Ahsanullah University of Science and Technology

Department of Computer Science and Engineering

Program: Bachelor of Science in Computer Science and Engineering

Course No: CSE 4108

Course Title: Artificial Intelligence Lab

Assignment No: 01

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Submitted to:

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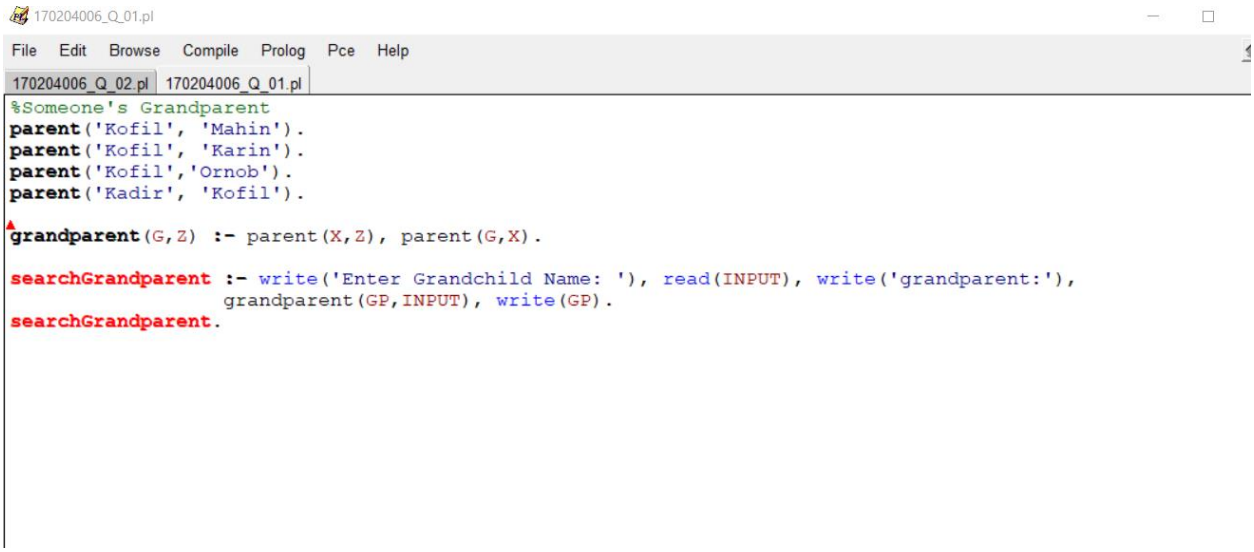
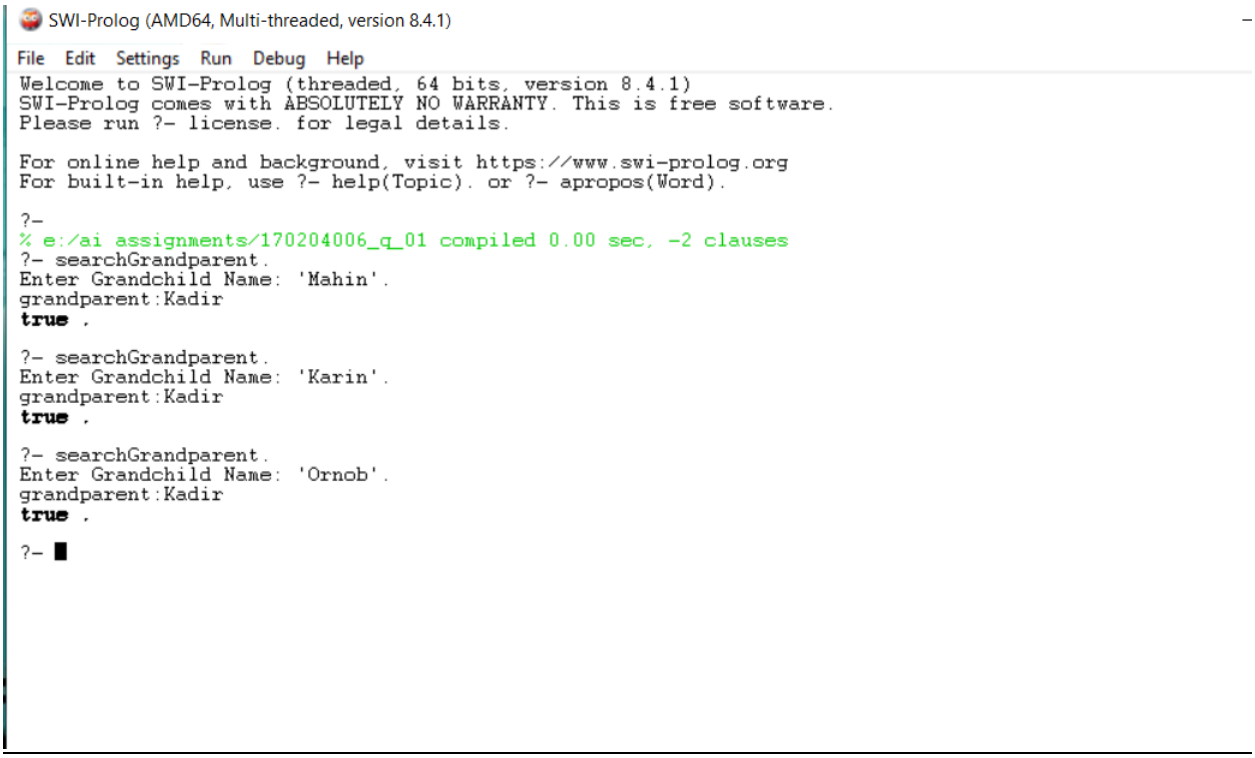
Question 1: Write Python and Prolog codes to find the grandparent(s) of somebody.

