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Exercise Sheet 1

# ACM Programming Challenges Lab

## Exercise 1 – *Space Shooter*

**Description** The company Spacegames developes a new game which is called Space Shooter. The game is easy: just shoot down your enemy's space ships. However, so far there is no way to calculate the final score. Spacegames wants the score to be the size of the smallest spaceship the player shot (smaller scores are better). Now it is your task to implement it!

The game is in a 2D environment. A spaceship is a simple polygon and it is hit by a shot, which is a point, if the point is stricly inside the polygon or on its boundary. The size of a spaceship is the area of the corresponding polygon.

**Input** The first line of the input contains $c$ ($1 \leq c \leq 20$), the number of test cases. Each test case starts with one line containing two numbers $n$ ($1 \leq n \leq 100$), the number of shots and $m$ ($1 \leq m \leq 100$), the number of spaceships. The following line contains $2n$ integers $x_i, y_i$ ($0 \leq x_i, y_i < 2^{15}$), the coordinates of the shots. The following $m$ lines contain an integer $m_i$ ($3 \leq m_i \leq 100$) and $2m_i$ integers $x_{i,j}, y_{i,j}$ ($0 \leq x_{i,j}, y_{i,j} < 2^{15}$), the coordinates of points describing the $i$-th spaceship as a polygon in ccw order.

**Output** For each test case you should output a line containing the area of the smallest spaceship which is shot down, if it exists, and otherwise output 'fail'.

**Sample input**

```
2
1 3
1 2
4 0 0 5 0 5 5 0 5
4 1 1 4 1 4 4 1 4
4 2 2 3 2 3 3 2 3
1 1
0 0
4 1 1 4 1 4 4 1 4
```

**Sample output**

```
9
fail
```