

# Jane Street puzzle October 2022

You've ventured warily into Puzzle Forest, and as you round a bend you see a rickety bridge crossing a stream into a swampy area up ahead. Papers with line diagrams and decks of playing cards are strewn about next to the trail here. A grotesque monster climbs out from under the bridge! Upon seeing your defensive stance, it screeches, "Oh have the faeries been telling stories about me again? I'm just Hashi, the poor old bridge troll of Puzzle Forest!"

"I'm not so bad, but I do need some help arranging the spans through the four swampy fields up ahead (pictured above). Due to my trollish nature, each field has one island marked with the wrong number of bridges... sorry, I can't help myself! I have three friends coming over to play cards later and I would love to set up the spans and correct the wrong numbers before then!"

*[The answer to this puzzle is a rational number between 0 and 1, please give it accurate to 7 digits (or exactly in lowest terms).]*

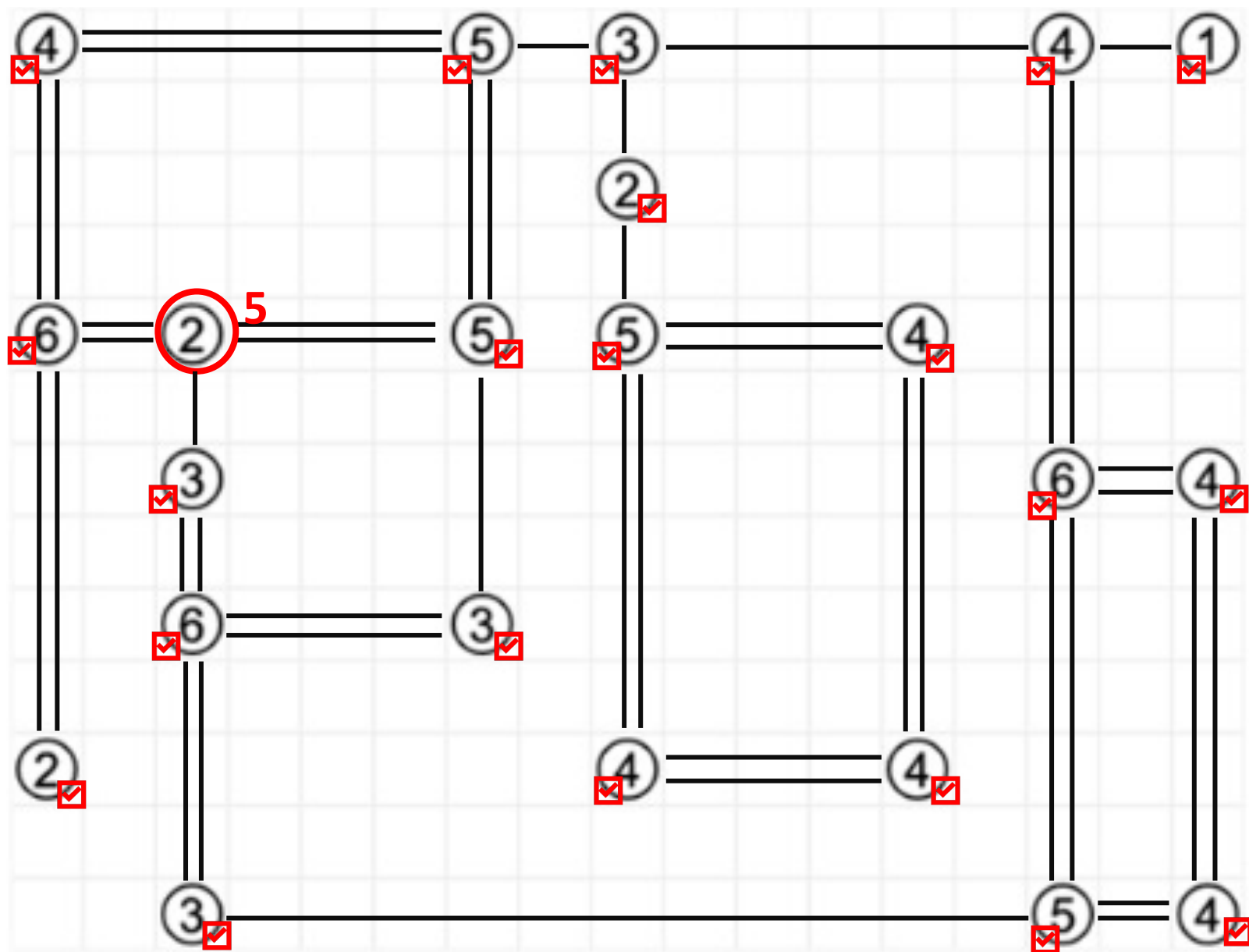
*Go to [jane street puzzle archives](#) to see the empty grids*

