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from itertools import product
def pl_true(sentence, model):
     ""Evaluates if a sentence is true in a given model."""
    if isinstance(sentence, str):
        return model.get(sentence, False)
    elif isinstance(sentence, tuple) and len(sentence) == 2: # NOT operation
        operator, operand = sentence
        if operator == "NOT":
            return not pl_true(operand, model)
    elif isinstance(sentence, tuple) and len(sentence) == 3:
        operator, left, right = sentence
        if operator == "AND":
           return pl_true(left, model) and pl_true(right, model)
        elif operator == "OR":
           return pl_true(left, model) or pl_true(right, model)
        elif operator == "IMPLIES":
           return not pl_true(left, model) or pl_true(right, model)
        elif operator == "IFF":
           return pl_true(left, model) == pl_true(right, model)
def print_truth_table(kb, query, symbols):
    """Generates and prints the truth table for KB and Query."""
   # Define headers with spaces for alignment
                   ", "В
   headers = ["A
                                  ", "C
                                             ", "A ∨ C ", "B ∨ ¬C ", "KB
                                                                               ", "α
   print(" | ".join(headers))
   print("-" * (len(headers) * 9)) # Separator line
   # Generate all combinations of truth values
    for values in product([False, True], repeat=len(symbols)):
        model = dict(zip(symbols, values))
        # Evaluate sub-expressions and main expressions
       a_or_c = pl_true(("OR", "A", "C"), model)
b_or_not_c = pl_true(("OR", "B", ("NOT", "C")), model)
kb_value = pl_true(("AND", ("OR", "A", "C"), ("OR", "B", ("NOT", "C"))), model)
        alpha_value = pl_true(("OR", "A", "B"), model)
        # Print the truth table row
        row = values + (a_or_c, b_or_not_c, kb_value, alpha_value)
        row_str = " | ".join(str(v).ljust(7) for v in row)
        # Highlight rows where both KB and \alpha are true
        if kb value and alpha value:
           print(f"\033[92m{row_str}\033[0m") # Green color for rows where KB and \alpha are true
        else:
           print(row_str)
# Define the knowledge base and query
symbols = ["A", "B", "C"]
kb = ("AND", ("OR", "A", "C"), ("OR", "B", ("NOT", "C")))
query = ("OR", "A", "B")
# Print the truth table
print_truth_table(kb, query, symbols)
           В
                     C
                                A V C B V ¬C KB
     False False False
                                 False
                                           True
                                                      False
                                                               False
     False
               False
                       True
                                  True
                                             False
                                                                False
                                                       False
     False
               True
                       False
                                 False
                                            True
                                                      False
                                                                I True
     False
               True
                                 l True
                                                                True
                       True
                                             True
                                                       True
     True
               False False
                                 True
                                             True
                                                       True
                                                                True
     True
               False | True
                                 True
                                             False
                                                       False
                                                                True
     True
               True
                       I False
                                 I True
                                                                True
                                            True
                                                       True
     True
             True
                       True
                                 True
                                            True
                                                      True
                                                                True
```