LAB-6
KNOWLEDGE BASE ENTAILMENT

Entailment refers to the logical relationship between a KB and a query.
If KB entails a statement, it means that whenever the statement in the KB are true, the given query is also true.

$$KB \models Q$$

Knowledge Base:

· If its raining (P) then the ground is wet.
· If the ground is wet (Q), then the plants will grow (R)
· Its not the case that plants will grow (~R)

Query: whether it's raining?

Code:

```
from sympy import symbols

def create_knowledge_base()
    p = symbols('p')
    q = symbols('q')
    r = symbols('r')

    knowledge_base = And(Implies(p,q), Implies(q,r),
                          Not(r))
    return knowledge_base
```

```python
def query-entails (knowledge-base, query):
    entailment = satisfiable (And (knowledge-base,
                                    Not (query)))

    return not entailment


if __name__ == "__main__":
    kb = create_knowledge-base()
    query = symbols ('p!)
    result = query-entails (kb, query)

    print ("Knowledge Base :", kb)
    print ("Query :", query)
    print ("Query entails knowledge base:", result)
```

Procedd

Explaination $\models$ = Entails.

→ $\alpha \models \beta$, iff in every model where α is true, β is true

→ $\alpha \models \beta$ if $(\alpha \wedge \sim \beta)$ is unsatisfiable.

Output:

knowledge base : $\sim r \wedge$ (Implies (p,q)) $\wedge$ (Implies (q,r))

Query : p

Query entails knowledge base : False

Harshitha R-1BM21CS075
Knowledge Base: ~r & (Implies(p, q)) & (Implies(q, r))
Query: p
Query entails Knowledge Base: False