

TOTEM POLES SOLUTION - FIGURE OUT

For convenience, label columns 1-10 and rows A-J. Colored bars in the figures below indicate the facing direction of columns (consider "north" to be the blue bar). "Clue" will always refer to numerical clues outside the grid. "0" will be used to refer to any empty square. "9-pole" and "9" both refer to a pole 9 units tall. A "conflict" will always refer to the impossibility of entering a pole of a given height in a square because of a same-sized pole already placed in the same row or column.

One key element of the logic is that for a clue of value N to "see" N faces, there must be a pole of at least N height facing the clue.

Consider the two 9-clues at either end of column 4. If one of these is a face clue, the 9-pole in that column must face it, by the above. Therefore, both clues cannot refer to faces. For a 9-clue to refer to poles, the 1-9 poles must be placed in ascending order away from that clue, which obviously can't happen with both of two 9-clues facing each. Therefore, one 9-clue in col 4 must be a pole clue, and one must be a face clue. We don't know which yet, but this means the 9-poles must all face either north or south. Because of this, the 9-clue in row I cannot refer to faces, and must be a pole clue, with poles 1-9 in row I in ascending order moving away from that clue. The 0 in that row must fall at I4. Otherwise, the possible heights for that space are 6 or 7, and both of those would make an ascending order in col 4 impossible in either direction. (Figure 1)

Space J1 cannot be empty; if it were, the 1-clue below it would have to be a pole clue, with the 2 a face clue, but it would be impossible for the 9-pole in I1, the only pole visible, to show exactly 2 faces. So J1 is occupied by a <9-pole, and the 2-clue refers to poles, with the 1-clue referring to faces.

J4 must be either a 1-pole or 9-pole, depending which 9-clue on col 4 refers to poles. The 1-clue below col 1 must see either a 1-pole facing it in J1 with the 9-pole in I1 turned in a different direction, or the 9-pole facing it with all but one face hidden behind an 8-pole in J1 facing in some other direction. In the former case, the pole in J4 must be a 9 that faces some direction other than south. This would make the 9-clue below col 4 unable to see either 9 faces or 9 poles, so the latter case must be true. So 9-poles face south, which, by similar logic, places the col 4 9-pol in J4, making the upper 9-clue the pole clue, and the lower one the face clue. (Figure 2)

This places an 8 in H4. The row H 8-clue can therefore see a maximum of 5 poles, so that must be a face clue. 9's do not face west, so 8's must. (Figure 3)

If J2 were empty, exactly 1 face would be seen from the bottom of that column (as in col 1), but that matches no clues below col 2. Therefore, that space is occupied, by a <8-pole. So the 3 clue refers to poles, and the 2 clue refers to faces. We see one face from the south-facing 9 somewhere in that column, and nothing else behind the 8 in I2, so the pole in J2 must be a south-facing 1.

If J3 were empty, the 3-pole clue below col 3 would have to see the 7, 8 and 9 poles in that column. The 3-face clue would see one face from the 9-pole and none from the 8, with it being impossible for the unblocked 7-pole to provide exactly 2 faces. Therefore J3 is occupied by a >7-pole with the 3-face clue seeing that pole, the 7 pole, and the 9-pole somewhere behind it. Since the 8 in that column is somewhere behind the 9, the clue sees 2 faces from the 9 pole and must see the third from either the 7 or the pole in J3. The 1-pole in J2 precludes the possibility of a south-facing 1-pole in J3, so the third face must come from the 7 in I3 facing south, with all but one face blocked by a 6-pole in J3 facing in some other direction. (Figure 4)

The clues topping col 2 see exactly two poles and two faces. One pole will be the 9, but it faces away from the clues, so the other visible pole must be an unblocked 2-pole facing north. An empty space in A2 would necessitate the 2-pole being in B2, but there's already a pole in that row. The 2-pole cannot be any further down that column without being blocked by something taller, so it must be in A2. If the 9-pole in that column were any lower than C2, more than 2 poles would be visible. If it were in C2 itself, the 8 clue in that row would be unable to see either 8 poles or 8 faces, so the 9-pole must be in B2. The 6 clue on row B can not then see 6 poles, so it must be a face clue, with the only way to fulfill it a west-facing 6-pole in B1. (Figure 5)

