

AMERICAN COMPUTER SCIENCE LEAGUE

2018-2019

Contest #3

Senior Division - Stretch

PROBLEM: Given a rectangular grid and the 5 types of pieces shown below, the object of Stretch is to place pieces in the grid so that they form a connected path across the grid. If the initial piece is in the leftmost column, the path goes to the rightmost column. If the initial piece is in the rightmost column, the path goes to the leftmost column..



- A piece cannot be rotated or flipped.
- A piece can only connect to the last piece that was placed. It will connect one column to the right of that piece if the path is left-to-right OR one column to the left of that piece if the path is right-to-left.
- A piece can connect only at a tile with a circle and the tiles with the circles are the only tiles that are allowed to touch.
- All tiles of the connecting piece must be to the right (if left-to-right) or to the left (if right-to-left) of all previously placed pieces.
- A piece cannot be placed in the grid such that it would cover any part of another piece, cover a blocked cell, or extend beyond the grid.
- The first piece can only touch the starting side at one circle tile.
- The final piece can only touch the opposite side at one circle tile.
- Pieces are placed in alphabetical order. If a piece does not fit, skip it and use the next piece that fits. When Piece E is either used or skipped, then begin again with Piece A.
- Grid cells are numbered consecutively starting with 1 in the upper left corner and continue from left to right and from top to bottom.
- We guarantee that if a piece can be placed, then that will be the only location that it can be placed.

1	2	3	4	5	6	7	8	9	10
•		•	•	15	16	17	18	19	20
21	22	23		25	26	•	•		30
31	32	33	•	•	36		38		•
41	42	43	44		•	•			50
51	52	53	54	55	56	57	58	59	60

EXAMPLE: The example above is a 6 x 10 grid with a starting cell of 11. There are blocked cells at cells 48 and 49. Piece A is placed at 11. Piece B can only be placed at 14. The next piece must connect at either 15 or 35. Piece C cannot be placed at 15 because that would cause Pieces C and B to touch at

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more than one tile. Location 35 is legal so it is placed there. The next piece must connect at 47. Piece D cannot be placed there, nor can E or A. Piece B is placed at 47. The only place the next piece can go is at 28. Pieces C and D cannot be placed there, but E can.

INPUT: There will be 5 lines of data. Each line will contain the numbers: r , c , s , n , followed by n numbers. r indicates the number of rows in the grid. c indicates the number of columns in the grid. s indicates the starting cell number for the first piece. n indicates the number of blocked cells. The next n numbers are the cells that are designated as blocked.

OUTPUT: Form a path from the starting cell to the opposite edge of the grid using the algorithm above. Print the sequence of pieces that were used to form the path in the order that they were placed in the grid.

SAMPLE INPUT: <http://www.datafiles.acsl.org/2019/contest3/sr-sample-input.txt>

```
6 10 11 2 48 49
5 10 40 1 27
6 14 70 3 6 54 66
9 12 108 5 69 106 77 91 55
6 13 78 1 49
```

SAMPLE OUTPUT:

1. ABCBE
2. ACDA
3. ABCABCD
4. CECDE
5. ACDEA