

**2005/2006 SOUTHERN CALIFORNIA REGIONAL
ACM INTERNATIONAL COLLEGIATE PROGRAMMING CONTEST**

**Problem 7
Triangles**

The gameboard shown in Figure 7-1 is a regular grid of equilateral triangles. Two players take turns drawing line segments that connect any two neighboring vertices on the grid. When a player completes one of the equilateral triangles, that player receives a point for that triangle (Figure 7-2). If the player completes two triangles with a single segment, the player receives a point for each triangle (Figure 7-3). Points are awarded as triangles are completed. A game is completed when all segments on the grid have been drawn. The game is also subject to the following additional definitions and constraints:

1. The starting gameboard will always have the shape of an equilateral triangle itself; also, it will not have missing or extra vertices or line segments.
2. A vertex is a neighbor of another vertex if a gridline connects the two vertices and no vertices lie between them.
3. The vertices on the gameboard are numbered from 1 to N , where 1 is the topmost vertex and the remaining rows are numbered successively from left to right within a row through the last vertex N (Figure 7-1).
4. A line segment may not connect two vertices that are not neighbors.
5. A player may draw only a single line segment per turn.
6. A given segment may be used (drawn) only once.
7. Points are awarded when a line segment a player draws completes one or more of the smallest equilateral triangles on the grid.

Your program will take as input the size of the gameboard, the number of moves for a single game, and the series of moves for that game. The first line of input will contain the size, which represents the number of segments along one edge of the gameboard. The size will be expressed as an integer between 3 and 60. The second line of input will contain the number of moves for the game, expressed as a positive integer. The remaining lines of input contain the moves in order, one move per line. Each move is represented by a pair of integers that are the starting and ending vertices (in that order) of the line segment drawn by a player for a given turn. For convenience, we'll refer to the first player to move as Player A and the second as Player B. The moves will be legal according to the rules stated above, but they may or may not form a complete game.

Your program is to calculate the scores of Player A and Player B as of the last move and print Player A's score followed by Player B's score. Print the scores as integers separated by one space on a single line.

Problem 7
Triangles (continued)

Sample Input

5
16
1 2
5 3
2 4
8 5
7 4
8 12
7 11
17 12
10 14
14 20
15 20
10 15
14 15
2 3
1 3
5 2

Output for the Sample Input

3 1