注意：

允許學生個人、非營利性的圖書館或公立學校合理使用本基金會網站所提供之各項試題及其解答。**可直接下載而不須申請**。

重版、系統地複製或大量重製這些資料的任何部分，必須獲得財團法人臺北市九章數學教育基金會的授權許可。

申請此項授權請電郵 ccmp@seed.net.tw

Notice:

Individual students, nonprofit libraries, or schools are permitted to make fair use of the papers and its solutions. Republication, systematic copying, or multiple reproduction of any part of this material is permitted only under license from the Chiuchang Mathematics Foundation.

Requests for such permission should be made by e-mailing Mr. Wen-Hsien SUN ccmp@seed.net.tw

International 5^{th} Mathematics and Science Olympiad (IMSO) for Primary School 2008

Lombok, November 8-14, 2008

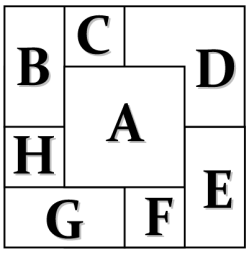
Instructions:

* Write down your name and country on answer sheet.
* Write down your answer on the provided answer sheets.
* Use pen or pencil to write your answer.

1. The product of all the digits in 166 is $1 \times 6 \times 6 = 36$.
   Question:
   List as many numbers as possible, between 100 and 1000,
   whose product of its digits is 36.

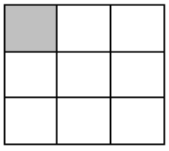
2. Eight squares A, B, C, D, E, F, G, H of the same size are stacked together such that some parts of the squares overlap.

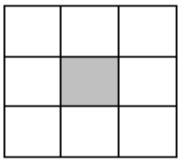
   The following figure shows the top view of the stack.



   Question:
   List the eight squares in order from the top to the bottom.

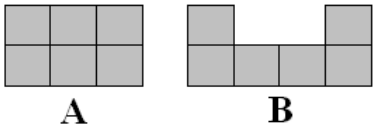
3. If we remove the top left square from the 3×3 square grid, as can be seen in the figure on the right, then we obtain 11 white squares (eight unit squares and three 2×2 squares).

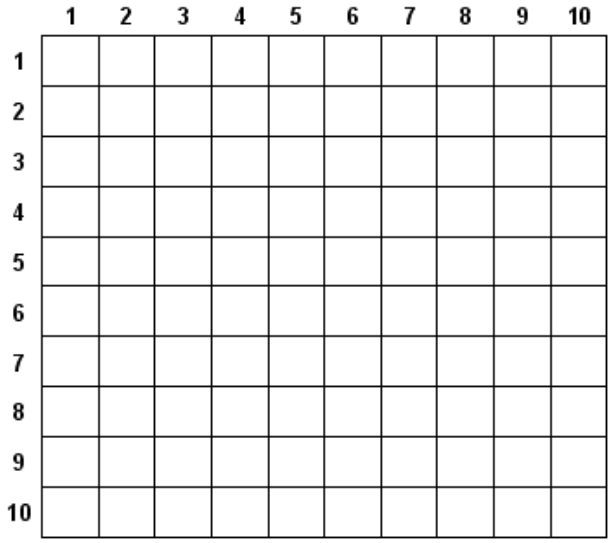




If we remove the grey square at the center of the 3×3 square grid, as can be seen in the figure on the left, then the remaining white region contains eight squares, all of them are unit squares.

Suppose the shapes **A** and **B** are formed by six unit squares as shown in the figure below.





Questions:

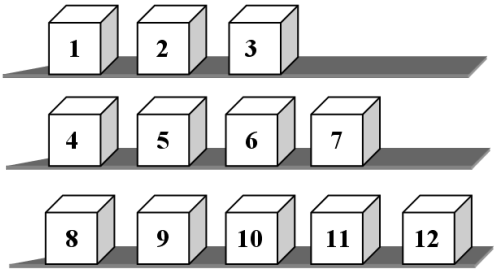
(a) Remove one shape **A** anywhere from the 10×10 square grid, so that the remaining white region contains the minimum number of squares. The boundaries of the shape A must be on the grid lines.

(b) Remove one shape **A** anywhere from the 10×10 square grid, so that the remaining white region contains the maximum number of squares. The boundaries of the shape A must be on the grid lines.

