

Foundations  
In-Class Presentation

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Let  $A$  be a set and  $\heartsuit$  be an operation on  $\mathcal{P}(A)$  where  $S \heartsuit T = (S \setminus T) \cup (T \setminus S)$ . Assume now that there is some  $T \heartsuit S$  where  $(T \setminus S) \cup (S \setminus T)$ . Order does not matter with unions so  $(T \setminus S) \cup (S \setminus T) = (S \setminus T) \cup (T \setminus S)$ . Therefore  $S \heartsuit T = T \heartsuit S$ , which satisfies the definition of commutativity. Thus  $\heartsuit$  is commutative.  $\square$