

### 5.3.2 Facts

A fact is an atomic formula, such as *loyalCustomer(a345678)*, which says that the customer with ID a345678 is loyal. The variables of a fact are implicitly universally quantified.

### 5.3.3 Logic Programs

A logic program  $P$  is a finite set of facts and rules. Its predicate logic translation  $pl(P)$  is the set of all predicate logic interpretations of rules and facts in  $P$ .

### 5.3.4 Goals

A goal denotes a query  $G$  asked to a logic program. It has the form

$$B_1, \dots, B_n \rightarrow$$

If  $n = 0$  we have the *empty goal*  $\square$ .

Our next task is to interpret goals in predicate logic. Using the ideas we have developed so far (interpretations of commas as conjunction, implicit universal quantification), we get the following interpretation:

$$\forall X_1 \dots \forall X_k (\neg B_1 \vee \dots \vee \neg B_n)$$

This formula is the same as  $pl(r)$ , with the only difference that the rule head  $A$  is omitted.<sup>3</sup>

An equivalent representation in predicate logic is

$$\neg \exists X_1 \dots \exists X_k (B_1 \wedge \dots \wedge B_n)$$

where  $X_1, \dots, X_k$  are all variables occurring in  $B_1, \dots, B_n$ . Let us briefly explain this formula. Suppose we know

---

<sup>3</sup>Note that the formula is equivalent to  $\forall X_1 \dots \forall X_k (false \vee \neg B_1 \vee \dots \vee \neg B_n)$ , so a missing rule head can be thought of as a contradiction *false*.