Chapter 19
Appendix D: Defining Boolean and Fuzzy Logic Operators

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19.1 Definition Boolean Logic

If an element x	
is contained in set A then	$\mu_A(x) = 1 \quad \text{if} \quad x \in A$
is not contained in set A then	$\mu_A(x) = 0$
As	$\mu_{A \cup B}(x) = 1 \quad \text{if} \quad x \in A \text{ or } x \in B$
and	$\mu_{A \cap B}(x) = 1 \quad \text{if} \quad x \in A \text{ and } x \in B$
Then it follows that	$A \cup B \rightarrow \mu_{A \cup B}(x) = \max[\mu_A(x), \mu_B(x)]$
and	$A \cap B \rightarrow \mu_{A \cap B}(x) = \min[\mu_A(x), \mu_B(x)]$

19.2 Definition Fuzzy Logic

If an element x	
has some membership in set A then	$\mu_A(x) = k_A \quad 0 < k_A \leq 1$
has no membership in set A then	$\mu_A(x) = 0$
define	$A \cup B \rightarrow \mu_{A \cup B}(x) = \max[\mu_A(x), \mu_B(x)]$
and	$A \cap B \rightarrow \mu_{A \cap B}(x) = \min[\mu_A(x), \mu_B(x)]$

thus $0 \leq \mu_{A \cup B}(x) \leq 1$ and $0 \leq \mu_{A \cap B}(x) \leq 1$

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