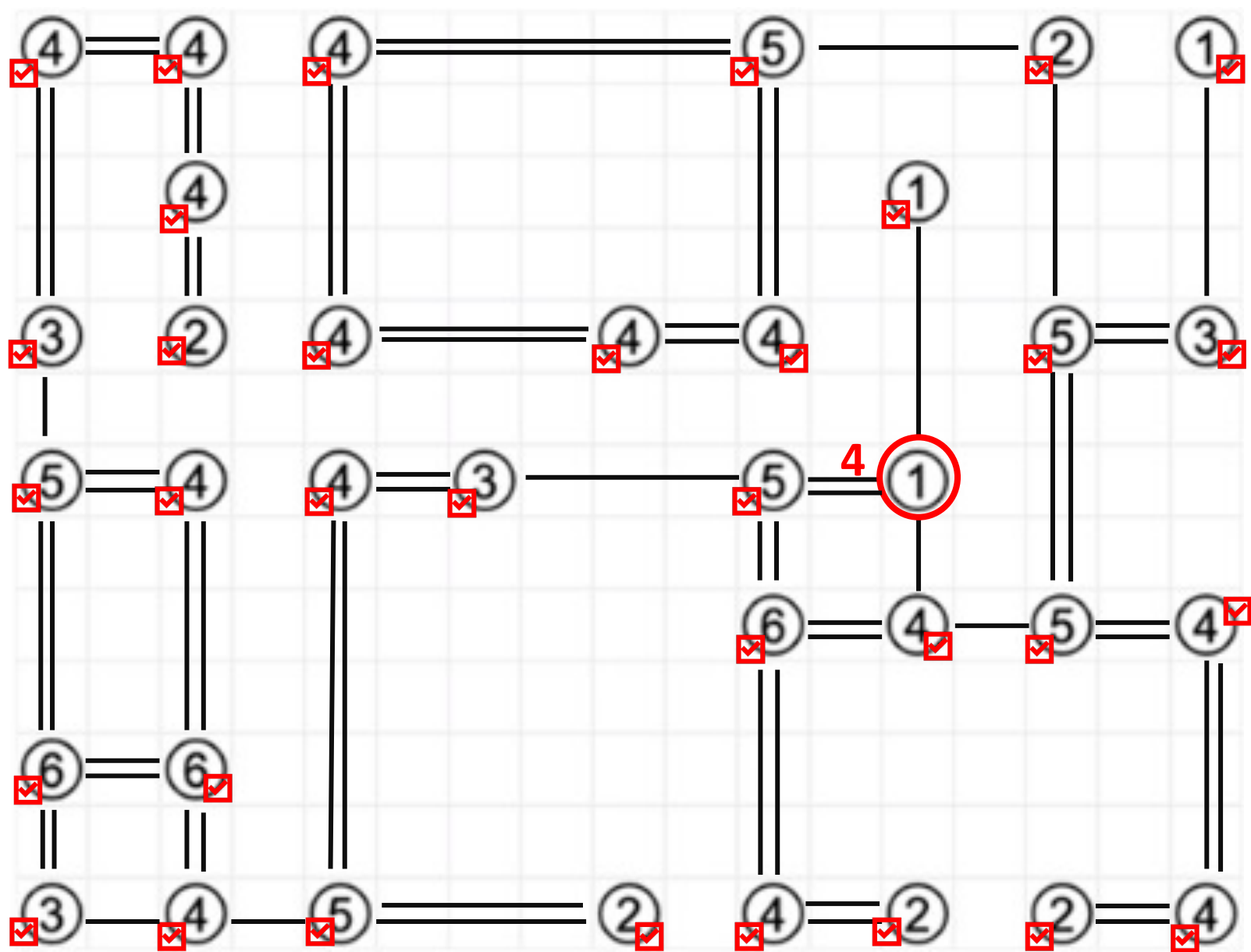
# Problem explanation

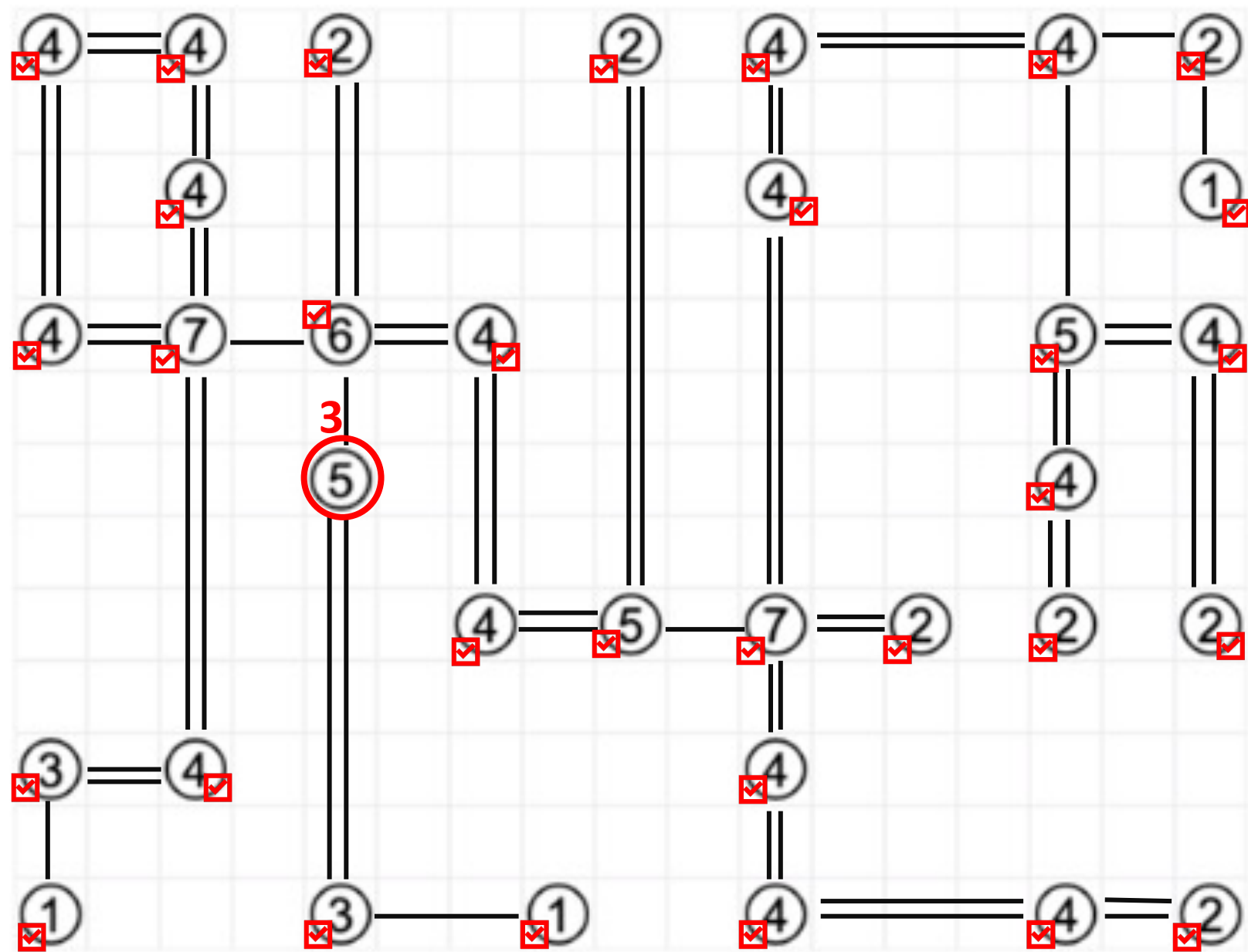
The first hint given by the question in the troll's name. A google search on "Hashi game" gives us a bridge connecting game with the following rules.

