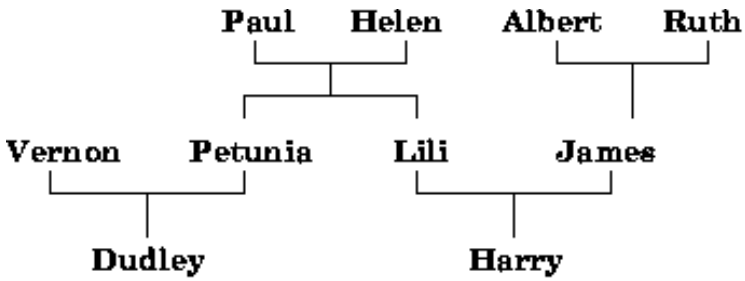
MC 312 ARTIFICIAL INTELLIGENCE

ASSIGNMENT 3

2022-23 SESSION

Q.1. Given a family tree below.



The tree can be understood as follows. Paul and Helen have two children named Lili and Petunia. Vernon and Petunia have a child named Dudley. Similarly, other relations can be understood from the family tree. Further, it is given that Paul, Albert, Vernon, James and Harry are male members and rest are females. How will you store the above family tree in Prolog using facts and rules. Further, how can you write the queries in Prolog to determine the grandfather and grandmother of Dudley and Harry.

Q.2. Explain, with examples, how can we write loops and if-else statements in Prolog.

Q.3. Explain, using Prolog programs, how conjunction and disjunction properties work in Prolog.

Q.4. Explain, with Prolog programs, how the following operations are performed on the List data structure:

a. Concatenation of two lists

b. Reverse the items in a list

c. Divide the list in two lists of approximately same length

d. Sort the elements of a list with Merge Sort

Q.5. How backtracking works in Prolog environment. Explain with a Prolog code.

Q.6. Write a program in Prolog to find the factorial of any number.

Q.7. Given the following data of students either passing the exam or failing in the exam based upon parameters given in the table below:

Reading	**Assignments**	**End Term Paper**	**RESULT**
No	Yes	Yes	Fail
Yes	Yes	No	Pass
No	Yes	No	Fail
Yes	No	No	Fail
Yes	Yes	Yes	Pass
No	No	No	Fail
No	No	Yes	Fail
Yes	No	Yes	Fail

Evaluate the information gain feature for all three attributes, i.e., Reading, Assignments, and End Term paper. Using the information gain feature, build the decision tree for the above data.

Q.8. Explain how you can build a spam filter based on Naïve Bayes algorithm that can classify email messages in two categories, i.e., either spam messages or useful messages. You can take a sample dataset of your own and explain how can you build a spam filter with Naïve Bayes technique.