

**Submitted To :** Ma'am Neha

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**Practical file for Core Paper XIII:** Artificial  
Intelligence

6. Write a Prolog program to implement power (Num, Pow, Ans) : where Num is raised to the power Pow to get Ans.

### Editor Code

```
:- initialization(main).

% base case
power(_, 0, 1).

% recursive case
power(Num, Pow, Ans) :-
    Pow > 0,
    NewPow is Pow - 1,
    power(Num, NewPow, NewAns),
    Ans is Num * NewAns.

% main predicate to read input and compute power
main :-
    write('Enter the base number: '),
    read(Num),
    write('Enter the power: '),
    read(Pow),
    power(Num, Pow, Ans),
    write('The result of '), write(Num), write(' raised to the
power '), write(Pow), write(' is: '), write(Ans), nl.
```

## PRACTICAL FILE - Core Paper XIII: Artificial Intelligence

```
Alq2.pl  Alq3.pl  Alq4.pl  Alq5.pl  Alq6.pl  x  Alq7.pl  Alq8.pl  Alq9.pl  Alc
Alq6.pl
1  :- initialization(main).
2
3  % base case
4  power(_, 0, 1).
5
6  % recursive case
7  power(Num, Pow, Ans) :-
8      Pow > 0,
9      NewPow is Pow - 1,
10     power(Num, NewPow, NewAns),
11     Ans is Num * NewAns.
12
13 % main predicate to read input and compute power
14 main :-
15     write('Enter the base number: '),
16     read(Num),
17     write('Enter the power: '),
18     read(Pow),
19     power(Num, Pow, Ans),
20     write('The result of '), write(Num), write(' raised to the power '), write(Pow), write(' is: '), write(Ans), nl.
21
```

## Output

```
SWI-Prolog (AMD64, Multi-threaded, version 9.2.1)
File Edit Settings Run Debug Help
Welcome to SWI-Prolog (threaded, 64 bits, version 9.2.1)
SWI-Prolog comes with ABSOLUTELY NO WARRANTY. This is free software.
Please run ?- license. for legal details.

For online help and background, visit https://www.swi-prolog.org
For built-in help, use ?- help(Topic). or ?- apropos(Word).

?-
% c:/Users/HP/Desktop/ai programs/Alq6.pl compiled 0.00 sec, 4 clauses
Enter the base number: 6.
Enter the power: | 5.
The result of 6 raised to the power 5 is: 7776
█
```

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7. Prolog program to implement multi (N1, N2, R) : where N1 and N2 denote numbers to be multiplied and R represents the result.

### Editor Code

```
:- initialization(main).

multi(N1, N2, R) :-
    R is N1 * N2.

% main predicate to read input and compute multiplication
main :-
    write('Enter the first number: '),
    read(N1),
    write('Enter the second number: '),
    read(N2),
    multi(N1, N2, R),
    write('The result of multiplying '), write(N1), write(' and '),
    write(N2), write(' is: '), write(R), nl.
```

A screenshot of a Prolog editor window. The window has a title bar with several tabs labeled 'Alq1.pl', 'Alq2.pl', 'Alq3.pl', 'Alq4.pl', 'Alq5.pl', 'Alq7.pl', 'Alq8.pl', and 'Alq9.pl'. The 'Alq7.pl' tab is active. The code in the editor is as follows:

```
1  :- initialization(main).
2
3  multi(N1, N2, R) :-
4      R is N1 * N2.
5
6  % main predicate to read input and compute multiplication
7  main :-
8      write('Enter the first number: '),
9      read(N1),
10     write('Enter the second number: '),
11     read(N2),
12     multi(N1, N2, R),
13     write('The result of multiplying '), write(N1), write(' and '), write(N2), write(' is: '), write(R), nl.
```

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## Output

```
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?-
% c:/Users/HP/Desktop/ai programs/AIq7.pl compiled 0.00 sec, 3 clauses
Enter the first number: 8.
Enter the second number: | 9.
The result of multiplying 8 and 9 is: 72
```

8. Write a Prolog program to implement `memb(X, L)`: to check whether X is a member of L or not.

## Editor Code

```
:-initialization(main).

memb(X, [X|_]).
memb(X, [_|T]) :- memb(X, T).

main :-
    write('Enter a list: '),
    read(L),
    write('Enter an element: '),
    read(X),
    (memb(X, L) ->
        write(X), write(' is a member of '), write(L), write('.')
    ;
        write(X), write(' is not a member of '), write(L), write('.')
    ).
```

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## PRACTICAL FILE - Core Paper XIII: Artificial Intelligence

```
Alq6.pl  Alq7.pl  Alq8.pl  ×  Alq9.pl  Alq10.pl
Alq8.pl
1  :- initialization(main).
2
3  memb(X, [X|_]).
4  memb(X, [_|T]) :- memb(X, T).
5
6  main :-
7      write('Enter a list: '),
8      read(L),
9      write('Enter an element: '),
10     read(X),
11     (memb(X, L) ->
12         write(X), write(' is a member of '), write(L), write('.')
13     ;
14         write(X), write(' is not a member of '), write(L), write('.')
15     ).
16
```

