**Definition**: The **Cartesian product** of the sets A and B,  $A \times B$ , is the set of all ordered pairs (a, b), where  $a \in A$  and  $b \in B$ . That is:  $A \times B = \{(a, b) \mid (a \in A) \land (b \in B)\}$ . The Cartesian product of the sets  $A_1, A_2, \ldots, A_n$ , denoted by  $A_1 \times A_2 \times \cdots \times A_n$ , is the set of ordered n-tuples  $(a_1, a_2, \ldots, a_n)$ , where  $a_i$  belongs to  $A_i$  for  $i = 1, 2, \ldots, n$ . That is,

$$A_1 \times A_2 \times \cdots \times A_n = \{(a_1, a_2, \dots, a_n) \mid a_i \in A_i \text{ for } i = 1, 2, \dots, n\}$$