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

Date of Submission: 25/12/2021

Submitted to:

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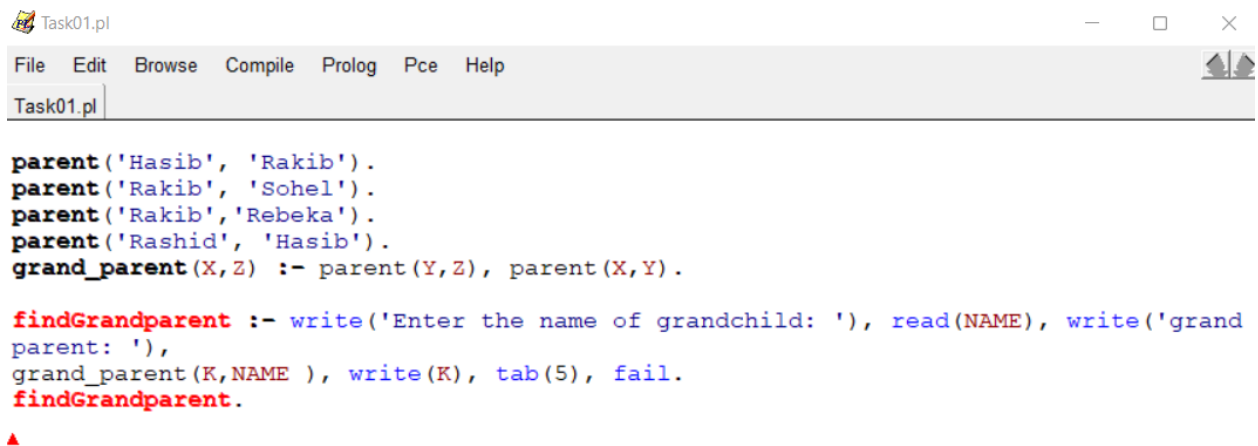
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Question 1: Write Python and Prolog codes to find the grandparent(s) of somebody.

Solution:

Prolog Code:

parent('Hasib', 'Rakib').

parent('Rakib', 'Sohel').

parent('Rakib','Rebeka').

parent('Rashid', 'Hasib').

grand_parent(X,Z) :- parent(Y,Z), parent(X,Y).

findGrandparent :- write('Enter the name of grandchild: '), read(NAME),

write('grandparent: '),

grand_parent(K,NAME), write(K), tab(5), fail.

findGrandparent.

```
Task01.pl                                                    —    □    ×

File  Edit  Browse  Compile  Prolog  Pce  Help

Task01.pl

parent('Hasib', 'Rakib').
parent('Rakib', 'Sohel').
parent('Rakib','Rebeka').
parent('Rashid', 'Hasib').
grand_parent(X,Z) :- parent(Y,Z), parent(X,Y).

findGrandparent :- write('Enter the name of grandchild: '), read(NAME), write('grand
parent: '),
grand_parent(K,NAME ), write(K), tab(5), fail.
findGrandparent.

▲
```

Python Code:

```python
FAMILYLIST =   [('parent', 'HASIB', 'RAKIB'),

        ('parent', 'RAKIB', 'SOHEL'),

        ('parent', 'RAKIB',  'REBEKA'),

        ('parent', 'RASHID',  'HASIB'),

        ]
K = str(input("Grandchildren:\n"))

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

for i in range(len(FAMILYLIST)):

 if ((FAMILYLIST [i][0] == 'parent') and  (FAMILYLIST [i][2] == K)):

 for j in range(len(FAMILYLIST)):

 if (FAMILYLIST [j][0] == 'parent') and (FAMILYLIST [i][1] == FAMILYLIST[j][2]):

     print(FAMILYLIST[j][1])

       i=i+1
```

```python
FAMILYLIST =    [('parent', 'HASIB', 'RAKIB'),
                ('parent', 'RAKIB', 'SOHEL'),
                ('parent', 'RAKIB',  'REBEKA'),
                ('parent', 'RASHID',  'HASIB'),

                ]

K = str(input("Grandchildren:\n"))
print('Grandparent:', end='\n')


for i in range(len(FAMILYLIST)):
    if ((FAMILYLIST [i][0] == 'parent') and  (FAMILYLIST [i][2] == K)):

        for j in range(len(FAMILYLIST)):
            if (FAMILYLIST [j][0] == 'parent') and (FAMILYLIST [i][1] == FAMILYLIST[j][2]):
                print(FAMILYLIST[j][1])

    i=i+1
```