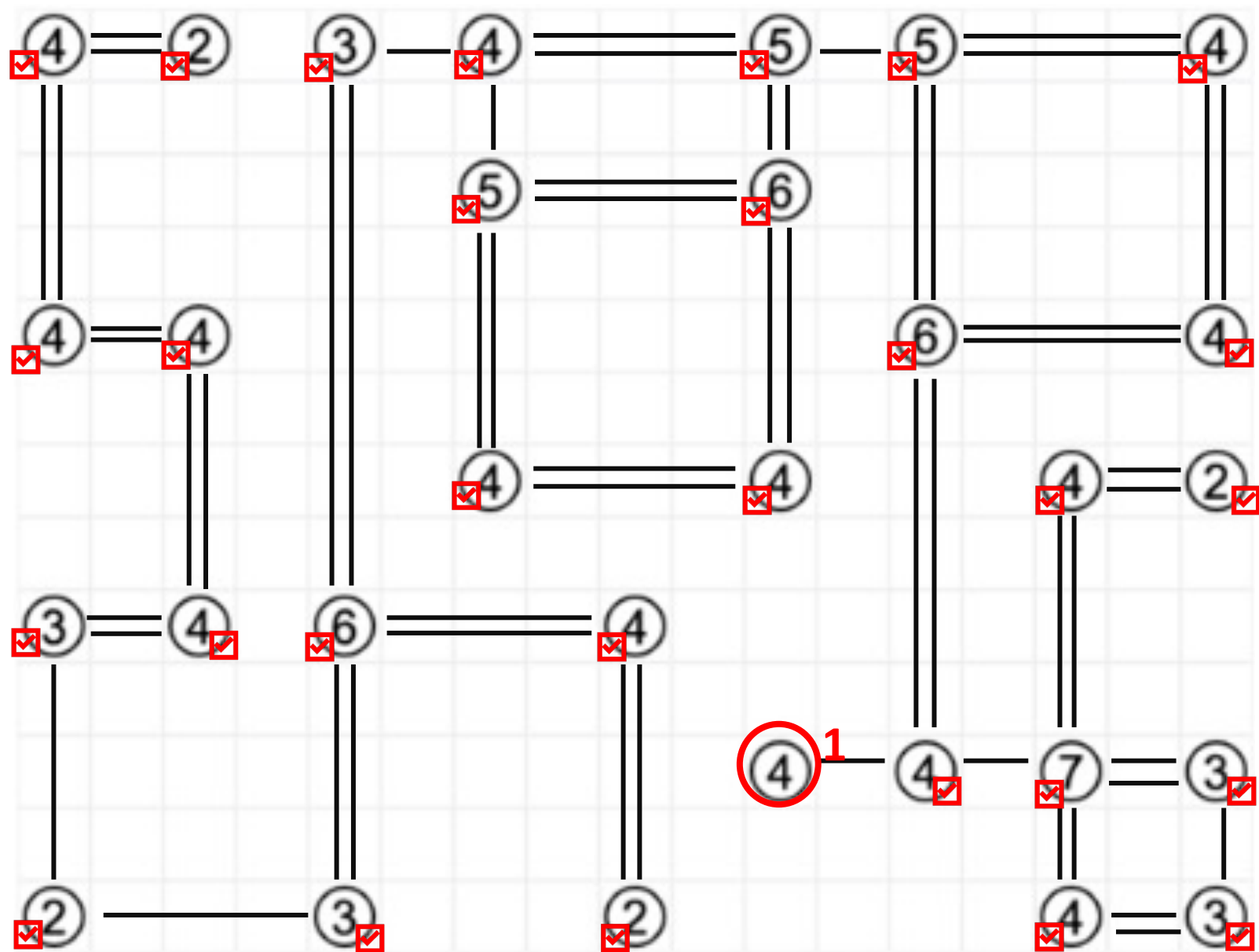
- Connect all of the islands into a single connected group by drawing a series of bridges between the islands
- They must begin and end at distinct islands, travelling a straight line in between
- They must not cross any other bridges or islands
- They may only run orthogonally
- At most two bridges connect a pair of islands
- The number of bridges connected to each island must match the number on that island