Solution**:**

Prolog Code:

```
%Someone's Grandparent
parent('Kofil', 'Mahin').
parent('Kofil', 'Karin').
parent('Kofil','Ornob').
parent('Kadir', 'Kofil').

grandparent(G,Z) :- parent(X,Z), parent(G,X).

searchGrandparent :- write('Enter Grandchild Name: '), read(INPUT), write('grandparent:'),
                     grandparent(GP,INPUT), write(GP).
searchGrandparent.
```

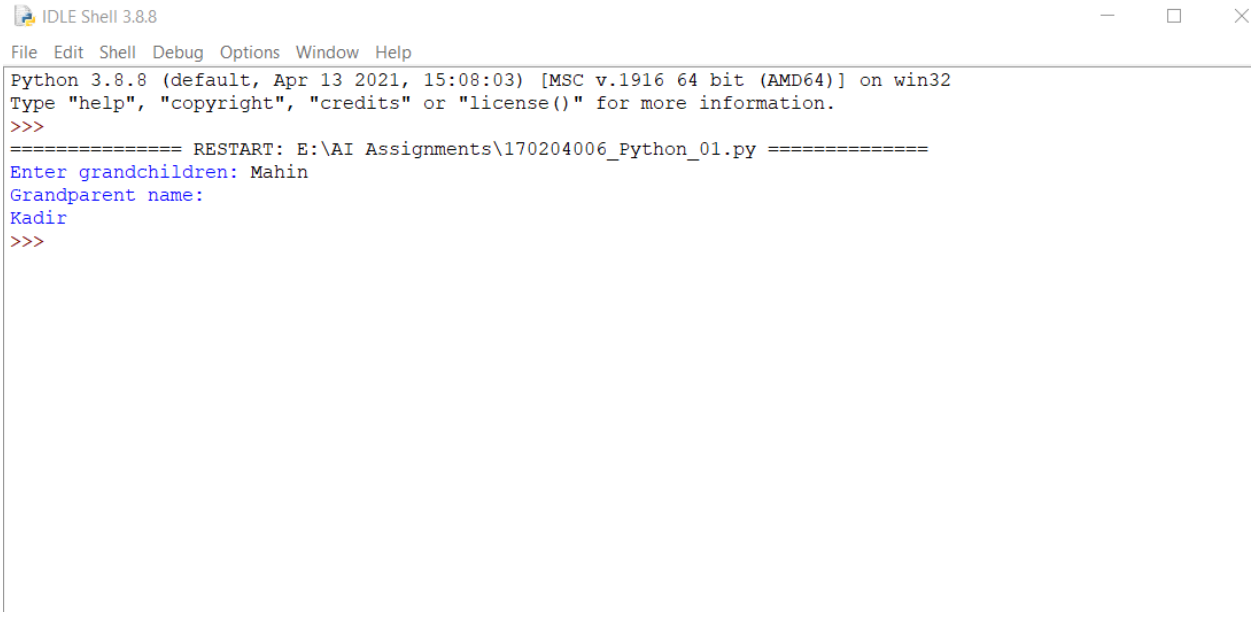




Python Code:

```
parentlist=[
   ('parent','Kofil','Mahin'),
   ('parent','Kofil','Karin'),
   ('parent','Kofil','Ornob'),
   ('parent','Kadir','Kofil')
   ]
X=str(input("Enter grandchildren: "))
print("Grandparent name: ")

i,j=0,0
while(i<=3):
   if((parentlist[i][0]=='parent')&(parentlist[i][2]==X)):
      for j in range(4):
         if((parentlist[j][0]=='parent')&(parentlist[i][1]==parentlist[j][2])):
            print(parentlist[j][1]," ")
   i=i+1
```


