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Batch - 3

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④th Convert FOL to CNF

```
def fol_to_cnf(fol):
    statement = fol.replace("<=>", "_")
    while '_' in statement:
        i = statement.index('_')
        new_statement = '[' + statement[:i] + '=>' + statement
        [i+1:] + ']^[' + statement[i+1:] + '=>' + statement[:i] + ']'
        statement = new_statement
    statement = statement.replace("=>", "_")
    expr = '\[([^]]+)\]'
    statements = re.findall(expr, statement)
    for i, s in enumerate(statements):
        if '[' in s and ']' not in s:
            statements[i] += ']'
    for s in statements:
        statement = statement.replace(s, fol_to_cnf(s))
    while '_' in statement:
        i = statement.index('_')
        br = statement.index('[') if '[' in statement else 0
        new_statement = '~' + statement[br:i] + 'v' + statement
        statement = statement[:br] + new_statement if
                br > 0 else new_statement
    while '~∀' in statement:
        i = statement.index('~∀')
        statement = list(statement)
        statement[i], statement[i+1], statement[i+2] = '∃',
            statement[i+2], '~'
        statement = ''.join(statement)
    while '~∃' in statement:
        i = statement.index('~∃)
        s = list(statement)
        s[i], s[i+1], s[i+2] = '∀', s[i+2], '~'
        statement = ''.join(s)
statement = statement.replace('~[∀', '[-∀')
statement = statement.replace('~[∃', '[-∃')
expr = '(~[∀|∃.)'
statements = re.findall(expr, statement)
for s in statements:
        statement = statement.replace(s, fol-to-cnf(s))
expr = '~\[[^]]+\]'
statements = re.findall(expr, statement)
for s in statements:
        statements = statement.replace(s, DeMorgan(s))
return statement
```

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