Programming Refresher Workshop

Session 6 Exercises

Learning objectives:

- Using array
- Apply sorting in program
- Problem solving

Exercise 17 (ex17): Mind Manipulation

You are to implement the program that will simulate mind manipulation that was done in class earlier. That is, implement the following algorithm:

1. Accept a 4-digit number in which one digit must be different from the other three. For example, 3345. Do input validation to ensure that there is one digit that is different from the other three.
2. Set the number as the old number.
3. Output the old number.
4. Re-arrange the four digits to form the largest value. For example, 5433.
5. Re-arrange the four digits to form the smallest value. For example, 3345.
6. Subtract the smallest value from the largest value to obtain another 4-digit number. For example, 5433 – 3345 = 2088. Set it as the new number.
7. If the new number is not the same as the old number, set the new number as the old number and repeat step 3 to step 6.
8. Else stop the process.

Input

The first line of input contains an integer N.

This is followed by N lines of input each with a 4-digit number.

Output

For each 4-digit number, output the number followed by "Invalid input. All four digits are the same" if it does not have a digit that is different from the other three digits. Otherwise, output the sequence of numbers generated as described above on one line separated by a space. The last number should not be followed by a space but followed by a newline character.

Sample input   **Sample output**

```
3              2222 Invalid input. All four digits are the same
2222           2333 0999 8991 8082 8532 6174
2333           5271 6264 4176 6174
5271
```

Algorithm template

Input

How to accept all the input

Processing

How to take the digits from the number?

How to form the largest number?

How to form the smallest number?

How to compare the old and the new number?

How to repeat the process until it is done.

Output

How to output the result?

How to output leading zeroes?