

**Terna Engineering College**  
**Computer Engineering Department**

Program: Sem VII

**Course: Artificial Intelligence & Soft Computing (AI&SC)**

**Experiment No. 02**

**Aim:** A case study on Basic Programming in PROLOG and Develop a program to implement a family tree.

**PART B**

**(PART B: TO BE COMPLETED BY STUDENTS)**

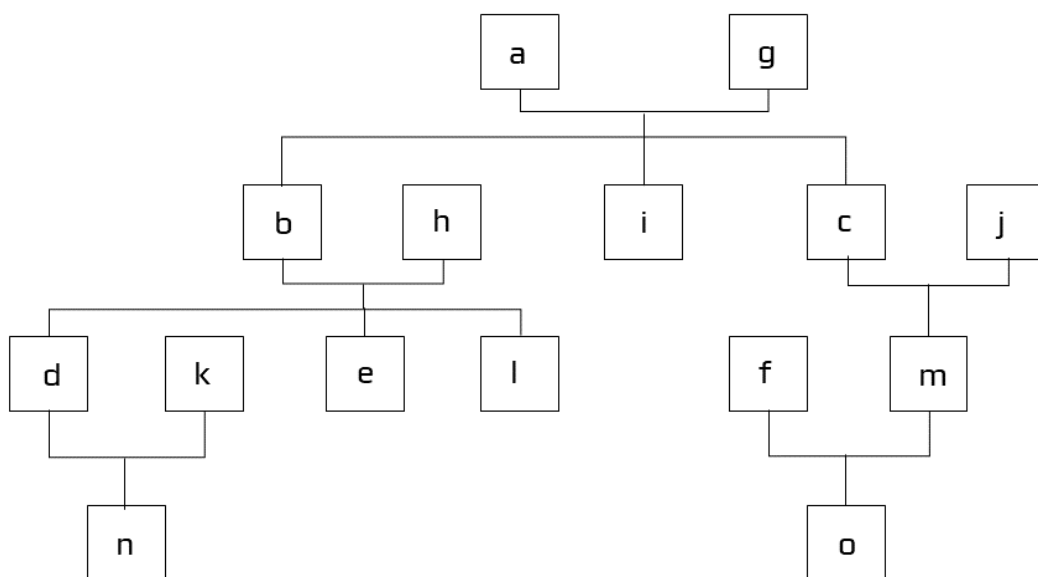
*(Students must submit the soft copy as per the following segments within two hours of the practical. The soft copy must be uploaded on the Blackboard or emailed to the concerned lab in charge faculties at the end of the practical in case there is no Blackboard access available)*

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Date of Experiment: 03-08-2021	Date of Submission: 03-08-2021
Grade :	

**B.1 Document created by the student:**

*(Write the answers to the questions given in section 4 during the 2 hours of practice in the lab here)*

**Family Tree:**



**Program:**

male(a).

male(b).

male(c).

male(d).

male(e).

male(f).

female(g).

female(h).

female(i).

female(j).

female(k).

female(l).

female(m).

female(n).

female(o).

parent(a,b).

parent(a,i).

parent(a,c).

parent(g,b).

parent(g,i).

parent(g,c).

parent(b,d).

parent(b,e).

parent(b,l).

parent(h,l).  
parent(h,d).  
parent(h,e).  
parent(c,m).  
parent(j,m).  
parent(d,n).  
parent(k,n).  
parent(f,o).  
parent(m,o).

mother(X,Y) :- parent(X,Y),female(X).  
father(X,Y) :- parent(X,Y),male(X).  
sister(X,Y) :- parent(Z,X),parent(Z,Y), female(X), X \= Y.  
brother(X,Y) :- parent(Z,X),parent(Z,Y), male(X), X \= Y.  
haschild(X) :- parent(X,\_).

