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1. With $S1 = \{2,3,5,7\}$
$S2 = \{2,4,5,8,9\}$, and $U = \{1:10\}$
compute $\neg S1 \cup S2$

$\Rightarrow \neg S1 = U - S1 = \{1,4,6,8,9,10\}$

$\neg S1 \cup S2 = \{1,2,4,5,6,8,9,10\}$

2. $S1 = \{2,3,5,7\}$
$S2 = \{2,4,5,8,9\}$
compute $S1 \times S2$ and $S2 \times S1$

$\Rightarrow S = S1 \times S2 = [(x,y); x \in S1, y \in S2]$
$S = S2 \times S1 = [(x,y); x \in S2, y \in S1]$

* $S = S1 \times S2 = \{(2,2),(2,4),(2,5),(2,8),(2,9),(3,2),(3,4),$
$(3,5),(3,8),(3,9),(5,2),(5,4),(5,5),(5,8),(5,9),$
$(7,2),(7,4),(7,5),(7,8),(7,9)\}$

* $S = S2 \times S1 = \{(2,2),(2,3),(2,5),(2,7),(4,2),(4,3),(4,5),$
$(4,7),(5,2),(5,3),(5,7),(8,2),(8,3),(8,5),(8,7),$
$(9,2),(9,3),(9,5),(9,7)\}$

3. $S = \{2,5,6,8\}$
$T = \{2,4,6,8\}$
compute $|S \cap T| + |S \cup T|$

$\Rightarrow |S \cap T| = n(S \cap T) = 3 \rightarrow \{2,6,8\}$

$\Rightarrow |S \cup T| = n(S \cup T) = 5 \Rightarrow \{2,4,5,6,8\}$

$\Rightarrow |S \cap T| + |S \cup T| = 3 + 5 = 8$ //

4. Equations (1.2) and (1.3)

$S = \{x \in U, x \notin S\}$

DeMorgan's law

$\overline{S1 \cup S2} = \overline{S1} \cap \overline{S2}$

$\overline{S1 \cap S2} = \overline{S1} \cup \overline{S2}$

$\Rightarrow U = \{a, b, c, d, e, x, y\}$

$S1 = \{a, b, c, y\}$ $\quad S1 \cup S2 = \{a, b, c, d, e, y\}$

$S2 = \{d, e, y\}$ $\quad S1 \cap S2 = \{y\}$

$\overline{S1} = \{d, e, x\}$

$\overline{S2} = \{a, b, c, x\}$

* $\overline{S1 \cup S2} = U - (S1 \cup S2) = \{a, b, c, d, e, x, y\} - \{a, b, c, d, e, y\}$

$= \{x\}$

* $\overline{S1} \cap \overline{S2} = \{d, e, x\} \cap \{a, b, c, x\} = \{x\}$

* $\overline{S1 \cup S2} = \overline{S1} \cap \overline{S2} = \{x\}$

* $\overline{S1 \cap S2} = U - (S1 \cap S2) = \{a, b, c, d, e, x, y\} - \{y\}$

$= \{a, b, c, d, e, x\}$

* $\overline{S1} \cup \overline{S2} = \{d, e, x\} \cup \{a, b, c, x\}$

$= \{a, b, c, d, e, x\}$

* $\overline{S1 \cap S2} = \overline{S1} \cup \overline{S2} = \{a, b, c, d, e, x\}$

5. Asumsi => $S \in U$ dan $T \in U$

Asumsi Himpunan :

$U = \{a, b, c, d, e, x, y, z\}$

$S = \{a, b, c, d\}$

$T = \{d, e, x\} \Rightarrow \neg T = \{a, b, c, y, z\}$

Show that for all sets S and T, $S - T = S \cap \neg T$

$\Rightarrow S - T = \{a, b, c\}$

$S \cap \neg T = \{a, b, c, d\} \cap \{a, b, c, y, z\}$

$= \{a, b, c\}$

$\therefore S - T = S \cap \neg T = \{a, b, c\}$

MORE EXERCISE

2. $S1 = S2 \leftrightarrow S1 \cup S2 = S1 \cap S2$

Asumsi

S1 dan S2 memiliki himpunan yang sama, misal $\{a, b, c\}$

$\Rightarrow S1 \cup S2 = S1 \cap S2$

$\{a, b, c\} \cup \{a, b, c\} = \{a, b, c\} \cap \{a, b, c\}$

$\{a, b, c\} = \{a, b, c\}$

3. Show that $S1 \cup S2 - S1 \cap S2 = S2$

Asumsi : $S1 = \{a, b, c\}$

$S2 = \{x, y, z\}$

$\Rightarrow S1 \cup S2 - S1 \cap S2 = S2$

$\{a, b, c, x, y, z\} - \{a, b, c\} \cap \{x, y, z\} = S2$

$\{x, y, z\} \cap \{x, y, z\} = S2$

$\{x, y, z\} = S2$