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# **Wrap-Up Practice**

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Computer Programming for Engineers

Week 16

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# Problem #1: Towers of Hanoi

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- There are three towers. There are  $N$  plates stacked on the 1st tower. However, the plate cannot be placed on a small plate.
- You should move all the dishes placed in tower 1 to the smallest possible number of times with tower 3.
- Only one dish can be moved at a time, and the top plate of one tower can be placed at the top of another tower. Like the first time, a plate cannot be placed on a small plate.
- Input Condition
  - The first line of input is given the number of test cases  $T$ .
  - The first line of each test case is given a natural number  $N$  representing the number of plates. ( $N \leq 10$ )
- Output Condition
  - For each test case, you should print "Case # $T$ " on the first line. Where  $T$  is the case number.
  - For each test case, output the order of how to move the plate to the minimum number of times. " $a \rightarrow b$ " means that the plate at the top of tower  $a$  is moved to the top of tower  $b$ .

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# Problem #1: Towers of Hanoi – Input/Output

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[ Input ]

2

1

3

[ Output ]

Case #1

1->3

Case #2

1->3

1->2

3->2

1->3

2->1

2->3

1->3

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# Problem #2: Programming Contest

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- The tournament is conducted through several rounds, and there are a total of  $N$  applicants in all rounds. For each round, the first place gets  $N$  points, the second place gets  $N-1$  points in order. And, in the back, the second place gets 2 points, the first place gets 1 point.
- There is no tie for each round, and the person with the highest overall score (The sum of the points received per round) is the final winner. When a total score is given up to the last round, calculate the number of candidates who are likely to win the final round.
- Input Condition
  - The first line of input is given the number of test cases  $T$ . ( $1 \leq T \leq 5$ )
  - The first line of each test case is given the number of candidates  $N$  ( $1 \leq N \leq 300,000$ )
  - The next  $N$  lines are given  $N$  integers, one per line, representing the overall score each candidate received before the last round. (The overall score here is a nonnegative integer that does not exceed 2,000,000)
- Output Condition
  - For each test case, you should print "Case # $T$ " on the first line. Where  $T$  is the case number.
  - For each case, print the number of candidates who are likely to win the final.

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# Problem #2: Programming Contest – Input/Output

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**[ Input ]**

1

3

5

7

6

**[ Output ]**

Case #1

3