170204006_Python_01.py - E:\AI Assignments\170204006_Python_01.py (3.8.8)
File Edit Format Run Options Window Help
parentlist=[
('parent','Kofil','Mahin'),
('parent','Kofil','Karin'),
('parent','Kofil','Ornob'),
('parent','Kadir','Kofil')
]
X=str(input("Enter grandchildren: "))
print("Grandparent name: ")
i,j=0,0
while(i<=3):
if((parentlist[i][0]=='parent')&(parentlist[i][2]==X)):
for j in range(4):
if((parentlist[j][0]=='parent')&(parentlist[i][1]==parentlist[j][2])):
print(parentlist[j][1]," ")
i=i+1


IDLE Shell 3.8.8
File Edit Shell Debug Options Window Help
Python 3.8.8 (default, Apr 13 2021, 15:08:03) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: E:\AI Assignments\170204006_Python_01.py ==========
Enter grandchildren: Mahin
Grandparent name:
Kadir
>>>

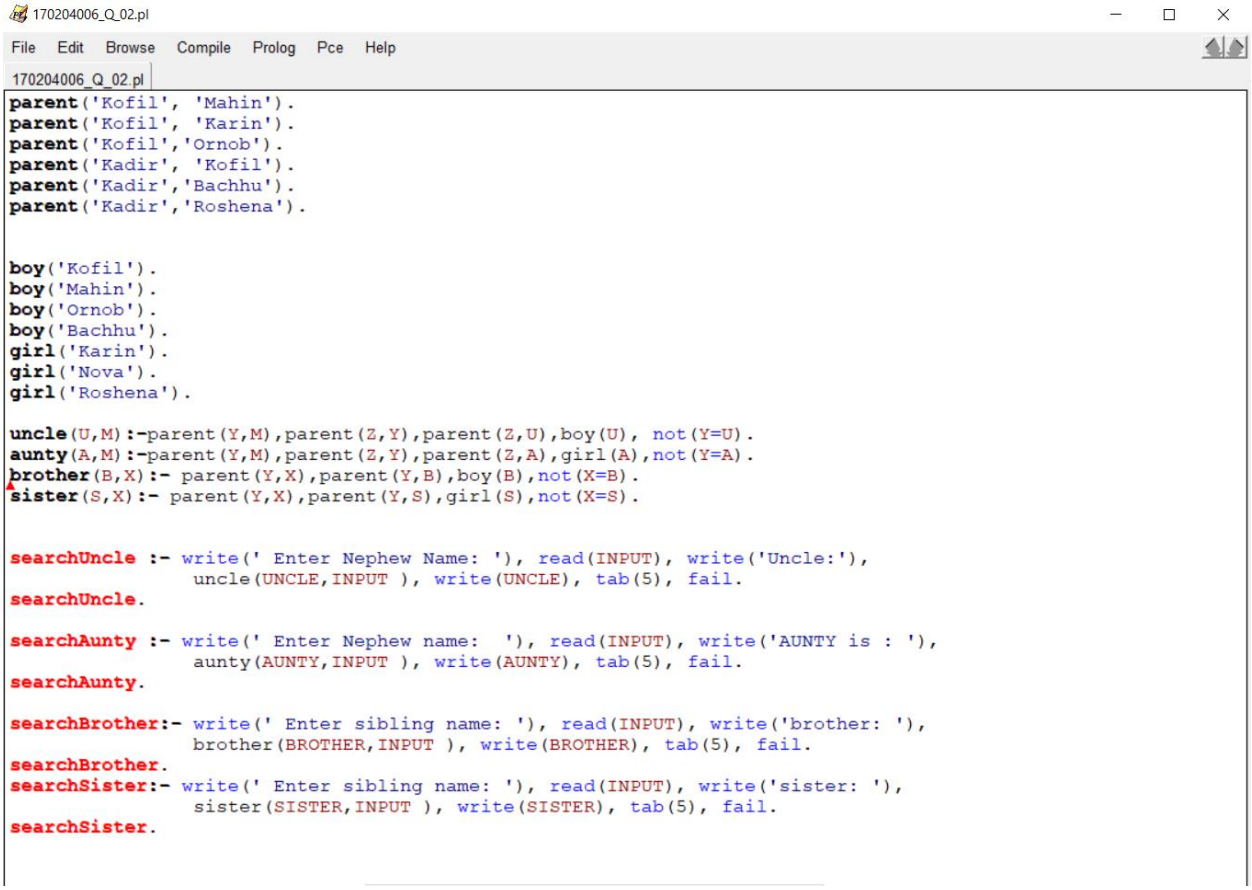
Question 2: Enrich the KB with ‘brother’, ‘sister’, ‘uncle’ and ‘aunt’ rules in Python and Prolog.

