## RUBBER SHIPS

## 25 points

Locate the complete 10 -ship fleet, 17 -cell,two 5 -cell, 3 3 -cell, and 41 -cell(the 7 -cell ship is shown below).Ships cannot touch each other.Ships can occupy diagonally touching cells if one or both of the cells contain corner of the ship(ship makes a right angle at the corner).Hints on top and left indicate number of cells occupied by ships.
Key: Coordinates of all six corners, from larger to smaller ships.


|  | 3 | 4 | 3 | 4 | 2 | 4 | 3 | 2 | 5 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 5 |  |  |  |  |  |  |  |  |  | A |
| 1 |  |  |  |  |  |  |  |  |  | B |
| 7 |  |  |  |  |  |  |  |  |  | C |
| 2 |  |  |  |  |  |  |  |  |  | D |
| 2 |  |  |  |  |  |  |  |  |  | E |
| 3 |  |  |  |  |  |  |  |  |  | F |
| 1 |  |  |  |  |  |  |  |  |  | G |
| 5 |  |  |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |  |  |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |  |



## ARROWSPACE 35 points

Locate seven arrows into the grid,atleast one arrow going into every row and column. The arrows must be oriented in any seven of eight different directions,each arrow in a different direction. For each arrow,exactly three contiguous cells,immediately following the arrow, in the direction it is oriented, must be empty.Arrow outside must be oriented in that direction in corresponding row/column.
Key:Contents of both main diagonals, using N,S,E,W,NW,NE,SW,SE for arrows and B for blank cell.

## IDENTICAL LOOPS <br> 30 points

Draw two identical loops,identical in both shape and perimeter,through the centers of the white cells.Loops cannot visit the grey cells and cannot overlap or intersect each other or themselves.Number of white cells inside each loop must be equal. The product (number of white cells inside the loop $x$ perimeter of the loop) must be the largest.
Key: Contents of bottom-left top-right main diagonal.Use T if loop turns in the cell,or $S$ if it goes straight, or E if the cell is empty.

## CHARACTERISTIC ROUTE 35+30 points

Find a route through the centers of cells,moving horizontally or vertically, without the grey cell, from the start cell to the finish cell.You must visit all cells exactly once.S,L or R labels at some nodes indicate that you can either go straight(S), or turn left(L), or right(R) exactly once in the four cells touching the node.
Key: Number of times you turned around each of the nodes labelled $L$ or $R$,first all $L$ nodes, then all $R$ nodes.