*Hashi game source: <https://www.puzzle-bridges.com/>*

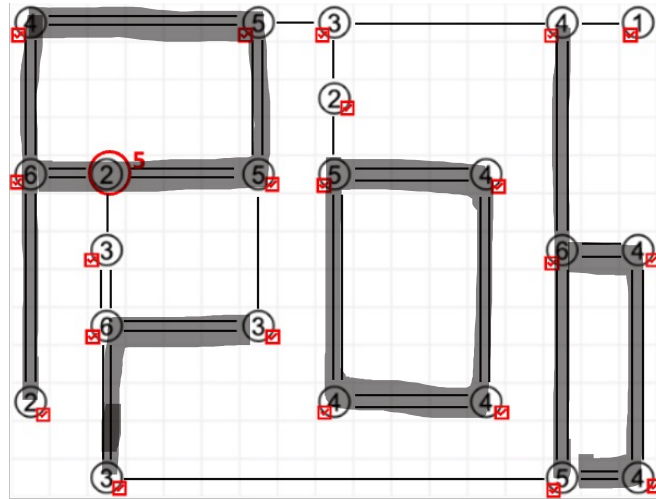




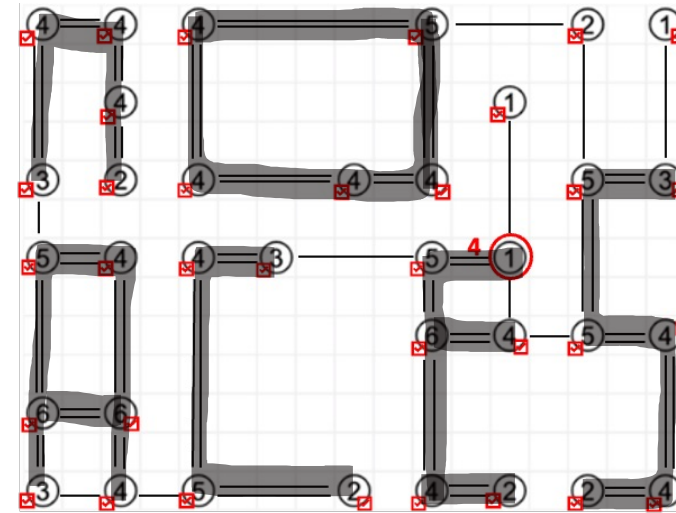




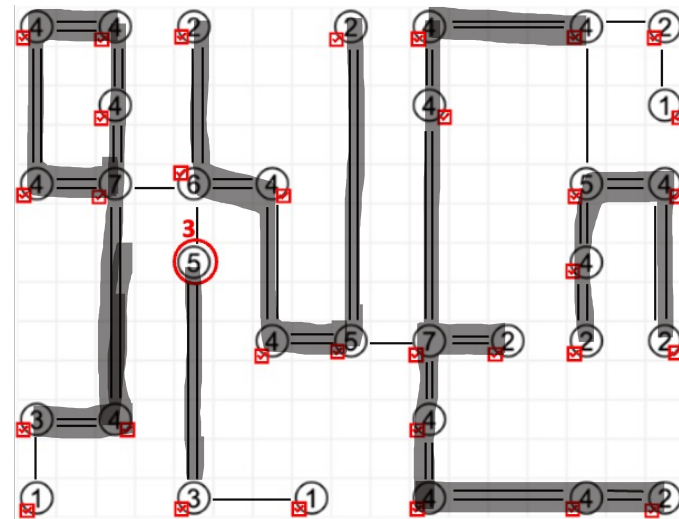
By tracing the double bridges for each field, we get the words:



