Examples 2

- Let A be the set of all humans, and we say $x\dagger$ if x and y were born in the same calendar year.
  - reflexive: everyone is born in the same year as themselves;
  - symmetric: if x and y were born in the same year, then y and x were born in the same year;
  - transitive: if x and y were born in the same year, and y and z were born in the same year, then x and z were born in the same year;
- Let $A = \mathbb{R}$ and let $\mathcal{R} = \leq$, i.e. $(x, y) \in \mathcal{R} \iff x \leq y$.
  - reflexive: $x \leq x$ for all $x \in \mathbb{Z}$;
  - symmetric: Assume that $x \leq y$. Does this imply that $y \leq x$? NO.
    For example, $2 \leq 3$ but $3 \not\leq 2$.
    Therefore, not an equivalence relation.
  - transitive: It does happen to be transitive:

$$x \leq y \land y \leq z \implies x \leq z,$$

but since it's not symmetric it is not an equivalence relation.