Two thousand and twenty-one students of distinct heights are positioned in a grid of 43 rows, each containing 47 students. From each formed column of 47 students the shortest student is selected and the tallest of these 47 students is called Student A. Next, with all students still in their original positions, the tallest student in each row is selected, and of these 43 students, the shortest among them is called Student B. Assuming Students A and B are not the same person, can we say if one of them is taller than the other?

Solution: Student B is taller than Student A.

If A and B are positioned in the same row (resp., column) as each other, then B is taller than A since B is the tallest person in their row (resp., since A is the shortest person in their column). So, assume that A and B are in neither the same row nor column as each other. Then there is a student, say C, who is in the same column as A and the same row as B. Since B is the tallest person in their own row, they are taller than C, and similarly, C is taller than A, as A is the shortest person in their own column. Thus, B is taller than A.

Solutions for this problem were submitted by Phil Boyd (Manchester, England), M.V. Channakeshava (India), Rob Hill (Gambrills, MD), Hari Kishan (India), Tengiz Kutchava (Georgia, the country), Tin Lam (St. Louis, MO), Yann Michel (Paris, France), François Seguin (Amiens, France), Bruno Alfonso Cuevas Villa (México), and Zurab Zakaradze (Georgia, the country).