Board example 3 revisited: Recall for this example we working with:

\begin{align*}
\text{Acct: (bname, acct#, bal)} & \quad \text{Branch: (bname, bcity, assets)} \\
\text{Owner: (name, acct#)} & \quad \text{Customer: (name, street, city)}
\end{align*}

**Want to express** in tuple relational calculus

"names of all customers who have accounts at all branches in Princeton"

**CORRECTION given 10/9/06:**

\[
\{T \mid \forall B \exists O \left( (B \in \text{Branch} \text{ and } B.\text{city} = \text{'Princeton'}) \Rightarrow \exists A \left( A \in \text{Acct} \text{ and } O \in \text{Owners} \text{ and } A.\text{acct#} = O.\text{acct#} \text{ and } B.\text{bname} = A.\text{bname} \text{ and } T.\text{name} = O.\text{name} \right) \right) \}
\]

But if NO branches in Princeton then any tuple *not just any customer name satisfies!! (unsafe query!!)*

**Solution:** put “there exists” up front to force T to be customer name:

\[
\{T \mid \exists C \left( C \in \text{Customer} \text{ and } T.\text{name} = C.\text{name} \right) \text{ and } \\
\quad \left( \forall B \exists O \left( (B \in \text{Branch} \text{ and } B.\text{city} = \text{'Princeton'}) \Rightarrow \exists A \left( A \in \text{Acct} \text{ and } O \in \text{Owners} \text{ and } A.\text{acct#} = O.\text{acct#} \text{ and } B.\text{bname} = A.\text{bname} \text{ and } T.\text{name} = O.\text{name} \right) \right) \right) \}
\]