

**Generating association rules.** Let's try an example based on the transactional data for *AllElectronics* shown before in Table 6.1. The data contain frequent itemset  $X = \{I1, I2, I5\}$ . What are the association rules that can be generated from  $X$ ? The nonempty subsets of  $X$  are  $\{I1, I2\}$ ,  $\{I1, I5\}$ ,  $\{I2, I5\}$ ,  $\{I1\}$ ,  $\{I2\}$ , and  $\{I5\}$ . The resulting association rules are as shown below, each listed with its confidence:

$\{I1, I2\} \Rightarrow I5, \quad \text{confidence} = 2/4 = 50\%$   
 $\{I1, I5\} \Rightarrow I2, \quad \text{confidence} = 2/2 = 100\%$   
 $\{I2, I5\} \Rightarrow I1, \quad \text{confidence} = 2/2 = 100\%$   
 $I1 \Rightarrow \{I2, I5\}, \quad \text{confidence} = 2/6 = 33\%$   
 $I2 \Rightarrow \{I1, I5\}, \quad \text{confidence} = 2/7 = 29\%$   
 $I5 \Rightarrow \{I1, I2\}, \quad \text{confidence} = 2/2 = 100\%$

If the minimum confidence threshold is, say, 70%, then only the second, third, and last rules are output, because these are the only ones generated that are strong. Note that, unlike conventional classification rules, association rules can contain more than one conjunct in the right side of the rule. ■