IDLE Shell 3.9.7   —   □   X

File   Edit   Shell   Debug   Options   Window   Help

```
Python 3.9.7 (default, Sep 16 2021, 16:59:28) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: G:\ATANU ACCADEMIC\CSE 4TH YEAR\CSE 4.1\ENIGMA 41\AI LAB\Python01.py
Grandchildren:
SOHEL
Grandparent:
HASIB
>>>
```

Ln: 9 Col: 0

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

Solution:

Prolog Code:

```prolog
parent('BIPLOB', 'RAJKONNA').
parent('BIPLOB', 'AHONA').
parent('BIPLOB','BISHAL').
parent('MOTIUR', 'BIPLOB').
parent('MOTIUR', 'MURAD').
parent('MOTIUR','MOUSHOMI').

boy('BIPLOB').
boy('MURAD').
boy('BISHAL').
girl('RAJKONNA').
girl('AHONA').
girl('MOUSHOMI').

uncle(U,X):-parent(Y,X),parent(Z,Y),parent(Z,U),boy(U), not(Y=U).
aunty(A,X):-parent(Y,X),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).


findUncle :- write(' Enter name '), read(NAME), write('Uncle:'),
             uncle(UNCLE , NAME), write(UNCLE), tab(5), fail.
findUncle.
findAunty :- write(' Enter name '), read(NAME), write('AUNTY : '),
             aunty(AUNTY,NAME), write(AUNTY), tab(5), fail.
findAunty.

findBrother:- write(' Enter name '), read(NAME), write('brother: '),
             brother(BROTHER,NAME), write(BROTHER), tab(5), fail.
findBrother.
findSister:- write(' Enter name '), read(NAME), write('sister: '),
             sister(SISTER,NAME), write(SISTER), tab(5), fail.
findSister.
```

```prolog
parent('BIPLOB', 'RAJKONNA').
parent('BIPLOB', 'AHONA').
parent('BIPLOB','BISHAL').
parent('MOTIUR', 'BIPLOB').
parent('MOTIUR', 'MURAD').
parent('MOTIUR','MOUSHOMI').

boy('BIPLOB').
boy('MURAD').
boy('BISHAL').
girl('RAJKONNA').
girl('AHONA').
girl('MOUSHOMI').

uncle(U,X):-parent(Y,X),parent(Z,Y),parent(Z,U),boy(U), not(Y=U).
aunty(A,X):-parent(Y,X),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).


findUncle :- write(' Enter name '), read(NAME), write('Uncle:'),
             uncle(UNCLE , NAME), write(UNCLE), tab(5), fail.
findUncle.
findAunty :- write(' Enter name '), read(NAME), write('AUNTY : '),
             aunty(AUNTY,NAME), write(AUNTY), tab(5), fail.
findAunty.

findBrother:- write(' Enter name '), read(NAME), write('brother: '),
             brother(BROTHER,NAME), write(BROTHER), tab(5), fail.
findBrother.
findSister:- write(' Enter name '), read(NAME), write('sister: '),
             sister(SISTER,NAME), write(SISTER), tab(5), fail.
findSister.
```

Welcome to SWI-Prolog (threaded, 64 bits, version 8.4.1)
SWI-Prolog comes with ABSOLUTELY NO WARRANTY. This is free software.
Please run ?- license. for legal details.

For online help and background, visit https://www.swi-prolog.org
For built-in help, use ?- help(Topic). or ?- apropos(Word).

?- findUncle.
 Enter name 'BISHAL'.
Uncle:MURAD
true.

?- findAunty.
 Enter name 'BISHAL'.
AUNTY : MOUSHOMI
true.

?- findBrother.
 Enter name 'BIPLOB'.
brother: MURAD
true.

?- findSister.
 Enter name 'MURAD'.
sister: MOUSHOMI
true.

