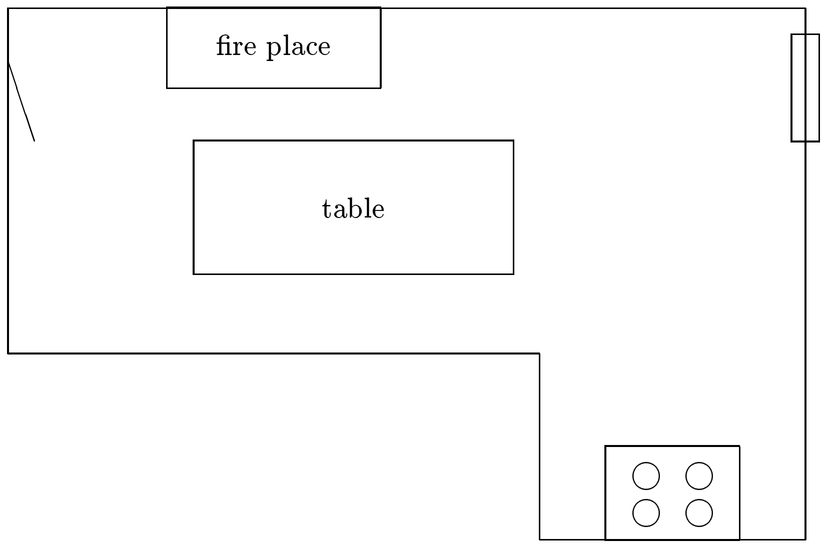


Problem Description:

If Patty is near the door, and Jim is talking to Patty, and Bill is between the fire-place and the table, and Bill owns the house, and Karen is looking out the window, and Karen is married to Jim, and Patty is married to Bill, then show that the owner of the house is between Karen and her husband.

Initial domain theory:

Facts:

$$near(patty, door) \wedge talk(jim, patty) \wedge between(bill, firePlace, table)$$

$$\wedge\ married(karen, jim) \wedge married(patty, bill)$$

$$\wedge\ lookOutWindow(karen) \wedge owns(bill, house)$$

Rules:

$$talk(X, Y) \rightarrow near(X, Y)$$

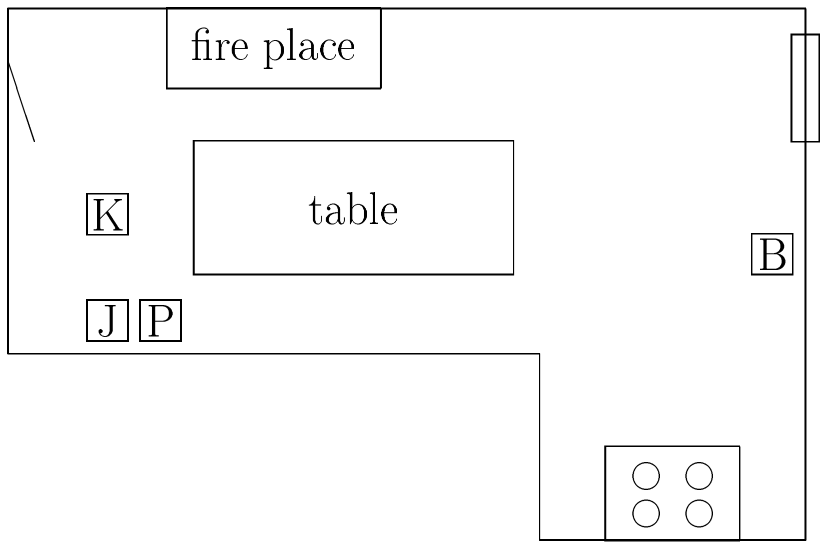
$$lookOutWindow(X) \rightarrow near(X, window)$$

$$married(X, Y) \rightarrow husband(X, Y)$$

Negated query:

$$\neg husband(karen, X) \vee \neg owns(Y, house) \vee \neg between(Y, X, karen)$$

