**1) Modify the Python and Prolog codes demonstrated above to find the grandparents of somebody.**

**Ans:**

**Python:**

tupleList1=[('parent', 'Hasib', 'Rakib'),('parent', 'Rakib', 'Sohel'),

('parent','Rakib','Rebeka'),('parent', 'Rashid', 'Hasib')]

# Procedure to find the grandparent of X

X=str(input("Grandchildren:"))

print('Grandparent:', end=' ')

i=0

while(i<=3):

if ((tupleList1[i][0] == 'parent')&( tupleList1[i][2] == X)):

for j in range(4):

if ((tupleList1[j][0] == 'parent') & (tupleList1[i][1] == tupleList1[j][2])):

print(tupleList1[j][1], end=' ')

i=i+1

**Prolog:**

parent('Hasib' , 'Rakib'). parent('Rakib' , 'Sohel'). parent('Rakib' , 'Rebeka').

parent('Rashid' , 'Hasib'). grandparent(X, Z) :- parent(X, Y), parent(Y, Z).

findGp :- write('Grandchild: '), read(X), write('Grandparent: '),

grandparent(Y,X), write(Y), tab(5), fail.

findGp.

**2) Enrich the KB demonstrated above with ‘brother’, ‘sister’, ‘uncle’ and ‘aunt’ rules in Python and Prolog.**

**Ans:**

**i) Brother:**

**Python:**

tupleList1=[('parent', 'Hasib', 'Rakib'),('parent', 'Rakib', 'Sohel'),

('parent', 'Rakib', 'Rebeka'),('parent', 'Rashid', 'Hasib')]

female=[('Rebeka')]

# Procedure to find the brother of X

X=str(input("Brother/Sister's Name:"))

print('Brother:', end=' ')

i=0

while(i<=3):

if ((tupleList1[i][0] == 'parent')&( tupleList1[i][2] == X)):

for j in range(4):

if((tupleList1[j][0]=='parent')&(tupleList1[i][1]==tupleList1[j][1])&(tupleList1[j][2] not in female)&(tupleList1[i][2]!=tupleList1[j][2])):

print(tupleList1[j][2], end=' ')

i=i+1

**Prolog:**

parent('Hasib' , 'Rakib'). parent('Rakib' , 'Sohel'). parent('Rakib' , 'Rebeka').

parent('Rashid' , 'Hasib').

female('Rebeka').

brother(X, Z) :- parent(Y,X), parent(Y,Z),not(female(Z)),(X \= Z).

findBro:-write('Name:'), read(X), write('Brother:'),

brother(X,Z),write(Z),tab(5),fail.

findBro.

**ii) Sister:**

**Python:**

tupleList1=[('parent', 'Hasib', 'Rakib'),('parent', 'Rakib', 'Sohel'),

('parent', 'Rakib', 'Rebeka'),('parent', 'Rashid', 'Hasib')]

female=[('Rebeka')]

# Procedure to find the brother of X

X=str(input("Brother/Sister's Name:"))

print('Sister:', end=' ')

i=0

while(i<=3):

if ((tupleList1[i][0] == 'parent')&( tupleList1[i][2] == X)):

for j in range(4):

if((tupleList1[j][0]=='parent')&(tupleList1[i][1]==tupleList1[j][1])&(tupleList1[j][2] in female)&(tupleList1[i][2]!=tupleList1[j][2])):

print(tupleList1[j][2], end=' ')

i=i+1

**Prolog:**

parent('Hasib' , 'Rakib'). parent('Rakib' , 'Sohel'). parent('Rakib' , 'Rebeka').

parent('Rashid' , 'Hasib').

female('Rebeka').

sister(X, Z) :- parent(Y,X), parent(Y,Z),female(Z),(X \= Z).

findSis:-write('Name:'), read(X), write('Sister:'),

sister(X,Z),write(Z),tab(5),fail.

findSis.

**iii) Uncle:**

**Python:**

tupleList1=[('parent', 'Hasib', 'Rakib'),('parent', 'Rakib', 'Sohel'),('parent', 'Hasib', 'Kabir'),

('parent', 'Rakib', 'Rebeka'),('parent', 'Rashid', 'Hasib'),('parent','Sohel','Anika')]

female=[('Rebeka'),('Anika')]

# Procedure to find the brother of X

X=str(input("Nephew/Niece's Name:"))

print('Uncle:', end=' ')

i=0

while(i<=3):

if ((tupleList1[i][0] == 'parent')&( tupleList1[i][2] == X)):

for j in range(4):

if((tupleList1[j][0]=='parent')&(tupleList1[i][1]==tupleList1[j][2])):

for k in range(4):

if((tupleList1[k][0]=='parent')&(tupleList1[j][1]==tupleList1[k][1])&(tupleList1[k][2] not in female)&(tupleList1[j][2]!=tupleList1[k][2])):

print(tupleList1[k][2], end=' ')

i=i+1

**Prolog:**

parent('Hasib' , 'Rakib'). parent('Rakib' , 'Sohel'). parent('Rakib' , 'Rebeka').

parent('Rashid' , 'Hasib'). parent('Hasib', 'Kabir'). parent('Sohel', 'Anika').

female('Rebeka'). female('Anika').

uncle(X,Z):-parent(Y,X),parent(P,Y),parent(P,Z),not(female(Z)),(Y\=Z).

findUncle:-write('Name:'),read(X),write('Uncle:'),

uncle(X,Z),write(Z),tab(5),fail.

findUncle.

**iv) Aunt:**

**Python:**

tupleList1=[('parent', 'Hasib', 'Rakib'),('parent', 'Rakib', 'Sohel'),('parent', 'Hasib', 'Kabir'),

('parent', 'Rakib', 'Rebeka'),('parent', 'Rashid', 'Hasib'),('parent','Sohel','Anika'),('parent','Rebeka','Zahir')]

female=[('Rebeka'),('Anika')]

# Procedure to find the Aunt of X

X=str(input("Nephew/Niece's Name:"))

print('Aunt:', end=' ')

i=0

while(i<=3):

if ((tupleList1[i][0] == 'parent')&( tupleList1[i][2] == X)):

for j in range(4):

if((tupleList1[j][0]=='parent')&(tupleList1[i][1]==tupleList1[j][2])):

for k in range(4):

if ((tupleList1[k][0] == 'parent') & ( tupleList1[j][1] == tupleList1[k][1])&( tupleList1[k][2] in female)&(tupleList1[j][2] != tupleList1[k][2])):

print(tupleList1[k][2], end=' ')

i=i+1

**Prolog:**

parent('Hasib' , 'Rakib'). parent('Rakib' , 'Sohel'). parent('Rakib' , 'Rebeka').

parent('Rashid' , 'Hasib'). parent('Hasib', 'Kabir'). parent('Sohel', 'Anika').

female('Rebeka'). female('Anika').

aunt(X,Z):-parent(Y,X),parent(P,Y),parent(P,Z),female(Z),(Y\=Z).

findAunt:-write('Name:'),read(X),write('Aunt:'),

aunt(X,Z),write(Z),tab(5),fail.

findAunt.