Module 2

Sai Nishwanth Raj Reddy

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Contents

1 PROLOG

```
% Defining a knowledge base
% Format:
relation(entity1, entity2, kentity).
%Example:
friends(raju, mahesh).
singer(sonu).
odd_numbers(5).

% Queries
? > singer(sonu)
returns true -> Sonu exists in singer.
```

2 Prolog Basics

```
% Knowledge Base (Facts)
girl(priya).
girl(tiyasha).
girl(jaya).
can_cook(priya).
```

Input	Output
- can_{cook}(priya).	true
- can_{cook}(What).	What = priya

3 Functions in Prolog

```
male(james1).
male(charles1).
male(charles2).
male(james2).
male(george1).

female(catherine).
female(elizabeth).
female(sophia).

parent(charles1, james1).
parent(elizabeth, james1).
parent(charles2, charles1).
parent(catherine, charles1).
parent(james2, charles1).
parent(sophia, elizabeth).
parent(george1, sophia).

mother(M, X):-
    female(M),
    parent(M, X).
```

Input	Output
- mother(elizabeth,sophia)	false
- mother(M,james1)	mother(M,james1)

4 Recursion in Prolog

```
is_digesting(X, Y):- just_ate(X,Y).
is_digesting(X,Y):-
    just_ate(X,Z),
    is_digesting(Z,Y).
just_ate(mosquito, blood(john)).
just_ate(frog, mosquito).
just_ate(stork, frog).
```

Input	Output
- $\text{is}_{\text{digesting}}$(stork, mosquito).	true
- just_{ate}(stork, Z)	Z = frog
- $\text{is}_{\text{digesting}}$(Z, mosquito).	Z = frog

5 Data Structures in Prolog

5.1 Stack

```
empty_stack([]).
stack(Top,Stack,[Top|Stack]).
member_stack(E,Stack):-
    member(E,Stack).
add_list_to_stack(L,S,R):-
    append(L,S,R).
reverse_print_stack(S):-
    empty_stack(S),!.
reverse_print_stack(S):-
    stack(H,T,S),
    reverse_print_stack(T),
    write(H),nl.
```

Input	Output
$\text{reverse}_{\text{printstack}}$([1,2,3,4,5]).	5
	4
	3
	2
	1

5.2 Queues

```
empty_queue([]).
```

```
enqueue(E,[],[E]).
enqueue(E,[H|T,[H|Tnew]):-
        enqueue(E,T,Tnew).
        dequeue(E,[E|T],T).
        dequeue(E,[E|_],_).
        member_queue(Element,Queue):-
        member(Element,Queue).
        add_list_to_queue(List,Queue,Newqueue):-
        append(Queue,List,Newqueue).
```

Input	Output