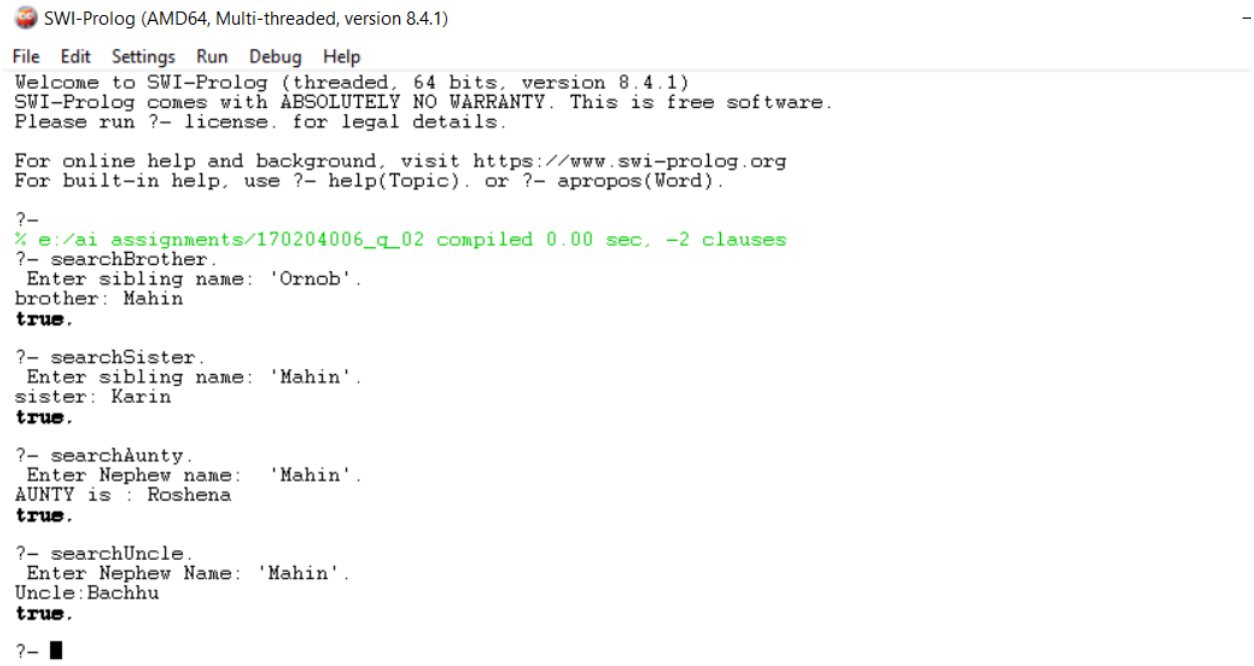
Solution:

