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Basis and subbasis for a topology

Definition. Basis for a topology

Let X be a set. Then a **basis** for a topology on X is a collection $\mathcal{B} \subseteq 2^X$ such that

- for each $x \in X$, there exists $B_x \in \mathcal{B}$ such that $x \in B_x$
- if $x \in B_1 \cap B_2$ where $B_1, B_2 \in \mathcal{B}$, then there exists $B_3 \in \mathcal{B}$ such that $x \in B_3$ and $B_3 \subseteq B_1 \cap B_2$

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