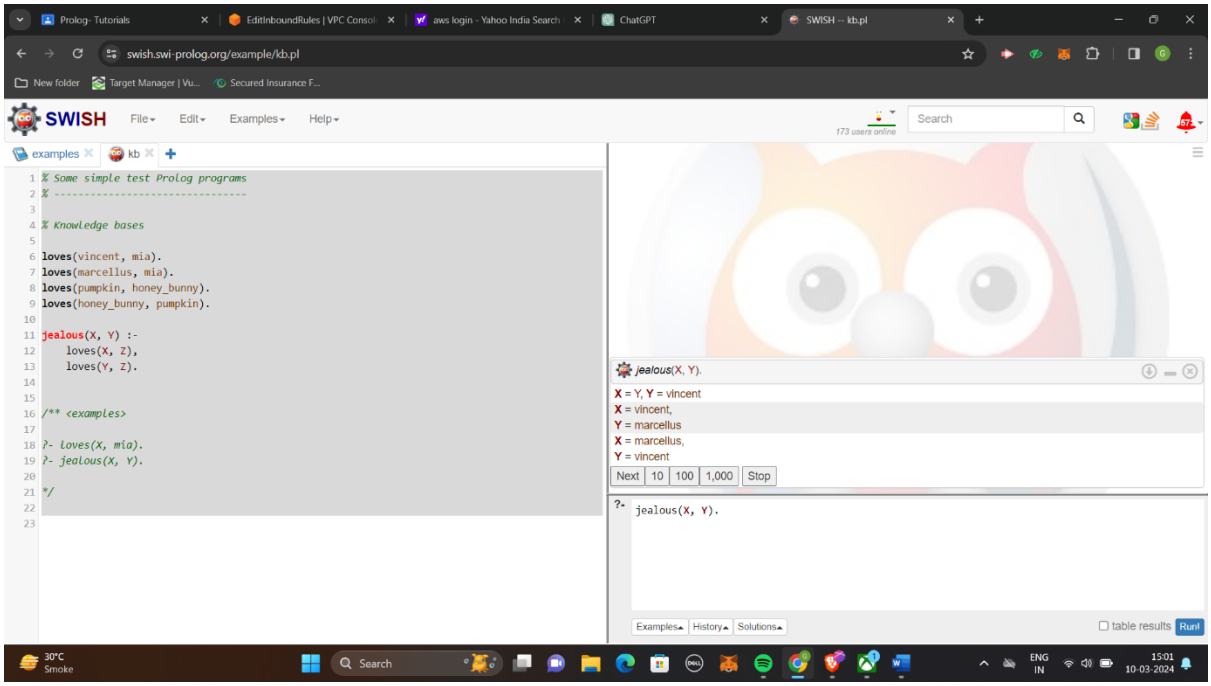
AI LAB – 7 Gaurav Mishra – 9557- Batch B

Prolog Programmes:

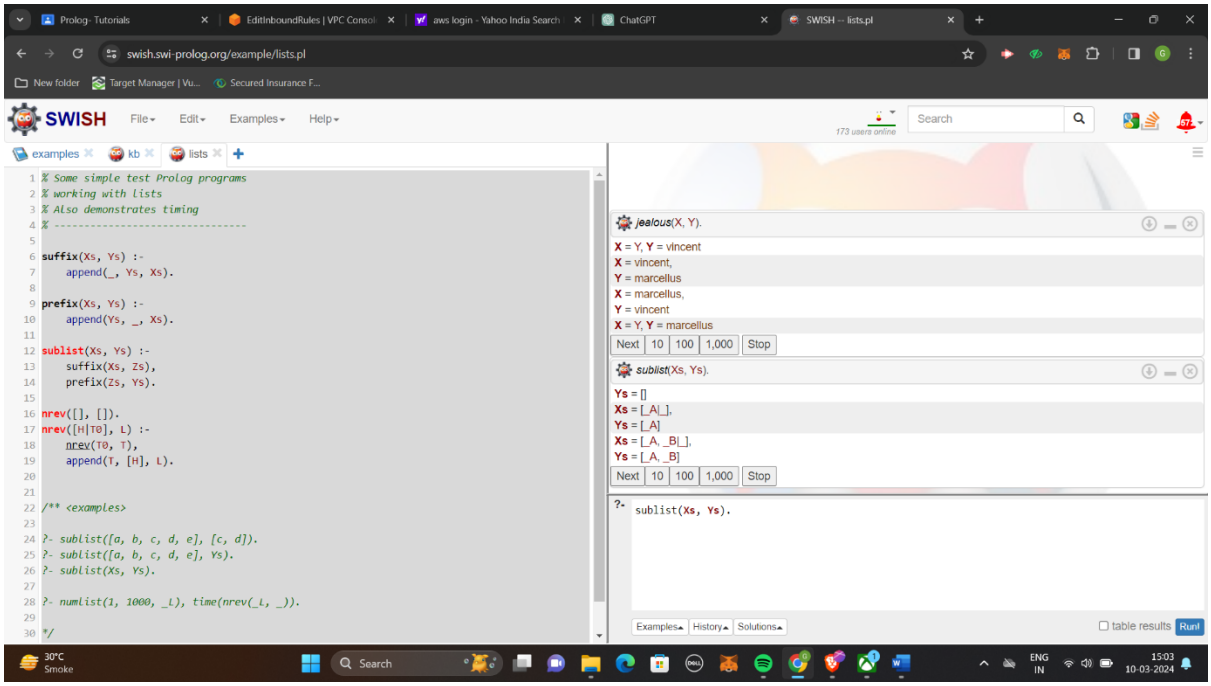
```
% Some simple test Prolog programs
% ------------------------------


% Knowledge bases


loves(vincent, mia).
loves(marcellus, mia).
loves(pumpkin, honey_bunny).
loves(honey_bunny, pumpkin).

jealous(X, Y) :-
    loves(X, Z),
    loves(Y, Z).



/** <examples>

?- loves(X, mia).
?- jealous(X, Y).

*/
```

