AHSANULLAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Course No: CSE 4108
Course Name: Artificial Intelligence Lab

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Ques: Queries to KB and finding an answer using Backward Chaining in Prolog and Python.

Prolog Code:

```
parent('Rasid','Hasib').
parent('Rasid','Shimul').
parent('Rasid','Kamal').
parent('Rasid','Humaira').
parent('Rasid','Poulomi').
parent('Hasib','Rakib').
parent('Rakib','Sohel').
parent('Rakib','Anuska').
parent('Rakib','Rebeka').

brother(A,C):- parent(B,A),parent(B,C),gen('M',A),\+(C=A).
sister(A,C):-parent(B,A),parent(B,C),gen('F',A),\+(C=A).
uncle(A,C):-gen('M',A),parent(P,A),parent(P,B),parent(B,C),not(A=B).
aunt(A,C):-gen('F',A),parent(P,A),parent(P,B),parent(B,C),not(A=B).


gen('M','Hasib').
gen('M','Rakib').
gen('M','Sohel').
gen('M','Rasid').
gen('M','Shimul').
gen('M','Kamal').
gen('F','Rebeka').
gen('F','Humaira').
gen('F','Poulomi').
gen('F','Anuska').

findBrother :- write('The brother of: '), read(X), write('is: '), brother(S,X), write(S), tab(5), fail.
findBrother.
findSister :- write('The sister of: '), read(X), write('is: '), sister(S,X), write(S), tab(5), fail.
findSister.
findUncle :- write('The uncle of:'),read(X),write('is: '),uncle(Un,X),write(Un),tab(5),fail.
findUncle.
findAunt :- write('The Aunt of:'),read(X),write('is: '),aunt(Un,X),write(Un),tab(5),fail. findAunt.
```

Sample Input/output:

findBrother.
The brother of: 'Hasib'.
is: Shimul Kamal
true.

findSister.
The sister of: 'Shimul'.
is: Humaira Poulomi
true.

findUncle.
The uncle of:'Rakib'.
is: Shimul Kamal
true.

findAunt.
The Aunt of:'Rakib'.
is: Humaira Poulomi
true.

Python Code:

```
parentTupple=[('parent','Rasid','Hasib'),('parent','Rasid','Shimul'),('parent','Rasid','Kamal'),('parent','Rasid','Humaira'),('parent','Rasid','Poulomi'),('parent','Hasib','Rakib'),('parent','Rakib','Sohel'),('parent','Rakib','Anuska'),('parent','Rakib','Rebeka')]

genderdictionarylist={'Hasib':'M','Rakib':'M','Sohel':'M','Rasid':'M','Shimul':'M','Kamal':'M','Rebeka':'F','Humaira':'F','Poulomi':'F','Anuska':'F'}
BrotherOf=input()
print('has',end =" ")


i = 0
count=0
shiblinglist=[]
while(i<=8):
    if(parentTupple[i][2]==BrotherOf):
        y = parentTupple[i][1]

        for j in range(8):
            z = parentTupple[j][2]
            if((BrotherOf != z) & ((parentTupple[j][1]) == y) & (genderdictionarylist[z] == 'M')):
                shiblinglist.append(z)
                count=count+1
    i=i+1
print(count," brothers")
print(shiblinglist)


SisterOf=input()
print('has',end =" ");


i = 0
count=0
shiblinglist=[]
while(i<=8):
    if(parentTupple[i][2]==SisterOf):
        y = parentTupple[i][1]
```

```
        for j in range(8):
            z = parentTupple[j][2]
            if((SisterOf != z) & ((parentTupple[j][1]) == y) & (genderdictionarylist[z] == 'F')):
                shiblinglist.append(z)
                count=count+1
    i=i+1

print(count," Sisters")
print(shiblinglist)
```

Sample Input/Output:

Shimul
has 2 brothers
['Hasib', 'Kamal']

Sister of : Shimul
has 2 Sisters
['Humaira', 'Poulomi']