Prolog Code:

```
parent('Kofil', 'Mahin').
parent('Kofil', 'Karin').
parent('Kofil','Ornob').
parent('Kadir', 'Kofil').
parent('Kadir','Bachhu').
parent('Kadir','Roshena').


boy('Kofil').
boy('Mahin').
boy('Ornob').
boy('Bachhu').
girl('Karin').
girl('Nova').
girl('Roshena').

uncle(U,M):-parent(Y,M),parent(Z,Y),parent(Z,U),boy(U), not(Y=U).
aunty(A,M):-parent(Y,M),parent(Z,Y),parent(Z,A),girl(A),not(Y=A).
brother(B,X):- parent(Y,X),parent(Y,B),boy(B),not(X=B).
sister(S,X):- parent(Y,X),parent(Y,S),girl(S),not(X=S).


searchUncle :- write(' Enter Nephew Name: '), read(INPUT), write('Uncle:'),
                uncle(UNCLE,INPUT ), write(UNCLE), tab(5), fail.
searchUncle.

searchAunty :- write(' Enter Nephew name:  '), read(INPUT), write('AUNTY is : '),
                aunty(AUNTY,INPUT ), write(AUNTY), tab(5), fail.
searchAunty.

searchBrother:- write(' Enter sibling name: '), read(INPUT), write('brother: '),
                brother(BROTHER,INPUT ), write(BROTHER), tab(5), fail.
searchBrother.
searchSister:- write(' Enter sibling name: '), read(INPUT), write('sister: '),
```

sister(SISTER,INPUT), write(SISTER), tab(5), fail.
searchSister.