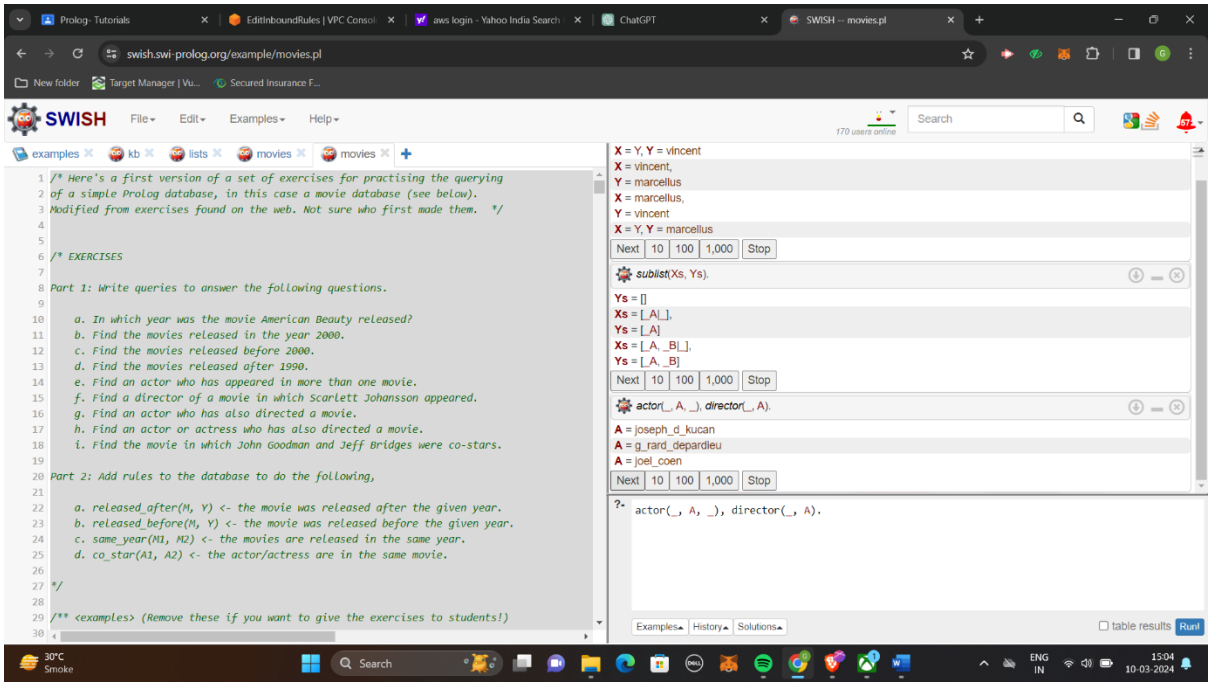


CODE 2:

```
% Some simple test Prolog programs
% working with lists
% Also demonstrates timing
% ------------------------------


suffix(Xs, Ys) :-
    append(_, Ys, Xs).


prefix(Xs, Ys) :-
    append(Ys, _, Xs).


sublist(Xs, Ys) :-
    suffix(Xs, Zs),
    prefix(Zs, Ys).
```

```
nrev([], []).
nrev([H|T0], L) :-
        nrev(T0, T),
        append(T, [H], L).


/** <examples>

?- sublist([a, b, c, d, e], [c, d]).
?- sublist([a, b, c, d, e], Ys).
?- sublist(Xs, Ys).

?- numlist(1, 1000, _L), time(nrev(_L, _)).

*/
```





Code 5:

```
% A meta-interpreter implementing
% a tiny expert-system
% -------------------------------



prove(true) :- !.
prove((B, Bs)) :- !,
    prove(B),
    prove(Bs).
prove(H) :-
    clause(H, B),
    prove(B).
prove(H) :-
    askable(H),
    writeln(H),
```

```
   read(Answer),
        Answer == yes.



good_pet(X) :- bird(X), small(X).
good_pet(X) :- cuddly(X), yellow(X).

bird(X) :- has_feathers(X), tweets(X).

yellow(tweety).

askable(tweets(_)).
askable(small(_)).
askable(cuddly(_)).
askable(has_feathers(_)).



/** <examples>

?- prove(good_pet(tweety)).

*/
```

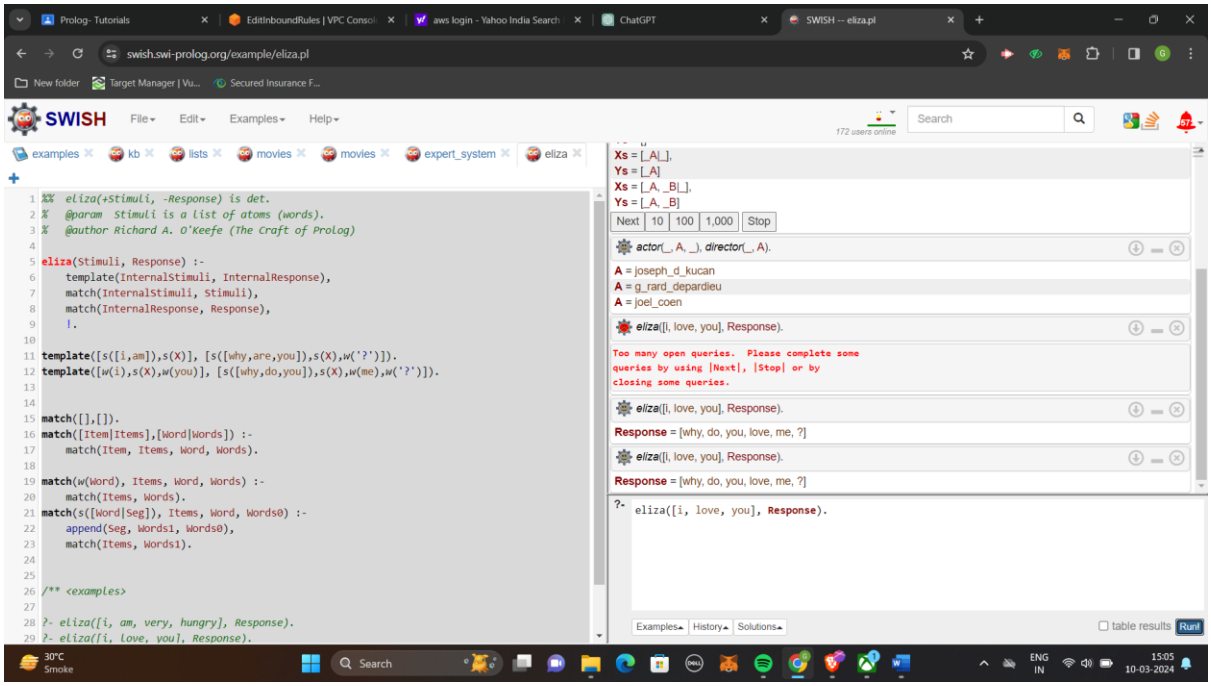
Code 6:

```
%%  eliza(+Stimuli, -Response) is det.
%   @param  Stimuli is a list of atoms (words).
```

```
%   @author Richard A. O'Keefe (The Craft of Prolog)

eliza(Stimuli, Response) :-
    template(InternalStimuli, InternalResponse),
    match(InternalStimuli, Stimuli),
    match(InternalResponse, Response),
    !.

template([s([i,am]),s(X)], [s([why,are,you]),s(X),w('?')]).
template([w(i),s(X),w(you)], [s([why,do,you]),s(X),w(me),w('?')]).



match([],[]).
match([Item|Items],[Word|Words]) :-
    match(Item, Items, Word, Words).

match(w(Word), Items, Word, Words) :-
    match(Items, Words).
match(s([Word|Seg]), Items, Word, Words0) :-
    append(Seg, Words1, Words0),
    match(Items, Words1).



/** <examples>

?- eliza([i, am, very, hungry], Response).
```

