AI LAB – 8

AIM: Database Handling in Prolog

Two types of databases:-static and dynamic.

- Static database is a part of the program that is complied along with it. It does not change during execution of the program.
- Dynamic database can change dynamically at execution time and are of two types.

  Type1: created at each execution. It grows, shrinks and is deleted at the end of program.

  - This type of database is no longer available after program finishes its execution and is called working memory.

  Type2: Other types of dynamic databases are those which are stored in files and called database files.

  - These are consulted in any program whenever required.
  - These types of databases are not part of any particular program and are available for use in future by different programs using system defined predicates called save and consult.
  - While executing a Prolog program one can load database file(s) using 'consult' predicate.
  - These files can be updated dynamically at run time and saved using 'save' predicate.

  The format of predicates 'save' and 'consult' are as follows:

  - save(filename) - succeeds after saving the contents of a file named 'filename'.
  - consult(filename) - succeeds after loading or adding all the clauses from a file stored in 'filename' in the current program being executed.

Clauses can be added to a database at run time using following predicates.

asserta(X) & assertz(X) - succeed by adding fact X in the beginning & at the end of database of facts respectively.

Similarly obsolete clauses can be deleted by using system defined predicate called retract from dynamic database at the run time.

Sample Code I: Dynamic Database Type1 Example

```
domains
 name,sub=symbol
 marks=integer
database
 result(name,sub,marks)
predicates
 write1
 read1
clauses
 write1:- readln(Name),readln(Sub),readint(Marks),
                    asserta(result(Name,Sub,Marks)).
 read1:-retract(result(Sname,Ssubj,Smarks)),
      write(Sname),nl, write(Ssubj),nl,write(Smarks),nl,fail.
```

Output trace for Sample Code I:

```
Goal: read1
No
Goal: write1
apurva
dm
21
Goal: write1
jatayu
dm
25
Goal: read1
jatayu
dm
25
apurva
dm
21
Goal: read1
No
```

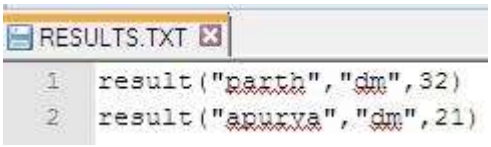
Sample Code II: Dynamic Database Type2 Example

```
domains
 name,sub=symbol
 marks=integer
database
 result(name,sub,marks)
predicates
 write1
 read1
 open1
 delete1(name)
 update1
 update2(name)
clauses
 open1:-consult("results.txt").
 write1:- readln(Name),readln(Sub),readint(Marks),
        asserta(result(Name,Sub,Marks)),save("results.txt").
 read1:-retract(result(Sname,Ssubj,Smarks)),
        write(Sname),nl, write(Ssubj),nl,write(Smarks),nl,fail.
 delete1(X):-retract(result(X,_,_)),
                save("results.txt"),nl.
 update1:-readln(X),retract(result(X,_,_)),
          readln(Y),readint(Z), asserta(result(X,Y,Z)), save("results.txt").
 update2(X):-retract(result(X,_,_)),readln(Y),readint(Z),
            asserta(result(X,Y,Z)), save("results.txt").
```

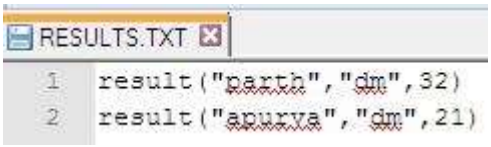
Output trace for Sample Code II:

Goal: open1
Goal: write1
apurva
dm
21

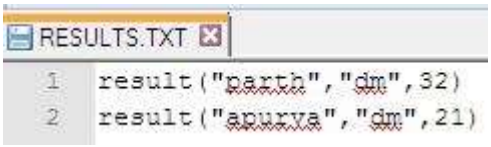
Goal: write1
parth
dm
32



Goal: read1
parth
dm
32
apurva
dm
21



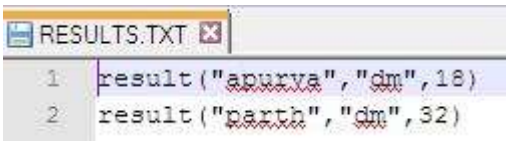
Goal: read1
No



Goal: open1
Goal: read1
parth
dm
32
apurva
dm
21

[*Got the point? File data are fetched into dynamic database and once read, vanished from database, so need to load file again*☺]

Goal: open1
Goal:update2(apurva)
dm
18



Goal: delete1(parth)

Sample Code III: PROLOG Program of searching a student's data when a name or a phone no is input.

```
domains
    name,address = symbol
    phone = string
    l = integer*
predicates
    start
    repeat
    selectItem(integer)
    studentData
    subjectL(l)
    searchByName(name)
    searchByPhone(phone)
database
    studentDB(name,address,phone,l)
goal
    clearwindow,
    makewindow(1,7,7,"Search Student Detail",0,0,25,80),
    start.
```

```
clauses
    repeat.
    repeat:-
        repeat.
    start:-
        repeat,
        write("\n0.Exit"),
        write("\n1.Enter student data"),
        write("\n2.Search by Name"),
        write("\n3.Search by Phone number"),
        write("\n4.Show all Student Data"),
        write("\nEnter your choice::"),
        readint(Choice),
        selectItem(Choice),
        Choice=0.
    selectItem(0).
    selectItem(1):-
        studentData,
        fail.
    selectItem(2):-
        write("\nEnter your name::"),
        readln(Name),
        searchByName(Name),
        fail.
    selectItem(3):-
        write("\nEnter the phone no::"),
        readln(Phone),
```

```
    searchByPhone(Phone),
    fail.
selectItem(4):-
    studentDB(Name,Address,Phone,Marks),
    write(Name,"  ",Address,"  ",Phone,"  ",Marks),nl,
    fail.
studentData:-
    write("\nEnter the name of the student::"),
    readln(Name),
    write("\nEnter the address of the student::"),
    readln(Address),
    write("\nEnter the phone number of the student::"),
    readln(Phone),
    write("\nEnter the five subject marks of the student"),
    subjectL(Marks),
    assert(studentDB(Name,Address,Phone,Marks)).
subjectL(Marks):-
    write("\nC ::"),
    readint(C),
    write("\nC++ ::"),
    readint(CC),
    write("\nVB ::"),
    readint(VB),
    write("\nJAVA ::"),
    readint(Java),
    write("\nPROLOG ::"),
    readint(Prolog),
```

```
    Marks=[C,CC,VB,Java,Prolog].
searchByName(Name1):-
    studentDB(Name1,Address,Phone,Marks),
    write("\nName::",Name1),
    write("\nAddress::",Address),
    write("\nPhone::",Phone),
    write("\nMarks[C,C++,VB,Java,Prolog]::",Marks).
searchByPhone(Phone1):-
    studentDB(Name,Address,Phone1,Marks),
    write("\nName::",Name),
    write("\nAddress::",Address),
    write("\nPhone::",Phone1),
    write("\nMarks[C,C++,VB,Java,Prolog]::",Marks).
```

Exercises

1. Write a prolog program to create application of "online quiz" using dynamic database and compound objects, use file to store data.
2. Write a prolog program to create application like "Placement System" using dynamic database and compound objects, use file to store data.