The main problem with this algorithm (for filling seats on a plane) seems to be that it prioritizes profits (i.e., fill all the seats, regardless of customer preference) above all else. It's also deceptive, or seems likely to be, in that it allows family preference to be indicated, but then seats customers without much of an attempt to keep families together.

I have a few ideas for how to make this more ethical.

One is to treat families as blocks, so that they are treated as discrete entities, rather than being just lumped into the dictionary soup of the economy_purchased block. This might mean making a dictionary or list inside of the dictionary, so that you can store groups of seats together inside of the dictionary of purchased economy seats.

Of course, this raises the problem of how you fill the plane up--if you were to then try to fill the seats not occupied by economy-plus customers, you likely wouldn't always be able to fill all of them without separating some blocks of tickets that had been purchased together. You could, I suppose, make a best attempt, with some nested loops, so that you first try to fit the largest block, and then the next smallest, and so on, and then if there is not a remaining large enough contiguous space in the plane, break up any such remaining groups. (This policy would essentially attempt to keep blocks of economy seats purchased together seated together, with the explicit caveat that if this is not possible, you will be assigned to whatever seats are available.)

Another option is to provide more choice on the front end--if a group wants to sit together, they might be told, *Well, we'll try, but if we can't, would you prefer another flight?* In a sense, you could try to take into account customer preference (not sure how we would model that; at the moment, the only customer preference appears to be the guess that 70% of economy-plus passengers want a window seat and the rest don't.) That way, you are ensuring that customers are opting into a situation where they get what they prefer--either the current flight, even if it means non-preferential seating, or a later flight, if they have a higher preference for sitting together. (You could store these passengers in some kind of leftover dictionary and print it out, so you know who will be on the next flight.)

A third option is to leave the algorithm unchanged and simply tell passengers how you are screwing them over--the airlines leave this unstated, and an argument could be made that, while the algorithm is not very nice, if it's transparent then it's more ethical.

A fourth idea is to categorize passengers in a more fine-tuned way, so that even if you seat the economy folks randomly, you do a pass *first* to seat the elderly next to caregivers, children next to parents, etc. (This might be represented by a simple model that guesses that some percentage of economy seats will want to be grouped together--i.e., there's maybe a 20% chance of wanting three seats together, a 40% chance of wanting two seats together and so on.) Then you would try to fit those groups in first, then randomly fill in the remaining seats with the remaining passengers. (This is similar to the first idea, above.)

Unfortunately, each of these ideas involves trade-offs. One benefit to the current system is that the plane is always filled, which means that the maximum possible work is extracted from the jet fuel, which disproportionately contributes to climate change, since it's released so high up in the atmosphere. (It must be said this is probably not why this algorithm was designed the way it is, but the fact that the plane is maximally full is, in a sense, a positive externality.)

If you get more picky about who sits where, of course, you run the risk of not filling the plane, even if you keep a pool off to the side of folks who didn't fit on other flights, which then wastes fuel. (The fewer passengers per plane, the worse for the environment the flight is on a per capita basis.) Still, it seems only fair that there are *some* measures put in place before folks get randomly seated--i.e., keep parents next to children. (If you subscribe to the idea that climate change is a bigger problem than a kid sitting next to strangers, this probably wouldn't trouble you, but I assume most people wouldn't consider that a worthy tradeoff.)