• For $n(S)$: There are 10 000 possible outcomes for her 1^{st} guess, and then 9999 possible outcomes for her 2^{nd} guess, So,

$$n(S) = 10000 \times 9999 = 99\,990\,000$$

* Here we treat (1111, 2222) and (2222, 1111) as two different outcomes.

• For $n(A)$: To have A occur, Jasmine needs to get the correct PIN in either her 1^{st} or 2^{nd} guess. In either case, there are 9999 possible outcomes in the guess which does not get the correct PIN. So,

$$n(A) = 9999 \times 2 = 19\,998.$$

$$\therefore P(A) = n(A)/n(S) = \frac{19\,998}{99\,990\,000} = 0.0002 = 0.02\%.$$

*Example 5 → There are 7 girls and 3 boys in a classroom. A teacher needs 2 volunteers to help with the lab setup. She randomly selects 2 students from the class. What is the probability that she gets 1 girl and 1 boy?

• Random experiment: Select 2 students from the class.
• Sample space: S = {(any 2 students of the class)}.
• Event: A = {get 1 girl and 1 boy}

• For $n(S)$: there are 10 possible choices for picking one student, and then 9 possible choices for picking another.
→ One may claim that $n(S) = 10 \times 9 = 90$, but this way one treats (Stud A, Stud B) and (Stud B, Stud A) as two different outcomes
∴ if orders does not matter, we have

$$n(S) = \frac{10 \times 9}{2} = 45$$

• For $n(A)$: To have A occur, the teacher needs to select 1 out of 3 boys and 1 out of 7 girls. So,

$$n(A) = 7 \times 3 = 21$$

$$P(A) = n(A)/n(S) = 21/45 = 7/15 \approx 46.67\%$$