Let $\{\mathcal{H}_i\}_{i\in I}$ be a family of σ-algs on Ω

prove that $\mathcal{H} = \bigcap_{i\in I} \mathcal{H}_i$ is a sigma alg

1) $\emptyset \in \mathcal{H}_i \ \forall\ i\in I \rightarrow \emptyset \in \bigcap \mathcal{H}_i$

2) if $A \in \mathcal{H}$ then for any i, $A \in \mathcal{H}_i$ and thus $A^c \in \mathcal{H}_i$, so $A^c \in \mathcal{H}$

3) if $\{A_n\}_{n\in\mathbb{N}} \subset \mathcal{H}$ then it is in every $\mathcal{H}_i$ thus $\bigcup A_n \in \mathcal{H}_i$ so $\bigcup A_n \in \mathcal{H}$