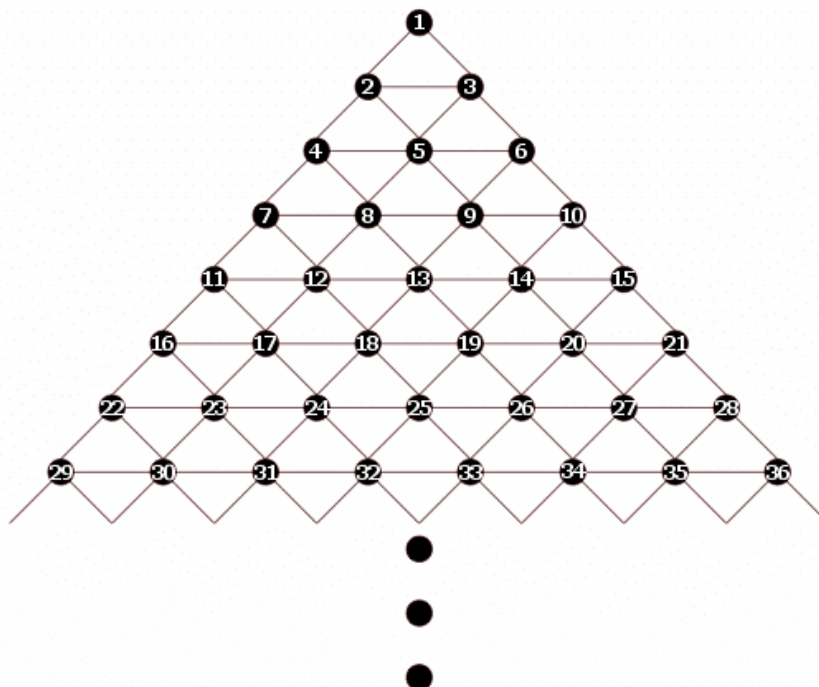


## HHC 2008 Programming contest

Consider the points on a grid of equilateral triangles as shown below. Note that if the points are numbered from left to right and top to bottom, then groups of these points form the vertices of certain geometric shapes. For example, the sets of points 1,2,3 and 7,9,18 are the vertices of triangles, the sets 11,13,24,26 and 2,7,9,18 are the vertices of parallelograms, and the sets 4,5,9,13,12,7 and 8,10,21,34,32,17 are the vertices of hexagons.



Write a program named A which will accept a set of points on this triangular grid, analyze it and determine whether the points are vertices of a triangle, parallelogram, hexagon or an illegal figure. In order for a figure to be acceptable, it must meet two conditions:

- 1) Each side of the figure must coincide with an edge in the grid, and
- 2) All sides of the figure must be of the same length.

INPUT: The input will consist of a series of point sets. Each point set will have at most six points in a set. The points in the set are limited to the range of 1 through 105.

35s (or other RPN model): Input will be done one point at a time. Each point will be keyed and R/S will be pressed. A -1 will be entered when all data points are entered and R/S will be pressed. The input for the data set { 1 2 3 } would be SHIFT CLEAR VARS then 1 STO A 2 STO B 3 STO C 1 CHS STO D. Variables A through G might be used in this manner. The last register used (in order) would contain the -1 value. Running the program will be done after storing the inputs by XEQ A ENTER.

50g (or other RPL model): The stack will be clear except for a list containing the data points. The input for the sample data set { 1 2 3 } would be { 1 2 3 } placed on a clear stack. Running the program will be done by pressing: VAR then the menu label A. USER RPL only. No unsupported entry points, System RPL, etc.

OUTPUT:

35s (or other RPN model): Display a 0 if the set is an invalid figure. Display a 1 if the set is a triangle. Display a 2 if the set is a parallelogram. Display a 3 if the set is a hexagon.

50g (or other RPL model): Display "ERROR", "TRIANGLE", "PARALLELOGRAM", or "HEXAGON", appropriately.

TEST: Fastest total time to evaluate a set of input test cases. Decision of the judge is ABSOLUTELY final.