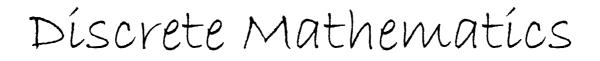
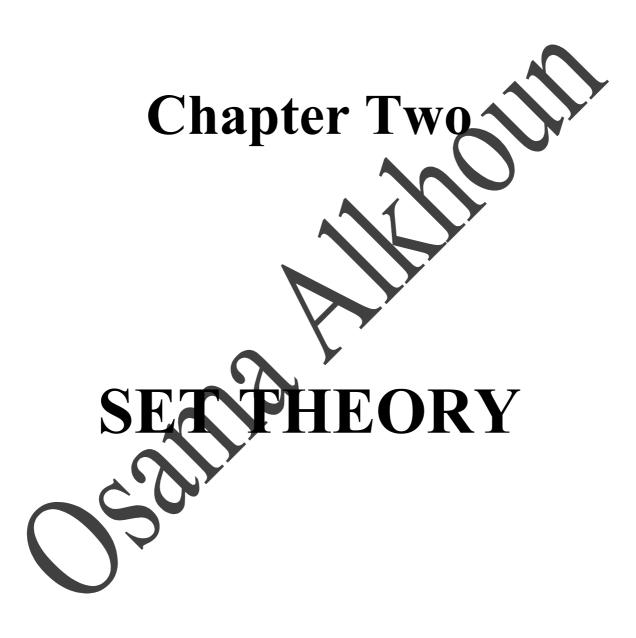
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Second Seme*s*ter 2009/2010

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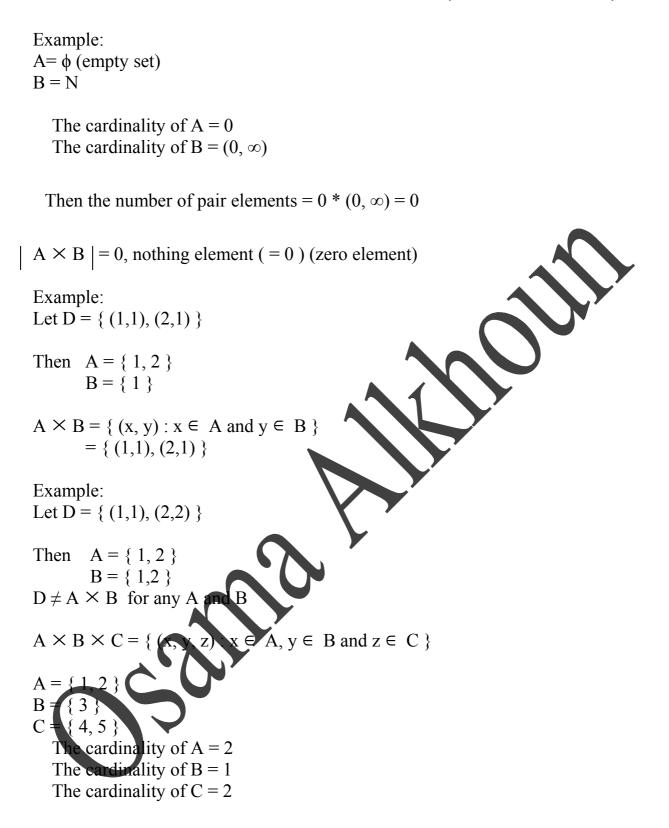
Section 2.6 Cartesian product

Definition:

Let A and B be sets, the Cartesian product of A and B, denoted by $A \times B$, is the set of all ordered pairs (x, y), where x is an element of A and y is an element of B That is $A \times B = \{ (x, y) : x \in A \text{ and } y \in B \}$

 $A = \{a, b\}$ $B = \{1, 2\}$ The cardinality of A = 2Then the number of pair elements = 2 *The cardinality of B = 2 $A \times B = \{(a, 1), (a, 2), (b, 1), (b, 2), \}$ Cardinality: If $|\mathbf{A}| = \mathbf{n}$, $|\mathbf{B}| = \mathbf{m}$, then $|\mathbf{A} \rightarrow \mathbf{B}| = \mathbf{n} \times \mathbf{m}$ Example: $A = \{1, 2, 3\}$ The cardinality of A = 3Then the number of pair elements = 3 * 3 = 9The cardinality of A = 3 $A \times A = \{ (1, 1), (1, 2), (1, 3), (2, 1), (2, 3) \}$ $(2, 3), (3, 1), (3, 2), (3, 3) \}$ Applying in Cartesian produc $\mathbf{A} \times \mathbf{B} \neq \mathbf{B} \times \mathbf{A}$ Example: Let $A = \{ 1, 2,$ $(1,3), (2,1), (2,2), (2,3), (3,1), (3,2), (3,3) \}$ $A \times A =$ Example: $A = \{a, b\}$ $\mathbf{B} = \mathbf{Z}$ $A \times B = \{\dots, (a, -1), (a, 0), (b, -1), (b, 0), \dots, \}$ Example: A = R $B = \{1\}$ $A \times B = \{ (x, y) : x \in A \text{ and } y \in B \}$ $R \times \{1\} = \{(x, y) : x \in R \text{ and } y \in \{1\}\}$ $= \{ (x, 1) : x \in \mathbb{R} \}$

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Then the number of pair elements = 1 * 2 * 2 = 4 element

 $A \times B \times C = \{ (1, 3, 4), (1, 3, 5), (2, 3, 4), (2, 3, 5) \}$

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