Proof. (i) $\Omega \in \mathcal{F}$.

(ii) Closure under complement: Let $A \in \mathcal{F}$, $A^c = \Omega \backslash A$. But we know $\Omega \in \mathcal{F}$, so $A^c \in \mathcal{F}$.

(iii) Closure under finite unions: Let $A, B \in \mathcal{F} \Rightarrow A \backslash B \in \mathcal{F}$ (by our assumption), which is equivalent to $A \cap B^c \in \mathcal{F}$, but then by (ii) $(A \cap B^c)^c = (A^c \cup B) =: ? \in mathcal{F}$

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