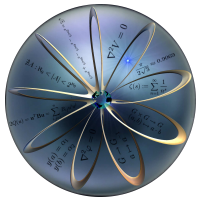

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symmetric relation

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A relation $\mathcal{R}$ on a set A is *symmetric* if and only if whenever $x\mathcal{R}y$ for some $x, y \in A$ then also $y\mathcal{R}x$.

An example of a symmetric relation on $\{a, b, c\}$ is $\{(a, a), (c, b), (b, c), (a, c), (c, a)\}$. One relation that is not symmetric is $\mathcal{R} = \{(b, b), (a, b), (b, a), (c, b)\}$, because $(c, b) \in \mathcal{R}$ but $(b, c) \notin \mathcal{R}$.

On a finite set with n elements there are 2^{n^2} relations, of which $2^{\frac{n^2+n}{2}}$ are symmetric.

A relation $\mathcal{R}$ that is both symmetric and antisymmetric has the property that $x\mathcal{R}y$ implies $x = y$. On a finite set with n elements there are only 2^n such relations.