



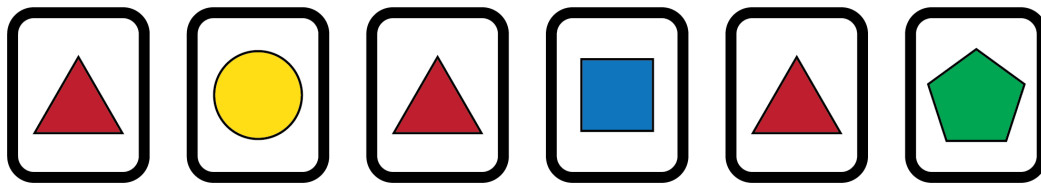
## Problem of the Week

### Problem D

### Six Cards

Antonia has a set of cards where each card has a shape on one side and a digit from 0 to 9 on the other side. Any two cards with the same shape have the same digit on the other side, and any two cards with different shapes have different digits on the other side.

Antonia lays out the following six cards.



She then flips each card over in place and records the six-digit number they form. For example, if there is a 4 on the other side of the cards with a triangle, a 2 on the other side of the card with a circle, a 7 on the other side of the card with a square, and a 5 on the other side of the card with a pentagon, then the six-digit number they form would be 424745.

Antonia notices that the six-digit number they form is divisible by 11. Determine the largest and smallest possible six-digit numbers that this could be.

NOTE: You may find the following fact useful:

A number is divisible by 11 exactly when the sum of the digits in the odd digit positions minus the sum of the digits in the even digit positions is divisible by 11.

For example, the number 138248 is divisible by 11 since

$$(1 + 8 + 4) - (3 + 2 + 8) = 13 - 13 = 0 \text{ and } 0 \text{ is divisible by } 11.$$

The number 693748 is also divisible by 11 since

$$(6 + 3 + 4) - (9 + 7 + 8) = 13 - 24 = -11 \text{ and } -11 \text{ is divisible by } 11.$$