

**Definition** (Partition). A *partition* of a set  $\mathbf{A}$  is a collection  $\{\mathbf{A}_i\}_{i \in I}$  of subsets  $\mathbf{A}_i \subseteq \mathbf{A}$  such that

1.  $\mathbf{A}_i \cap \mathbf{A}_j = \emptyset \quad \forall i \neq j;$
2.  $\bigcup_{i \in I} \mathbf{A}_i = \mathbf{A}.$