### Output:

```
compiling C:/Users/ameyt/Desktop/FAMILYTREE.pl for byte code...
C:/Users/ameyt/Desktop/FAMILYTREE.pl compiled, 39 lines read - 3980 bytes written, 16 ms
| ?- parent(X,o).

X = f ? ;
X = m
yes
| ?-
```

```
GNU Prolog 1.5.0 (64 bits)
Compiled Jul  8 2021, 12:22:53 with gcc
Copyright (C) 1999-2021 Daniel Diaz

compiling C:/Users/ameyt/Desktop/FAMILYTREE.pl for byte code...
C:/Users/ameyt/Desktop/FAMILYTREE.pl compiled, 40 lines read - 4124 bytes written, 10 ms
| ?- father(a,l).

no
| ?-
```

```

compiling C:/Users/ameyt/Desktop/FAMILYTREE.pl for byte code...
C:/Users/ameyt/Desktop/FAMILYTREE.pl compiled, 40 lines read - 4124 bytes written, 17 ms
| ?- haschild(h).

```

```

true ? ;

```

```

true ? ;

```

```

(32 ms) yes
| ?- |

```

```

compiling C:/Users/ameyt/Desktop/FAMILYTREE.pl for byte code...
C:/Users/ameyt/Desktop/FAMILYTREE.pl compiled, 40 lines read - 4124 bytes written, 17 ms
| ?- mother(X,Y).

```

```

X = g
Y = b ? ;

```

```

X = g
Y = i ? ;

```

```

X = g
Y = c ? ;

```

```

X = h
Y = l ? ;

```

```

X = h
Y = d ? ;

```

```

X = h
Y = e ? ;

```

```

X = j
Y = m ? ;

```

```

X = k
Y = n ? ;

```

```

X = m
Y = o

```

```

(110 ms) yes
| ?- |

```

```

compiling C:/Users/ameyt/Desktop/FAMILYTREE.pl for byte code...
C:/Users/ameyt/Desktop/FAMILYTREE.pl compiled, 40 lines read - 4124 bytes written, 17 ms
| ?- father(X,Y).

```

```

X = a
Y = b ? ;

```

```

X = a
Y = i ? ;

```

```

X = a
Y = c ? ;

```

```

X = b
Y = d ? ;

```

```

X = b
Y = e ? ;

```

```

X = b
Y = l ? ;

```

```

X = c
Y = m ? ;

```

```

X = d
Y = n ? ;

```

```

X = f
Y = o ? ;

```

```

(63 ms) no
| ?- |

```

```

compiling C:/Users/ameyt/Desktop/FAMILYTREE.pl for byte code...
C:/Users/ameyt/Desktop/FAMILYTREE.pl compiled, 40 lines read - 4124 bytes written, 13 ms
| ?- male(X).

```

```

X = a ? ;

```

```

X = b ? ;

```

```

X = c ? ;

```

```

X = d ? ;

```

```

X = e ? ;

```

```

X = f

```

```

(16 ms) yes
| ?- parent(k,j).

```

```

no
| ?- |

```

## B.2 Observations and learning:

*(Students are expected to understand the selected topic Prepare a flow of the steps defined in the paper)*

We used current techniques, tools necessary for computing practise using PROLOG and applied knowledge of computing, applied mathematics to solve engineering problems using logical programming. We used the PROLOG language to design a family tree with different facts and rules and we also asked different questions on the PROLOG console based on the facts and rules which are already defined in the code.

## B.3 Conclusion:

*(Students must write the conclusion as per the attainment of an individual)*

After successful completion of this experiment, we are able to use current techniques, tools necessary for computing practise using PROLOG. We are able to apply the knowledge of computing, applied mathematics to solve engineering problems using logical programming, & we are able to recognize the need and engage in lifelong learning for logical programming.

## B.4 Question of Curiosity:

**Q1)** Consider the following bachelor Prolog program.  
What would it be the "INCORRECT" result of the following query?

```
bachelor(P) :- male(P), not married(P).  
male(henry).  
male(tom).  
married(tom).
```

- A. ?- bachelor(henry).  
yes
- B. ?- bachelor(tom).  
no
- C. ?- bachelor(Who).  
Who=henry
- D. ?- married(X).  
X=tom
- E. ?- male(P).  
no

**ANS:** Option E is incorrect.

**Q2)** Which of the following is *not* a query? (I.e., which of the following does not conform to the syntax of queries?)

- ☐ ?- student(Lisa, 5).
- ☐ ?- student(Lisa, X), student(Abraham, X).
- ☒ ?- student(Abraham, X)

**ANS:**

Option 3 ?- student(Abraham, X)

NOTE: Full stop is missing at the end.