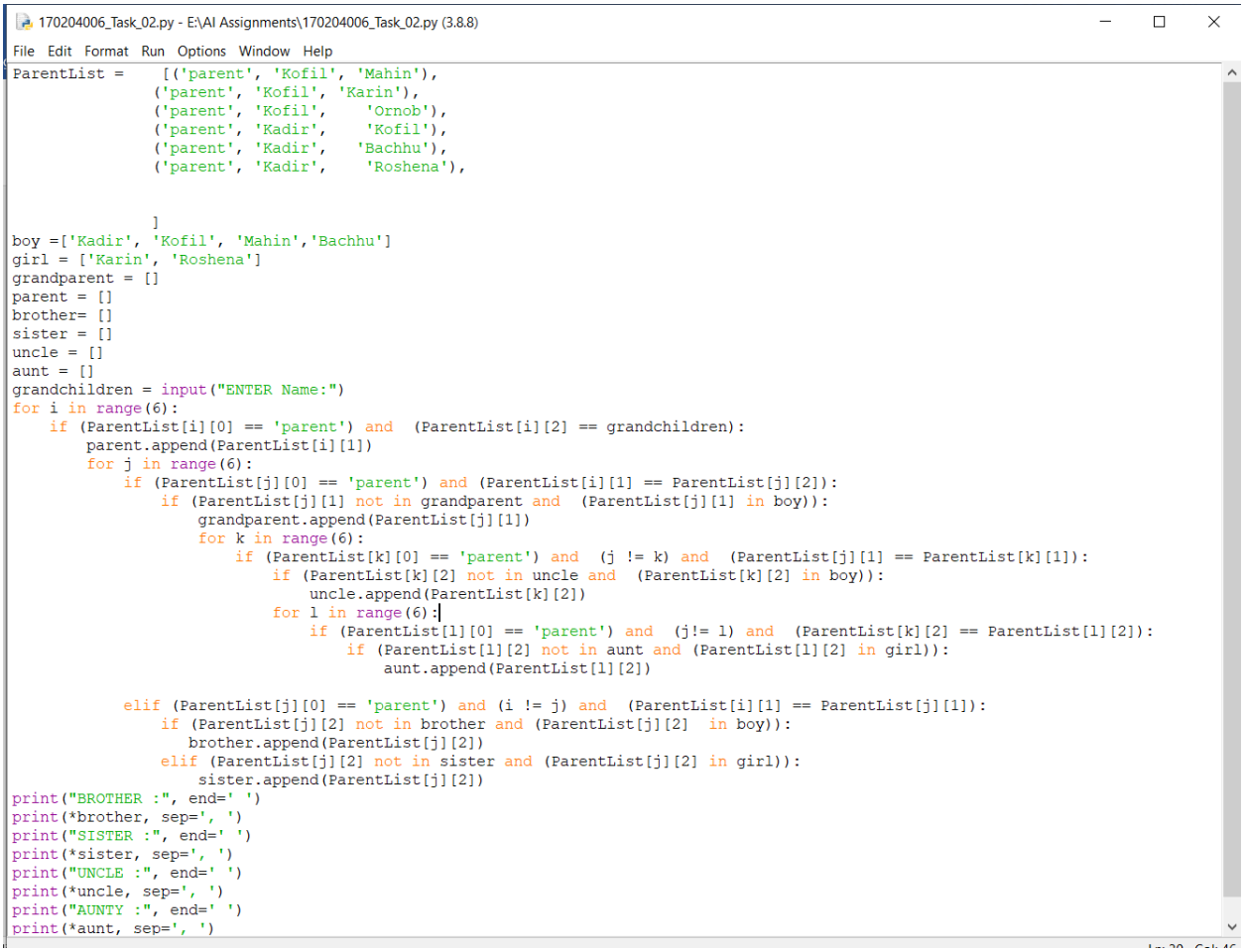


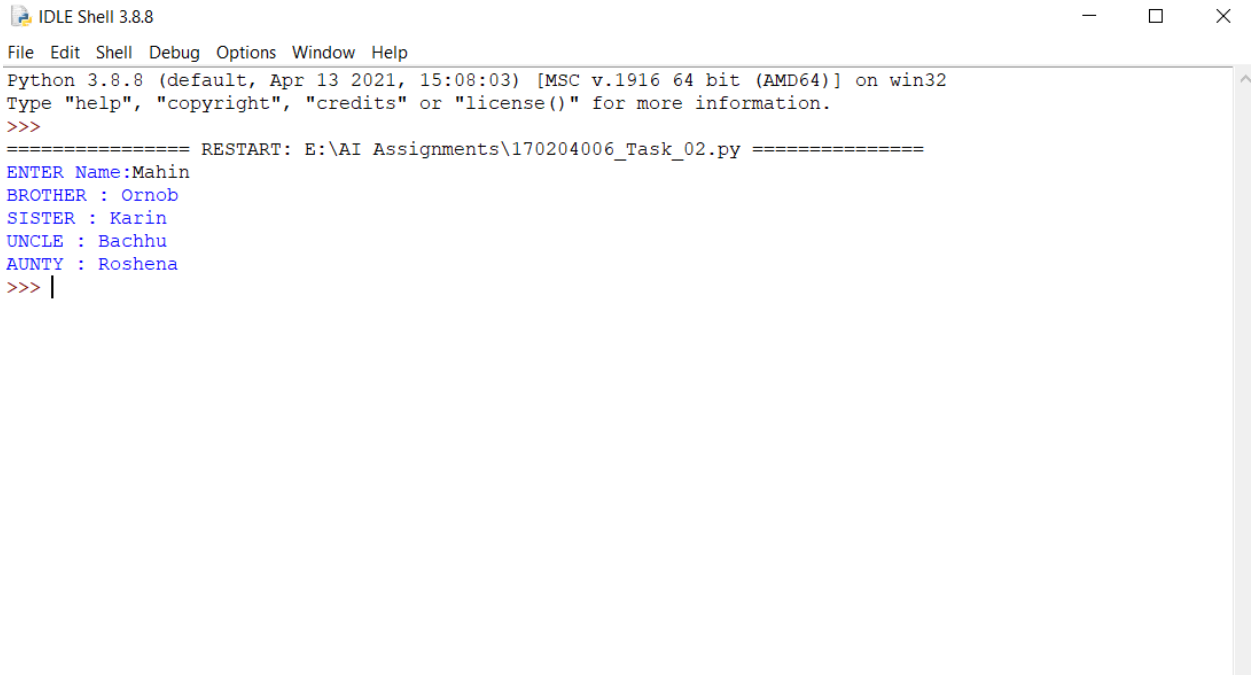


Python Code:

```
ParentList =    [('parent', 'Kofil', 'Mahin'),
                 ('parent', 'Kofil', 'Karin'),
                 ('parent', 'Kofil',    'Ornob'),
                 ('parent', 'Kadir',    'Kofil'),
                 ('parent', 'Kadir',   'Bachhu'),
                 ('parent', 'Kadir',    'Roshena'),


                 ]
boy =['Kadir', 'Kofil', 'Mahin','Bachhu']
girl = ['Karin', 'Roshena']
grandparent = []
parent = []
brother= []
sister = []
uncle = []
aunt = []
```

```
grandchildren = input("ENTER Name:")
for i in range(6):
    if (ParentList[i][0] == 'parent') and  (ParentList[i][2] == grandchildren):
        parent.append(ParentList[i][1])
        for j in range(6):
            if (ParentList[j][0] == 'parent') and (ParentList[i][1] == ParentList[j][2]):
                if (ParentList[j][1] not in grandparent and  (ParentList[j][1] in boy)):
                    grandparent.append(ParentList[j][1])
                    for k in range(6):
                        if (ParentList[k][0] == 'parent') and  (j != k) and  (ParentList[j][1]
== ParentList[k][1]):
                            if (ParentList[k][2] not in uncle and  (ParentList[k][2] in boy)):
                                uncle.append(ParentList[k][2])
                            for l in range(6):
                                if (ParentList[l][0] == 'parent') and  (j!= l) and
(ParentList[k][2] == ParentList[l][2]):
                                    if (ParentList[l][2] not in aunt and (ParentList[l][2] in girl)):
                                        aunt.append(ParentList[l][2])

            elif (ParentList[j][0] == 'parent') and (i != j) and  (ParentList[i][1] ==
ParentList[j][1]):
                if (ParentList[j][2] not in brother and (ParentList[j][2]  in boy)):
                    brother.append(ParentList[j][2])
                elif (ParentList[j][2] not in sister and (ParentList[j][2] in girl)):
                    sister.append(ParentList[j][2])
print("BROTHER :", end=' ')
print(*brother, sep=', ')
print("SISTER :", end=' ')
print(*sister, sep=', ')
