Partitions

Let S be a set. A partition of S is a family $A_1, \ldots, A_n$ of subsets of S such that:

- Each A_i is non-empty, that is, $\forall\, 1 \leq i \leq n\ (A_i = \emptyset)$
- The A_i **cover** S: $S = A_1 \cup \cdots \cup A_n$
- The A_i are pairwise disjoint, that is, every pair of sets selected from $A_1, \ldots, A_n$ is disjoint: $\forall\, 1 \leq i, j \leq n\ (i \neq j \implies A_i \cap A_j = \emptyset)$

We write $A_1 \cup \cdots \cup A_n$ as $\cup_{i=1}^{n} A_i$