# Answer on Question \#84496 - Math - Combinatorics | Number Theory 

## Question

Five visitors are sitting in a room. Each one likes ROSMALAI or RAJVOG, at least one likes RAJVOG. Given that between any two students at least one likes ROSMALAI. How many visitors like RAJVOG? Explain your answer.
Note: ROSMALAI or RAJVOG are names of sweets.

## Solution

Assume that a $1 \times 5$ grid was drawn on the floor, and the visitors were asked to move their chairs to every of the 5 squares.

| S1 | S2 | S3 | S4 | S5 |
| :--- | :--- | :--- | :--- | :--- |

Assume that person that occupied the first square, S1, likes RAJVOG, X.

| X | S 2 | S 3 | S 4 | S 5 |
| :--- | :--- | :--- | :--- | :--- |

This is possible, because the chairs have rollers, thus we may rotate the group in any way in our head. This transformation doesn't affect the tastes of the public. If we got a contradiction, nobody in the room would know about that experiment.
Now we will try to determine what the student in the second square, S2, likes. This is obvious that they likes ROSMALAI, Y , because at least one students in S1 and S2 likes Y, and the student in $S 1$ doesn't like $Y$ since it likes $X$.

| X | Y | S 3 | S 4 | S 5 |
| :--- | :--- | :--- | :--- | :--- |

If the student in S1 doesn't like $Y$, what does the student in S3 like? Yes, $Y$.

| $X$ | $Y$ | $Y$ | S4 | S5 |
| :--- | :--- | :--- | :--- | :--- |

May the student in S4 like $X$ if we know that the student in S1 likes $X$ ? No, they may be fond of $Y$ only.

| $X$ | $Y$ | $Y$ | $Y$ | $S 5$ |
| :--- | :--- | :--- | :--- | :--- |

Have we already known the answer? Yes, the student in S1 enjoys X more (*** we are not in the room) than any other person in this room.

| $X$ | Y | Y | Y | Y |
| :--- | :--- | :--- | :--- | :--- |

Just one visitor likes RAJVOG. If we assume that there are two students who likes RAJVOG, both of them don't like ROSMALAI, and this is a contradiction.

Answer: Just one visitor likes RAJVOG.