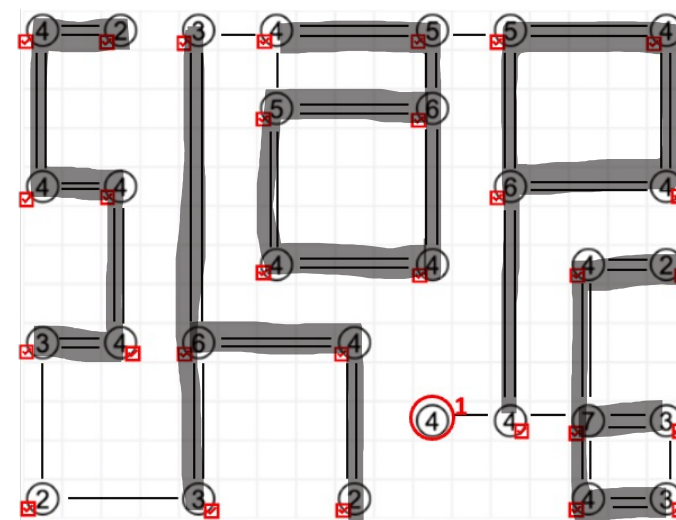
Field 1: **Prob**



Field 2: **no aces**



Field 3: **given**



Field 4: **shape**

From the fields we get the words:

Prob (probability) no Aces (playing cards) given, shape

Clues to the meaning of "shape" in the problem statement;

- "Bridge" Troll
- "Play cards"
- "three" friends

From this it can deduce that shape probably has something to do with contract bridge, a card game. By doing a google search on shapes + contract bridge. we find out that "shape" refers to the hand dealt to the player, comprising of 13 cards usually represented in this a,b,c,d suit form. For example, (4,3,3,3) means the player have 4 spades (suit) card, 3 hearts, 3 diamonds, 3 clovers.

The final clue to the puzzle's question is from the wrongly marked islands in the grids, the correct islands are (5,4,3,1) which sums up to 13 reinforcing the above interpretation of "shapes".

By combining the clues, we get this question: what is the probability of having no aces given this shape (5,4,3,1), which can be calculated as

$$\frac{12C5}{13C5} * \frac{12C4}{13C4} * \frac{12C3}{13C3} * \frac{12C1}{13C1} = \frac{8640}{28561} \text{ or } \underline{0.3025104} \text{ (7 d.p)}$$

*\*12C5 means 12 choose 5;*

*\* Each suit have 13 cards;*



#### CORRECT SUBMISSIONS AS OF 2022-10-20:

---

I eat books  
Cubist  
Dan Taylor  
Scott Okuno  
Carol K  
Gracie Shanley  
Thiruvayindai  
Spencer Wright  
Evan Semet  
Aaditya Raghavan (+intro)  
Gwennie Gilbert-Snyder  
Karl Mahlburg  
Arthur Bright

madun1999  
Alien P  
Swaz C  
Kevin Guo  
Hazel Mitchley  
James Ormsby  
Ryan A  
Ronny  
Dan Heathcote  
Simon Cyrani  
Dan Samuels  
gilbert g  
Charlie R

Erik Vandenberg  
Swaraat Chakraborty  
Harry Allen  
Joseph Sun  
Rei Yamahara  
Tomek Bialach  
Brandy M. Hargrove  
Konstantin Vladimirov  
Anthony Georgiou  
Kevin Liu  
Henry Teo  
decapitated king