?- eliza([i, love, you], Response).

*/



Code :

% Render parse trees using a tree, but ignore lists Relies on native SVG

% support in the browser. IF THE ANSWER LOOKS EMPTY, COMMENT OR REMOVE

% THE LINE BELOW.

:- use_rendering(svgtree, [list(false)]).

% A simple English DCG grammar

% ============================

s(s(NP,VP)) --> np(NP, Num), vp(VP, Num).

np(NP, Num) --> pn(NP, Num).

np(np(Det,N), Num) --> det(Det, Num), n(N, Num).

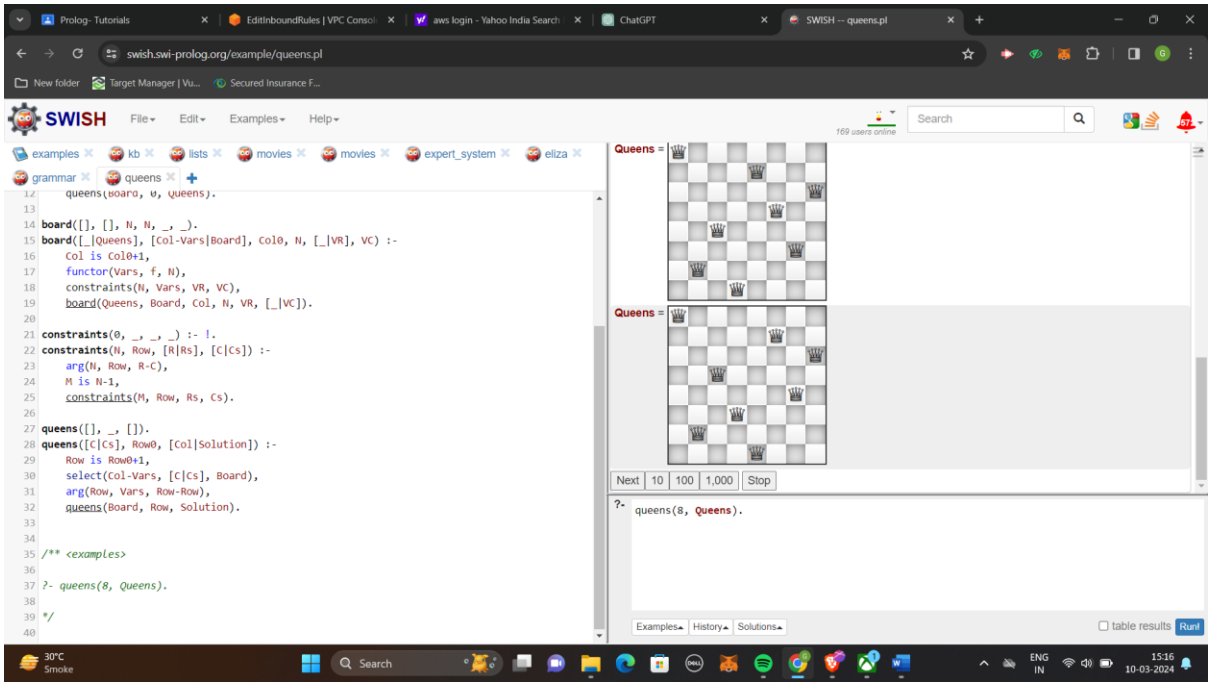
```
np(np(Det,N,PP), Num) --> det(Det, Num), n(N, Num), pp(PP).

vp(vp(V,NP), Num) --> v(V, Num), np(NP, _).
vp(vp(V,NP,PP), Num) --> v(V, Num), np(NP, _), pp(PP).

pp(pp(P,NP)) --> p(P), np(NP, _).

det(det(a), sg) --> [a].
det(det(the), _) --> [the].

pn(pn(john), sg) --> [john].

n(n(man), sg) --> [man].
n(n(men), pl) --> [men].
n(n(telescope), sg) --> [telescope].

v(v(sees), sg) --> [sees].
v(v(see), pl) --> [see].
v(v(saw), _) --> [saw].

p(p(with)) --> [with].


/** <examples>

?- phrase(s(Tree), [john, saw, a, man, with, a, telescope]).
```

```
?- phrase(s(Tree), Sentence).
?- between(1, 8, N), length(S, N), phrase(s(_), S), writeln(S), sleep(0.2), false.

*/
```

