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Create a knowledge base using propositional logic

Step 1: Knowledge Base (3 statements)

Symbol	Meaning
B	Burglary happend
A	Alarm srings
C	Neighbor calls polic

Knowledge Base (KB)

1) $B \rightarrow A$ (If a burglary happens, the alarm srings)
2) $A \rightarrow C$ (If the alarm srings, the neighbor calls the police)
3) B (A burglary happened)

step 2: Query

Query : C

(Is it true that the neighbor calls the police?)

We are testing whether

$KB \models C$

Step3: Truth Table

B	A	C	B→A	A→C	Is KB True?	Query C
F	F	F	T	T	F (because B=F →KB3 false)	F
F	F	T	T	T	F	T
F	T	F	T	F	F	F
F	T	T	T	T	F	T
T	F	F	F	T	F	F
T	F	T	F	T	F	T
T	T	F	T	F	F	F
T	T	T	T	T	T	T

Step4:

To test whether the query is entailed by KB

- We look at all the rows of the truth table
- We find the rows where every sentence in the KB is true (the KB holds)
- Then we check the query in those rows.
  - If the query is true in all those rows, it is entailed by the KB
  - If there is even one row where the KB is true but the query is false, then it is not entailed.

Step5: Conclusion

Since in every situation where the KB is true, the query C is also true,

KB ⊨ C

Hence, the query c is entailed by the knowledge base.

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