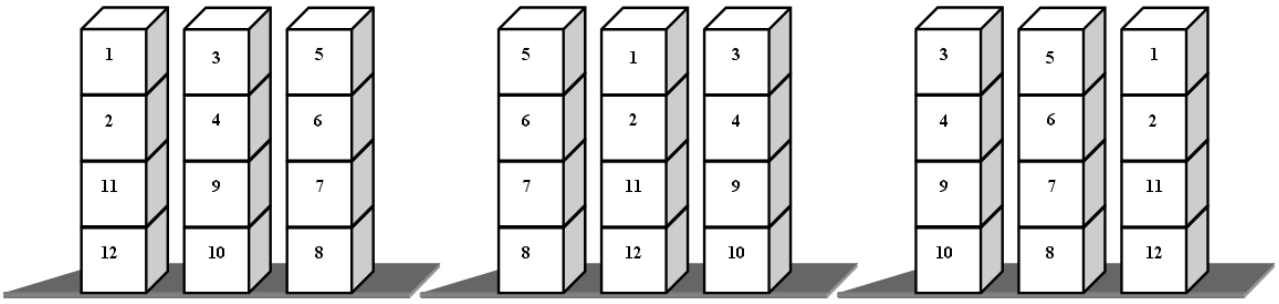
(c) Remove one shape **B** anywhere from the 10×10 square grid, so that the remaining white region contains the minimum number of squares. The boundaries of the shape B must be on the grid lines.

(d) Remove one shape **B** anywhere from the 10×10 square grid, so that the remaining white region contains the maximum number of squares. The boundaries of the shape B must be on the grid lines.

4. Twelve blocks, numbered from 1 to 12, are given.

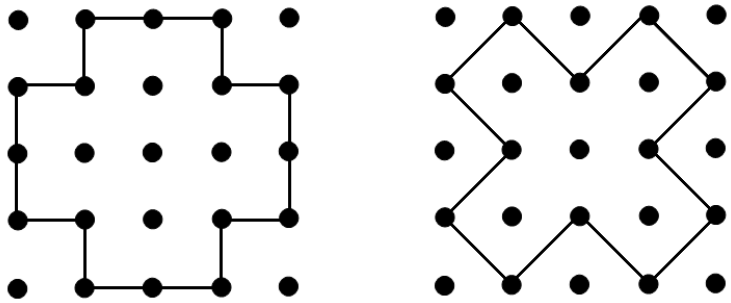


We arrange these blocks into three stacks of equal heights, so that the sum of the numbers in each stack are equal and the numbers are in increasing order from the top to the bottom. Three examples of the arrangement are given in the following figure. These three arrangements are considered the same.



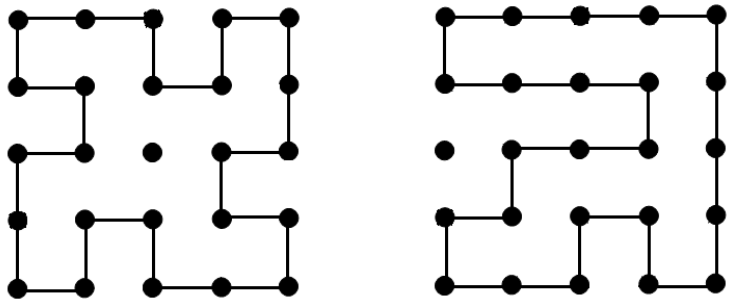
Question:
List as many arrangements as possible.

5. Consider the 5×5 geo-board shown below. Two ways are shown on how to form a cross surrounding five pins.

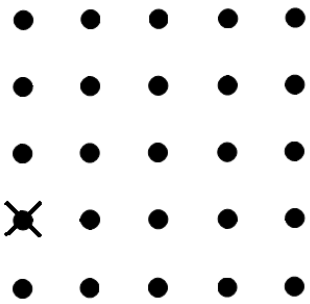


Question A:
Find all possible ways of forming a square surrounding 9 pins.

We also can form a certain shape using 24 pins starting from one pin, moving to the next pin horizontally or vertically, visiting a pin at most once, and ending up at the starting pin. Two examples of the desired shape are shown in the following figure.



Using the above rule, there are pins that are always part of whatever shape formed by 24 pins, as seen in the following figure.



Question B:
Find all such pins.

6. A table consists of 6 rows and 6 columns.

		COLUMN					
		C1	C2	C3	C4	C5	C6
ROW	R1						
	R2						
	R3						
	R4						
	R5						
	R6						

Question:

Fill each cell in the table with one number among $1, 2, 3, 4, 5, 6, 7, 8$ and 9 according to the following rules:

Row	**Rule**
R1	Sum of all numbers placed in this row is 21
R2	Sum of all numbers placed in this row is 39
R3	This row is filled in by six consecutive numbers, in order
R4	In this row, the largest number and the smallest number are placed next to each other
R5	There are exactly two 9s that are placed in this row
R6	Sum of all the numbers placed in this row is 21

Column	**Rule**
C1	There are exactly two 9s placed in this column. The smallest number placed in this column is 2
C2	This column is filled in by six consecutive numbers, in order
C3	There are exactly two 3s placed in this column. Sum of all numbers placed in this column is 21
C4	There are exactly two 8s placed in this column, and no number 4 is present
C5	There are exactly two 6s placed in this column. Sum of all numbers placed in this column is 40
C6	There is no 7 in this column