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Some possible considerations that airlines should honor are passengers with:

- infant(s)/small child(ren)
- physical disabilities
- language barrier (needs to sit with interpreter)
- mental/emotional challenges
- service animal

I propose developing an algorithm that allows passengers to purchase economy seats that guarantee that groups of up to 4 people who can prove any of the above will be seated together. Groups of 2 should be guaranteed to be seated next to each other. For groups of 3 or 4, it should be guaranteed that 2 will sit next to each other and the remaining 1 or 2 will be seated adjacent to them (either next to them or 1 row in forward or 1 row back).

To implement this, the algorithm will need to keep track of how many of each type of group (2, 3, or 4 people) of economy travelers remain to be seated and how many appropriate groups of seats remain to accommodate them. Working from the most restrictive (groups of 4) to the least restrictive (groups of 2), the algorithm will need to begin assigning seats when the number of appropriate seating arrangements is equal to the number of unassigned ticket holders in that category. At this point, the flight should be listed as “sold out” for groups of that size. This implies that there could be as many as 4 rounds of assigning seats: first when groups of 4 are sold out, second when groups of 3 are sold out, third when groups of 2 are sold out, and finally when single seats are sold out.

The algorithm to count “living neighbors” from Conway’s Game of Life should be a good starting point for determining suitable groups of seats for groups of 4, 3, or 2 ticket holders to be seated together.