

We can use a recursive definition to describe all compound propositions that use propositional variables from a specified collection. Here's the definition for all compound propositions whose propositional variables are in  $\{p, q\}$ .

Basis Step:  $p$  and  $q$  are each a compound proposition  
Recursive Step: If  $x$  is a compound proposition then so is  $(\neg x)$  and if  $x$  and  $y$  are both compound propositions then so is each of  $(x \wedge y), (x \oplus y), (x \vee y), (x \rightarrow y), (x \leftrightarrow y)$