Theorem

Let $k \in I$, then

$$\bigcap_{i \in I} A_i \subseteq A_k \subseteq \bigcup_{i \in I} A_i.$$

Proof.

1. Let $x \in \cap_{i \in I} A_i$. Then x is in every A_i, and in particular is in A_k.
2. Let $x \in A_k$. Then $x \in A_i$ for some i, and thus $x \in \cup_{i \in I} A_i$.

□