Code:

```
% render solutions nicely.
:- use_rendering(chess).

%%    queens(+N, -Queens) is nondet.
%
%       @param      Queens is a list of column numbers for placing the queens.
%       @author Richard A. O'Keefe (The Craft of Prolog)

queens(N, Queens) :-
   length(Queens, N),
        board(Queens, Board, 0, N, _, _),
        queens(Board, 0, Queens).

board([], [], N, N, _, _).
board([_|Queens], [Col-Vars|Board], Col0, N, [_|VR], VC) :-
        Col is Col0+1,
        functor(Vars, f, N),
        constraints(N, Vars, VR, VC),
        board(Queens, Board, Col, N, VR, [_|VC]).

constraints(0, _, _, _) :- !.
```

```
constraints(N, Row, [R|Rs], [C|Cs]) :-
        arg(N, Row, R-C),
        M is N-1,
        constraints(M, Row, Rs, Cs).

queens([], _, []).
queens([C|Cs], Row0, [Col|Solution]) :-
        Row is Row0+1,
        select(Col-Vars, [C|Cs], Board),
        arg(Row, Vars, Row-Row),
        queens(Board, Row, Solution).


/** <examples>

?- queens(8, Queens).

*/
```


Prolog- Tutorials
EditInboundRules | VPC Consol
aws login - Yahoo India Search
ChatGPT
SWISH -- queens.pl
swish.swi-prolog.org/example/queens.pl
New folder
Target Manager | Vu...
Secured Insurance F...
SWISH
File
Edit
Examples
Help
169 users online
Search
examples
kb
lists
movies
movies
expert_system
eliza
grammar
queens
queens(Board, 0, Queens).
board([], [], N, N, _, _).
board([_|Queens], [Col-Vars|Board], Col0, N, [_|VR], VC) :-
Col is Col0+1,
functor(Vars, f, N),
constraints(N, Vars, VR, VC),
board(Queens, Board, Col, N, VR, [_|VC]).
constraints(0, _, _, _) :- !.
constraints(N, Row, [R|Rs], [C|Cs]) :-
arg(N, Row, R-C),
M is N-1,
constraints(M, Row, Rs, Cs).
queens([], _, []).
queens([C|Cs], Row0, [Col|Solution]) :-
Row is Row0+1,
select(Col-Vars, [C|Cs], Board),
arg(Row, Vars, Row-Row),
queens(Board, Row, Solution).
/** <examples>
?- queens(8, Queens).
*/
Queens =
Queens =
Next
10
100
1,000
Stop
?-
queens(8, Queens).
Examples
History
Solutions
table results
Run!
30°C
Smoke
Search
ENG
IN
15:16
10-03-2024