20/01/24

LAB-10

FORWARD REASONING

```
class Implication:
    def __init__(self, expression):
        self.expression = expression
        l = expression.split('=>')
        self.lhs = [Fact(f) for f in l[0].split('&')]
        self.rhs = Fact(l[1])
    def evaluate(self, facts):
        constants = {}
        new_lhs = []
        for fact in facts:
            for val in self.lhs:
                if val.predicate == fact.predicate:
                    for i, v in enumerate(val.getVariables()):
                        if v:
                            constants[v] = fact.getConstants()
                    new_lhs.append(fact)
        predicate, attributes = getPredicates(self.rhs.exp),
        for key in constants:
            if constants[key]:
                attributes = attributes.replace(key,
                                                constants[key])
        expr = f'{predicate}{attributes}'
        return Fact(expr) if len(new_lhs) and
         all([f.getResult() for f in new_lhs])
        else None

class KB
    def __init__(self):
        self.facts = set()
        self.implications = set()
```

```
def tell (self, e)
    if '=>' in e:
        self.implications.add(Implication(e))
    else:
        self.facts.add ( Fact(e))
    for i in self.implications:
        res = i.evaluate (self.facts)
        if res
            self.facts.add(res).

def query (self, e):
    facts = set ([f.expression for f in
                        self.facts])
    i = 1
    print (f'Querying {e}:')
    for f in facts:
        if Fact (f).predicate == Fact(e).predicate
            print (f'\t{i}.{f}')
            i += 1

def display (self):
    print ("All facts:")
    for i, f in enumerate (set([f.exp
        for f in self.facts])):
        print (f'\t{i+1}. {f}')
```

Example!

All facts:

1. criminal (West)
2. hostile (Nono)
3. weapon (M1)
4. missile (M1)
5. american (West)
6. sells (West, M1, Nono)
7. owns (Nono, M1)
8. enemy (Nono, America)

Query: criminal (West)

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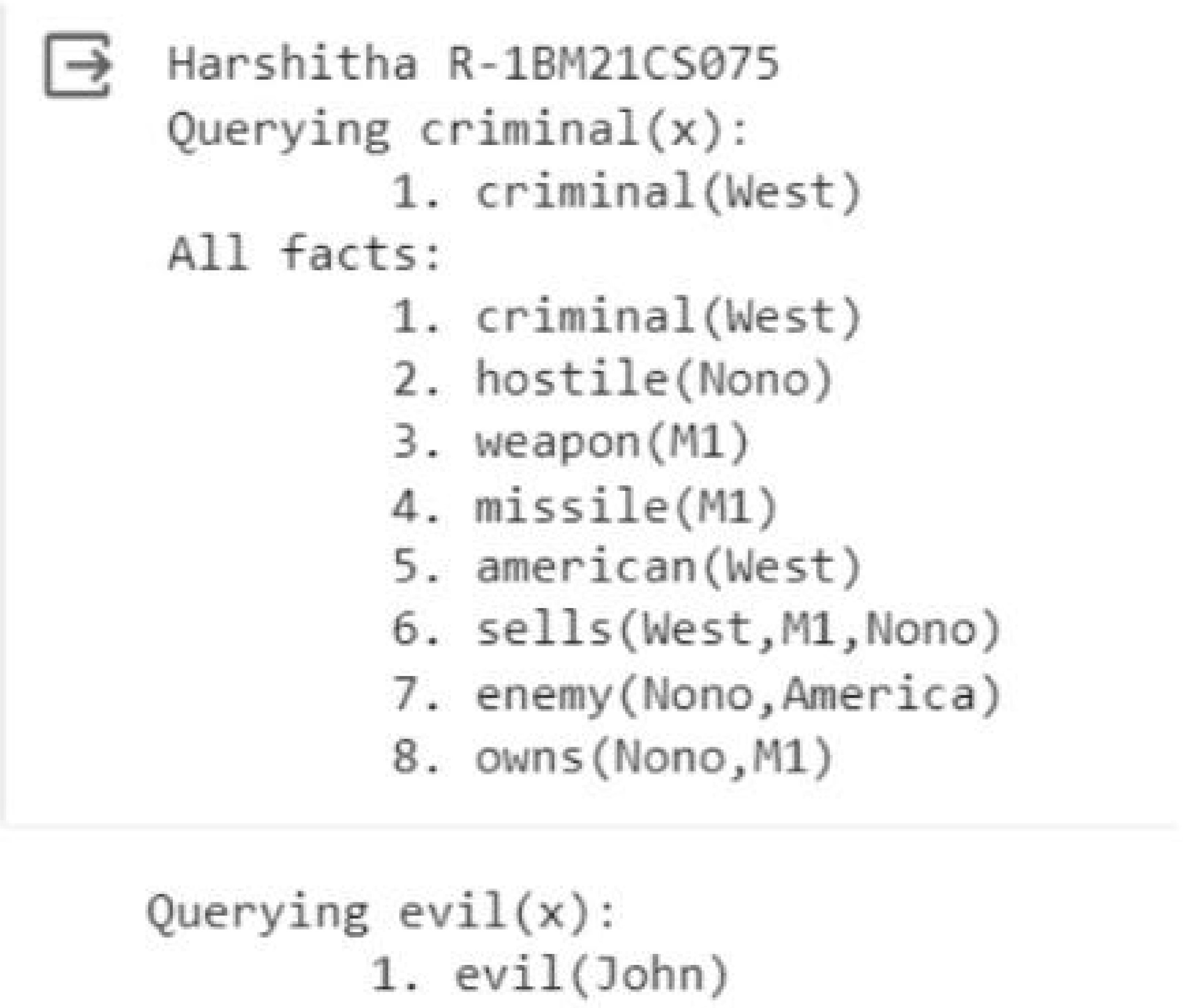
complete!



```
Harshitha R-1BM21CS075
Querying criminal(x):
        1. criminal(West)
All facts:
        1. criminal(West)
        2. hostile(Nono)
        3. weapon(M1)
        4. missile(M1)
        5. american(West)
        6. sells(West,M1,Nono)
        7. enemy(Nono,America)
        8. owns(Nono,M1)
```

```
Querying evil(x):
        1. evil(John)
```