

- Overview:** Find how large of a square will fit into a given grid at a given position
- Description:** Uh oh, Loki's at it again! He recently discovered a fantastically destructive magical spell in *How to be an Evil Supervillain for Dummies* that allows him to create temporary, square-shaped black holes on the ground that make everything that used to exist on top of them disappear.
- Loki is currently contemplating an  $n \times n$  grid (0-indexed) that represents New York City's layout. The spell is very finicky, and can only be cast  $k + 1$  times. Furthermore, each time he casts the spell, he only controls where the bottom left corner of the resulting square-shaped black hole is placed, which must exist at some coordinate on the  $n \times n$  grid.
- The first  $k$  spell castings create persistent black holes. Each time the spell is cast, the square must be expanded as much as possible without overlapping with a previously existing squares (or else kittens will emerge. Loki hates kittens).
- For all squares, if the given cell for the new square is on the interior of an existing square, then the expanded square has a side length of 0. Loki only has one spell left and would like to cause as much destruction and mayhem as possible. Can you help him figure out where to place his last spell?
- Filename:** adv92.{java, cpp, c, cc, py}
- Input:** The first line will contain two integers:  $n$   $k$ . The following  $k$  lines will contain two space separated integers  $x$  and  $y$  to indicate that a square should be placed at  $(x,y)$  as described above.
- Output:** Output 2 lines. The first line should contain one integer - the maximum possible side length for the last black hole. The next line should contain two integers -  $x$   $y$  - representing the lower left corner of the black hole. If there is more than one answer, output the one with the lowest  $x$  value. If there is still more than one answer, output the one with the lowest  $y$  value.
- Assumptions:**  $1 \leq n \leq 1000$   
 $0 \leq k \leq n^2$   
 $0 \leq x,y < n$  for all given  $x, y$
- Sample Input #1:**
- ```
5 4
3 3
0 0
1 4
4 0
```
- Sample Output #1:**
- ```
2
3 1
```
- Explanation:** After placing the 4 given squares the grid looks as below, where '.' represents an open cell and 'x' represents a covered cell:
- ```
. x . xx
. . . xx
xxx . .
xxx . .
xxx . x
```

