)/100

SI = (P \* R \* T) / 100

│

▼

Display SI

Display SI

│

▼

Stop

End