print("UNCLE :", end=' ')
print(*uncle, sep=', ')
print("AUNTY :", end=' ')
print(*aunt, sep=', ')
```


170204006_Task_02.py - E:\AI Assignments\170204006_Task_02.py (3.8.8)
File Edit Format Run Options Window Help
ParentList = [('parent', 'Kofil', 'Mahin'),
('parent', 'Kofil', 'Karin'),
('parent', 'Kofil', 'Ornob'),
('parent', 'Kadir', 'Kofil'),
('parent', 'Kadir', 'Bachhu'),
('parent', 'Kadir', 'Roshena'),
]
boy =['Kadir', 'Kofil', 'Mahin','Bachhu']
girl = ['Karin', 'Roshena']
grandparent = []
parent = []
brother= []
sister = []
uncle = []
aunt = []
grandchildren = input("ENTER Name:")
for i in range(6):
if (ParentList[i][0] == 'parent') and (ParentList[i][2] == grandchildren):
parent.append(ParentList[i][1])
for j in range(6):
if (ParentList[j][0] == 'parent') and (ParentList[i][1] == ParentList[j][2]):
if (ParentList[j][1] not in grandparent and (ParentList[j][1] in boy)):
grandparent.append(ParentList[j][1])
for k in range(6):
if (ParentList[k][0] == 'parent') and (j != k) and (ParentList[j][1] == ParentList[k][1]):
if (ParentList[k][2] not in uncle and (ParentList[k][2] in boy)):
uncle.append(ParentList[k][2])
for l in range(6):
if (ParentList[l][0] == 'parent') and (j!= l) and (ParentList[k][2] == ParentList[l][2]):
if (ParentList[l][2] not in aunt and (ParentList[l][2] in girl)):
aunt.append(ParentList[l][2])
elif (ParentList[j][0] == 'parent') and (i != j) and (ParentList[i][1] == ParentList[j][1]):
if (ParentList[j][2] not in brother and (ParentList[j][2] in boy)):
brother.append(ParentList[j][2])
elif (ParentList[j][2] not in sister and (ParentList[j][2] in girl)):
sister.append(ParentList[j][2])
print("BROTHER :", end=' ')
print(*brother, sep=', ')
print("SISTER :", end=' ')
print(*sister, sep=', ')
print("UNCLE :", end=' ')
print(*uncle, sep=', ')
print("AUNTY :", end=' ')
print(*aunt, sep=', ')


IDLE Shell 3.8.8
File Edit Shell Debug Options Window Help
Python 3.8.8 (default, Apr 13 2021, 15:08:03) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: E:\AI Assignments\170204006_Task_02.py ==========
ENTER Name:Mahin
BROTHER : Ornob
SISTER : Karin
UNCLE : Bachhu
AUNTY : Roshena
>>>