

$$\mathcal{P}(A) = \{\{\}, \{a\}, \{\{b\}\}, \{a, \{b\}\}\} \quad \mathcal{P}(B) = \{\{\}, \{\{a\}\}, \{b\}, \{\{a\}, b\}\}$$

$$C = \mathcal{P}(A) \Delta \mathcal{P}(B) = (A \setminus B) \cup (B \setminus A) = \{\{a\}, \{\{a\}\}, \{b\}, \{\{b\}\}, \{a, \{b\}\}, \{\{a\}, b\}\}$$

$$A \times B = \{(a, \{a\}), (a, b), (\{b\}, \{a\}), (\{b\}, b)\}$$

$$B \times A = \{(\{a\}, a), (\{a\}, \{b\}), (b, a), (b, \{b\})\}$$

$$D = (A \times B) \cap (B \times A) = \emptyset$$