Initial Random Image



Clause in Original Theory: $\{\ near(patty, door)\ \}$

Clause in Specialized Theory: $\{\}$ / $\{\ near(patty, door)\ \}$

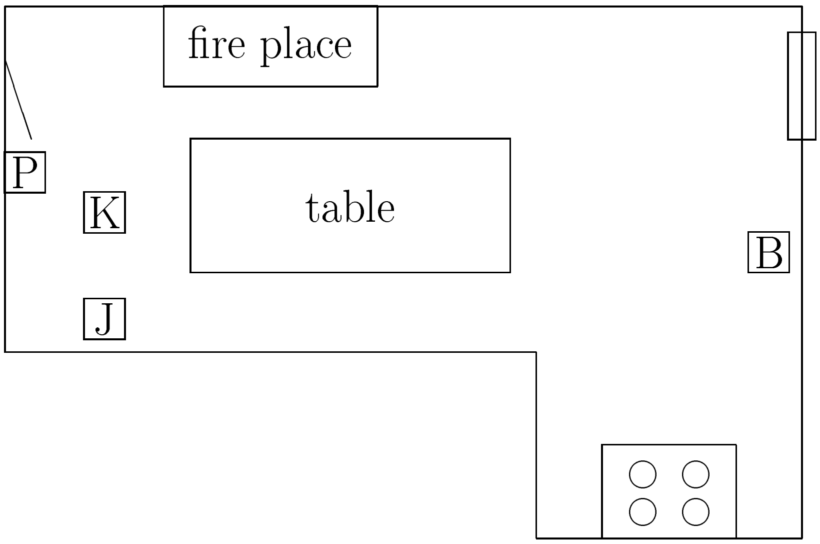
Theory already contains $\square$

Annotations from proof: $near(patty, door)$

New Covered List: $Cov = \neg near(patty, door)$

Literals selected from Covered List: $near(patty, door)$

New image updated with assertions:



Clause in Original Theory: $\{\ between(bill, firePlace, table)\ \}$

Clause in Specialized Theory: $\{\}$ / $\{between(bill, firePlace, table)\}$

Theory already contains $\Box$

Annotations from proof: $between(bill, firePlace, table)$

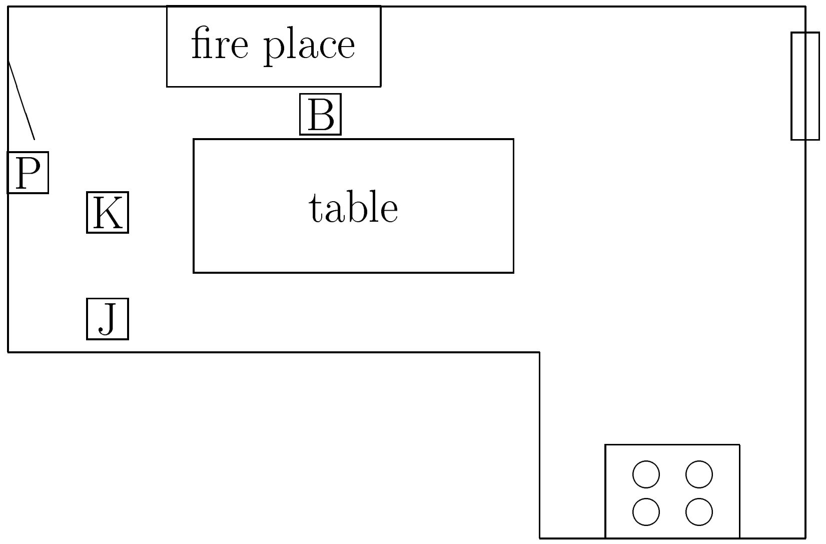
New Covered List:

$$Cov = \neg near(patty, door) \vee \neg between(bill, firePlace, table)$$

Literals selected from Covered List:

$$near(patty, door) \wedge between(bill, firePlace, table)$$

New image updated with assertions:



Clauses in Specialized Theory:

$$\{talk(jim, patty)\}$$

$$\{\neg talk(jim, patty)\}/\{near(jim, patty)\}$$

Derive $\Box$ by resolution

Annotations from proof: $near(jim, patty)$

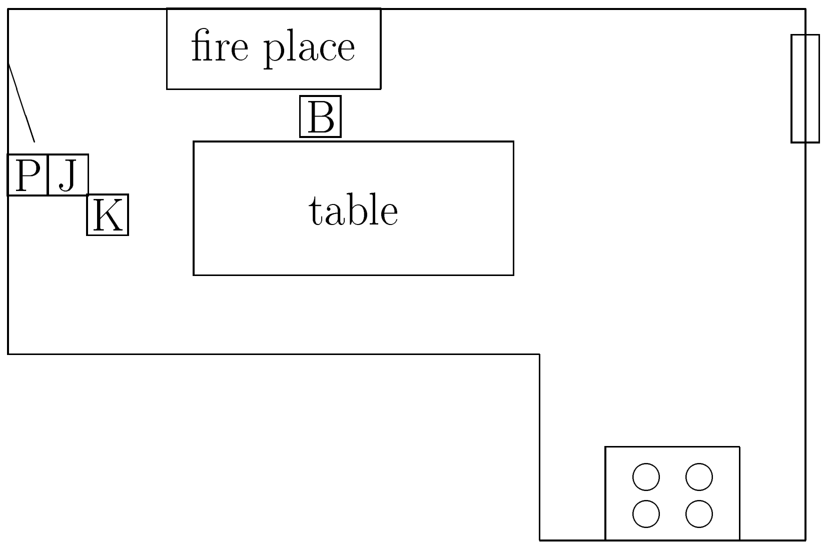
New Covered List:

$$Cov = \neg near(patty, door) \vee \neg between(bill, firePlace, table) \\ \vee \neg near(jim, patty)$$

Literals selected from Covered List: $near(jim, patty) \wedge$

$near(patty, door) \wedge between(bill, firePlace, table)$

New image updated with assertions:



Clauses in Specialized Theory:

$$\{lookOutWindow(karen)\}$$

$$\{\neg lookOutWindow(karen)\}/\{near(karen, window)\}$$

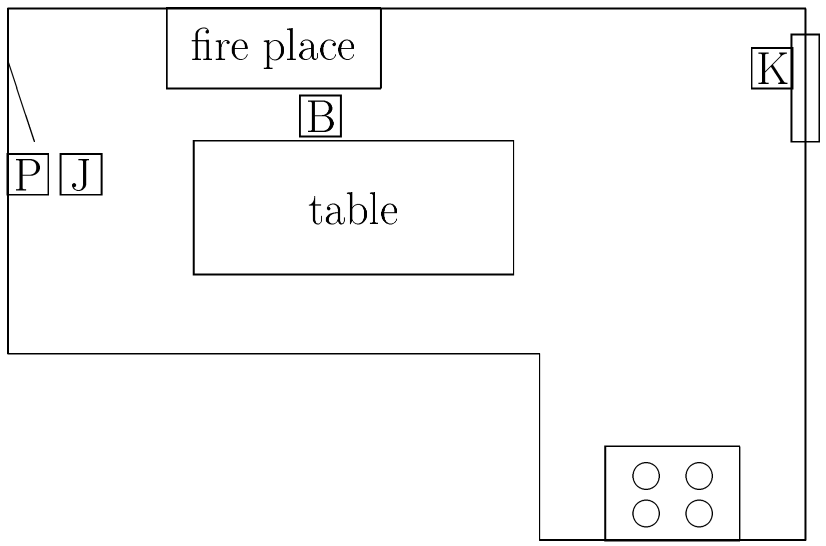
Derive $\Box$ by resolution

Annotations from proof: $near(karen, window)$

New Covered List:

$$Cov = \neg near(patty, door) \vee \neg between(bill, firePlace, table) \vee \neg near(jim, patty) \vee \neg near(karen, window)$$

New image updated with 4 selected literals:



Clauses from Specialized Theory:

$$\{\neg married(karen, jim) \vee husband(karen, jim)\}$$

$$\{married(karen, jim)\}$$

$$\{Owns(bill, house)\}$$

$$\{\neg Owns(bill, house) \vee \neg husband(karen, jim)\}$$
$$/\{\neg between(bill, jim, karen)\}$$

Annotations from proof: $\neg between(bill, jim, karen)$

New Covered List:

$$
\begin{aligned}
Cov = {} & \neg near(patty, door) \vee \neg between(bill, firePlace, table) \\
& \vee \neg near(jim, patty) \vee \neg near(karen, window) \\
& \vee between(bill, jim, karen)
\end{aligned}
$$

ISR reports that no image can be constructed that is consistent with these literals.