This problem gives you the chance to:

- invent your own measure for the concept of “awkward-ness”
- use your measure to put situations in order of “awkward-ness”
- generalize your measure to work in different situations.

• Have you ever arrived at a packed theater after the show has started?
• You have to make everyone stand while you squeeze past to take your seat.
• Imagine that five people A, B, C, D and E each arrive to take their seat in a theater.
• They are not allowed to take different seats to the one they have been allocated.

This diagram shows the order in which they arrive and their seating positions:

- So, D arrives first and sits in the second seat from the right hand end of the row.
- Then E arrives. D has to stand up while E squeezes into the last seat in the row.
- Then A arrives. She sits on the first seat of the row.
- Now B arrives and makes A stand, while he takes the second seat in.
- Finally C arrives and makes both A and B stand up while she takes her seat.

Warm-up
Try out this situation from different starting points using scraps of paper labeled A, B, C, D and E until you can see what is happening.
What is the most awkward situation you can devise?
Here are four movie theater situations:

1. Place the four situations in order of "awkward-ness."
   - Which is the easiest situation for people?
   - Which is the most awkward?
   - Explain how you decided.

2. Invent a way of measuring "awkward-ness." This should give a number to each situation. Explain carefully how your method works.
3. Show how you can use your measure to place the four situations in order of "awkward-ness." Show all your work.

4. Adapt your measure so that the minimum value it can take is 0 (where no-one is made to stand up) and the maximum it can take is 1 (the most awkward situation possible).

5. Show how your measure in part 4 may be generalised for any number of people entering a row. (That is when \( n \) people enter a row with \( n \) available seats).