Lab program - 7

Knowledge base resolution

Algorithm

Step 1: Initialize Knowledge Base:

- Create a class KnowledgeBase to represent the KnowledgeBase.
- Populate the KnowledgeBase with a set of predefined questions and answers.

Step 2: User interaction loop

- Enter a loop to interact with the user.
- Prompt the user to ask a question or type exit to end the program.

Step 3: User input

- Receive user input for the question.

Step 4: Knowledge Reolution

- Use the resolve_query method in the "KnowledgeBase" class to find the answer to the user's question.
- If an answer is found, display the answer.

Step 5: Exit condition

If the user types exit, the loop and end the program.

Code

```
def resolution(knowledge_base, query):

    clauses = knowledge_base + [frozenset([~query])]

    while True:
        new_clauses = set()

        for i in range(len(clauses)):
            for j in range(i+1, len(clauses)):
                resolvents = resolve(clauses[i],
                                     clauses[j])
                if frozenset() in resolvents:
                    new_clauses.update(resolvents)

        if new_clauses.issubset(clauses):
            return False

        clauses.update(new_clauses)

def resolve(ci, cj):
    resolvents = set()

    for di in ci:
        for dj in cj:
            if di == ~dj or ~di == dj:
                resolvent = (ci - {di}) | (cj - {dj})
                resolvents.add(frozenset(resolvent))
    return resolvents
```

```
knowledge_base = []

while True:
    clause = input("Enter a clause for the knowledge base (or 'done' to finish): ").strip()

    if clause.lower() == 'done':
        break
    knowledge_base.append(frozenset(eval(clause)))

query = eval(input("Enter the query: "))

result = resolution(knowledge_base, query)

print(f"Is {query} entailed by the knowledge base? {result}")
```

Output

```
Enter a clause for the knowledge base (or 'done' to finish): {p, ~q}
Enter a clause for the knowledge base (or 'done' to finish): {~p, r}
Enter a clause for the knowledge base (or 'done' to finish): {q, ~r}
```

Enter a clause for the knowledge base (or 'done' to finish): done

Enter the query: p

Is p resolved by the knowledge base?
False

29.12.22