?-

Python Code:

```
FAMILYLIST =   [('parent', 'MURAD', 'RAJKONNA'),
        ('parent', 'MURAD', 'JAYMA'),
        ('parent', 'JAHANARA',   'RAJKONNA'),
        ('parent', 'JAHANARA',   'JAYMA'),
        ('parent', 'MOTIUR',   'MURAD'),
        ('parent', 'MOTIUR',   'HARUN'),
```

```
            ('parent', 'MOTIUR',        'MOUSHUMI'),
            ('parent', 'MURAD', 'YUVORAJ'),
            ]
boy =['MOTIUR', 'MURAD', 'HARUN','YUVORAJ']
girl = ['JAHANARA', 'MOUSHUMI', 'JAYMA','RAJKONNA']
grandparent = []
parent = []
brother= []
sister = []
uncle = []
aunt = []
grandchildren = input("ENTER THE NAME :")
for i in range(8):
   if (FAMILYLIST[i][0] == 'parent') and  (FAMILYLIST[i][2] == grandchildren):
      parent.append(FAMILYLIST[i][1])
      for j in range(8):
         if (FAMILYLIST[j][0] == 'parent') and (FAMILYLIST[i][1] == FAMILYLIST[j][2]):
            if (FAMILYLIST[j][1] not in grandparent and  (FAMILYLIST[j][1] in boy)):
               grandparent.append(FAMILYLIST[j][1])
               for k in range(8):
                  if (FAMILYLIST[k][0] == 'parent') and  (j != k) and  (FAMILYLIST[j][1] ==
FAMILYLIST[k][1]):
                     if (FAMILYLIST[k][2] not in uncle and  (FAMILYLIST[k][2] in boy)):
                        uncle.append(FAMILYLIST[k][2])
                     for l in range(8):
                        if (FAMILYLIST[l][0] == 'parent') and  (j != l) and  (FAMILYLIST[k][2] ==
FAMILYLIST[l][2]):
                           if (FAMILYLIST[l][2] not in aunt and (FAMILYLIST[l][2] in girl)):
                              aunt.append(FAMILYLIST[l][2])

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

```python
FAMILYLIST =      [('parent', 'MURAD', 'RAJKONNA'),
                  ('parent', 'MURAD', 'JAYMA'),
                  ('parent', 'JAHANARA',     'RAJKONNA'),
                  ('parent', 'JAHANARA',     'JAYMA'),
                  ('parent', 'MOTIUR',    'MURAD'),
                  ('parent', 'MOTIUR',     'HARUN'),
                   ('parent', 'MOTIUR',           'MOUSHUMI'),
                  ('parent', 'MURAD', 'YUVORAJ'),
                  ]
boy =['MOTIUR', 'MURAD', 'HARUN','YUVORAJ']
girl = ['JAHANARA', 'MOUSHUMI', 'JAYMA','RAJKONNA']
grandparent = []
parent = []
brother= []
sister = []
uncle = []
aunt = []
grandchildren = input("ENTER THE NAME :")
for i in range(8):
    if (FAMILYLIST[i][0] == 'parent') and  (FAMILYLIST[i][2] == grandchildren):
        parent.append(FAMILYLIST[i][1])
        for j in range(8):
            if (FAMILYLIST[j][0] == 'parent') and (FAMILYLIST[i][1] == FAMILYLIST[j][2]):
                if (FAMILYLIST[j][1] not in grandparent and  (FAMILYLIST[j][1] in boy)):
                    grandparent.append(FAMILYLIST[j][1])
                    for k in range(8):
                        if (FAMILYLIST[k][0] == 'parent') and  (j != k) and  (FAMILYLIST[j][1] == FAMILYLIST[k][1]):
                            if (FAMILYLIST[k][2] not in uncle and  (FAMILYLIST[k][2] in boy)):
                                uncle.append(FAMILYLIST[k][2])
                            for l in range(8):
                                if (FAMILYLIST[l][0] == 'parent') and  (j != l) and  (FAMILYLIST[k][2] == FAMILYLIST[l][2]):
                                    if (FAMILYLIST[l][2] not in aunt and (FAMILYLIST[l][2] in girl)):
                                        aunt.append(FAMILYLIST[l][2])

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

```
Python 3.9.7 (default, Sep 16 2021, 16:59:28) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: G:\ATANU ACCADEMIC\CSE 4TH YEAR\CSE 4.1\ENIGMA 41\AI LAB\Python02.py
ENTER THE NAME :RAJKONNA
BROTHER : YUVORAJ
SISTER : JAYMA
UNCLE : HARUN
AUNT : MOUSHUMI
>>>
```