Because no pole 6 or higher faces north, the 6 clue on column 3 must be a pole clue. If A3 were occupied, the longest possible ascending string leading from that clue would be 3-4-5-8-9, which is not enough poles. Therefore, A3 is empty. B3 cannot be a 2-pole (conflict with col 4) and if it were a 3, the same problem arises; B3 therefore contains a 1-pole. Similar reasoning, considering conflicts with col 4, places the 2-4 poles in C3, D3 and E3 respectively. Of the remaining 5, 8 and 9-poles, neither the 8 or 9 can be in H3 (either by conflict or blocking the 8 face clue in row H), so that must be the 5-pole, with the 8 and 9 in F3 and G3 respectively. (Figure 6)

Also because no pole 6 or higher faces north, the 5-poles must, in order to fulfill the 5-face clue at the top of col 5. For the 8-face clue in row H to see 8 faces, something taller than the north-facing 5 in H3 must be to the west of it, facing west. The only possibility is a 6-pole, which must be in H2.

If the 8-clue on row E referred to faces, the same problem would occur, since the 8 in that row must be to the east of the 5 in that row. However, conflicts prevent a 6-pole from fixing that problem in this row, so the 8-clue must refer to poles. Both spaces to the west of the 4-pole in that row must be occupied by visible poles to hit that count, with 3 being the only option for E2, and the 6,7,8 and 9-poles must ascend in that order from the clue. That means that the 2-clue for that row will see the top faces of both the 6 and 8-poles, and so no visible poles to the west of the 6 and 8 (significantly, the 3 and 4-poles) can face west. Since that means 6 and 8 are the only west-facing poles, H1 must be empty.

Because conflicts make it impossible to place the 6 and/or 8 poles in row C without intervening poles, the 8-clue on row C must also refer to poles. The 2 and 3 poles must both be visible, allowing placement (accounting for conflicts) of the 1 and 0 poles in this row, and the 2 in row E. All poles but one will be seen by the 8-clue. The 4-clue at the opposite end of row C can therefore not be a pole clue, so must refer to faces. Nothing 5 or higher faces east, so 4-poles must, with an unobscured 4-pole adjacent to the clue, and the rest of the poles in that row arranged to fulfill the 8-clue at the other end. This forces the placement of the 6-7-8-9 poles in row E. (Figure 7)

Because no pole 5 or higher faces east, the 5-clue on row H must refer to poles. By elimination and conflict, the sequence 2-3-4-1-7-9 leading away from the clue may be placed. The last few placements make it impossible for the 8-clue below col 9 to be poles, so they must be faces; the only way to accomplish this is by placing a 7 in J9.

It is impossible for the 7-clue below col 8 to refer to faces; it must be poles, placing the 2 and 9 in the only available positions in this column.

At the top of col 5, at least one pole will come between the 5-pole and the 5-face clue. This must face north to preserve the face count, and it can't be the 2 (conflicts); therefore the 3-poles face north, and there must be an unobstructed one in A5. The 5-pole must also be unobstructed, which makes B5 empty, resolving the last two spaces in row E. (Figure 8)

F1 and F2 must both be visible and of increasing height no greater than 4 to allow both of row F's clues to work; these are 3 and 4-poles respectively. The rest of col 2 can be filled by elimination, followed by the rest of col 1.

J10 must be empty to allow the 5-pole clue on col 10 to see 5 poles. The rest of row J can then be filled by elimination. The remaining spaces in col 5 can now be filled to fulfill its 5-pole clue. (Figure 9)

F10 and G10 receive 5 and 3-poles respectively to fulfill col 10's 5-pole clue, followed by a 6-pole in G8 to fulfill col 8's 7-clue. 5 and 7 go in B8 and B10 respectively (by elimination), followed by 3, 8 and 4 in that order to finish row B.

It's impossible for col 7's 4-clue to see 4 columns, so it must be faces. 7 and 1 are too blocked in col 7, so the faces must come in a 9 in F7. (Figure 10)

All clues are now satisfied. Complete col 7 by elimination, followed by col 8. Follow by finishing row F, row G, and then cols 6, 9 and 10 in any order. (Figure 11)

Figure 12 shows the positions of the thunderbirds. Note that those on the 1, 2, 3, 4 and 6 are in the only possible positions they can be (with wings of 1 and 3 extending outside the grid). There is then only one placement for the 5 that doesn't violate the allowed numbers of placements per row and column. The available positions for the 7 are both in the left half of the grid, so the 8 and 9 must both be in the right half. There is only one free position for the 8 in the right half of the grid, which then forces unique positions for the 9 and 7.

Letters falling into the equivalent positions of the thunderbirds lowest to highest spell FIGURE OUT.



