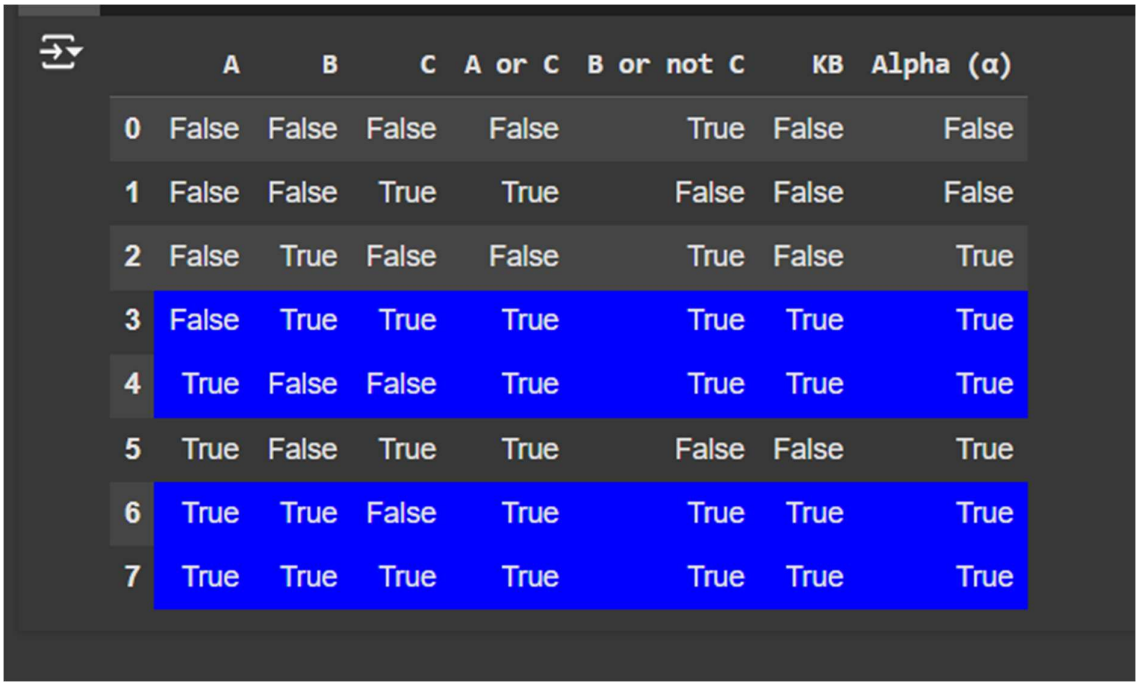
Q).Create a knowledge base using propositional logic and show that the given query entails the knowledge base or not.

Code:

```
import pandas as pd


# Define the truth table for all combinations of A, B, C
truth_values = [(False, False, False),
                (False, False, True),
                (False, True, False),
                (False, True, True),
                (True, False, False),
                (True, False, True),
                (True, True, False),
                (True, True, True)]


# Columns: A, B, C
table = pd.DataFrame(truth_values, columns=["A", "B", "C"])


# Calculate intermediate columns
table["A or C"] = table["A"] | table["C"]          # A ∨ C
table["B or not C"] = table["B"] | ~table["C"]     # B ∨ ¬C


# Knowledge Base (KB): (A ∨ C) ∧ (B ∨ ¬C)
table["KB"] = table["A or C"] & table["B or not C"]


# Alpha (α): A ∨ B
table["Alpha (α)"] = table["A"] | table["B"]


# Define a highlighting function
def highlight_rows(row):
    if row["KB"] and row["Alpha (α)"]:
```

```
        return ['background-color: blue'] * len(row)
    else:
        return [''] * len(row)

# Apply the highlighting function
styled_table = table.style.apply(highlight_rows, axis=1)

# Display the styled table
styled_table
```

output:



	A	B	C	A or C	B or not C	KB	Alpha (α)
0	False	False	False	False	True	False	False
1	False	False	True	True	False	False	False
2	False	True	False	False	True	False	True
3	False	True	True	True	True	True	True
4	True	False	False	True	True	True	True
5	True	False	True	True	False	False	True
6	True	True	False	True	True	True	True
7	True	True	True	True	True	True	True