## Output

```
SWI-Prolog (AMD64, Multi-threaded, version 9.2.1)
File Edit Settings Run Debug Help
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?-
% c:/Users/HP/Desktop/ai programs/Alq8.pl compiled 0.00 sec, 4 clauses
Enter a list: [3,4,5,6,7,8].
Enter an element: | 8.

8 is a member of [3,4,5,6,7,8].
```

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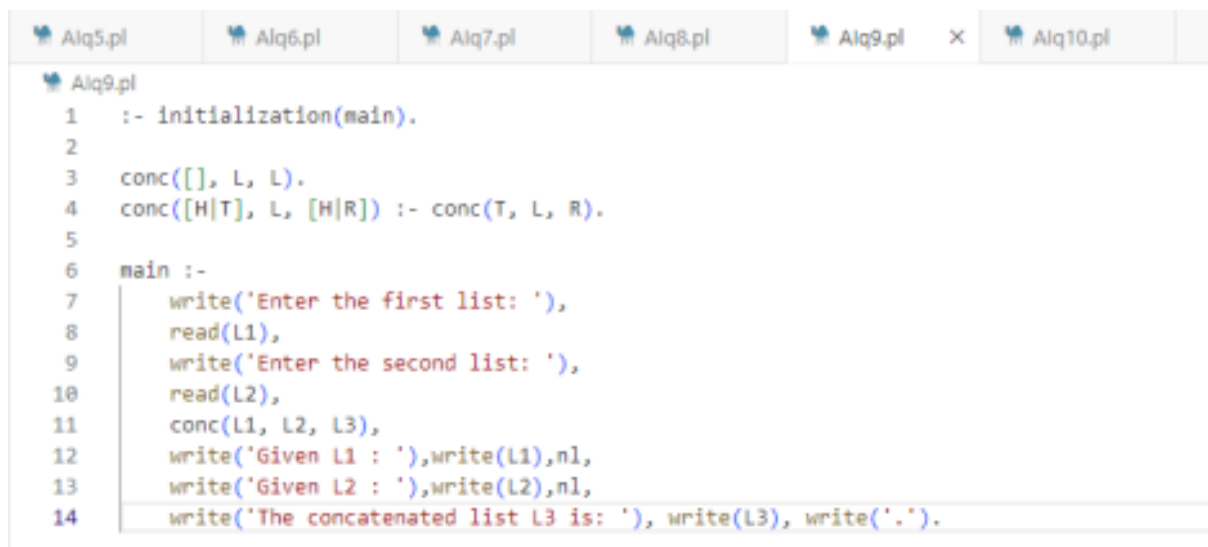
9. Write a Prolog program to implement conc (L1, L2, L3) where L2 is the list to be appended with L1 to get the resulting list L3.

### Editor Code

```
:- initialization(main).

conc([], L, L).
conc([H|T], L, [H|R]) :- conc(T, L, R).

main :-
    write('Enter the first list: '),
    read(L1),
    write('Enter the second list: '),
    read(L2),
    conc(L1, L2, L3),
    write('Given L1 : '), write(L1), nl,
    write('Given L2 : '), write(L2), nl,
    write('The concatenated list L3 is: '), write(L3), write('.').
```

A screenshot of a Prolog editor window. The window has a title bar with several tabs labeled 'Alq5.pl', 'Alq6.pl', 'Alq7.pl', 'Alq8.pl', 'Alq9.pl', and 'Alq10.pl'. The 'Alq9.pl' tab is active. The editor area shows the following Prolog code:

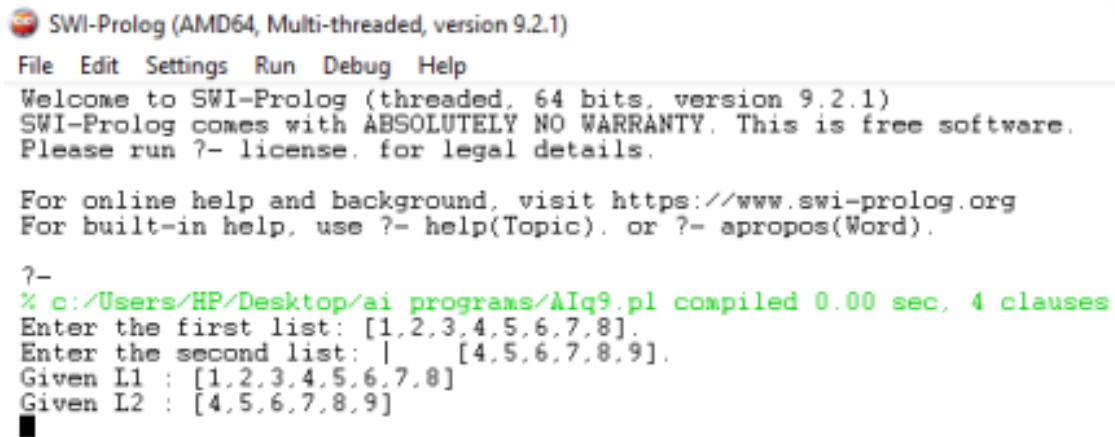
```
1  :- initialization(main).
2
3  conc([], L, L).
4  conc([H|T], L, [H|R]) :- conc(T, L, R).
5
6  main :-
7      write('Enter the first list: '),
8      read(L1),
9      write('Enter the second list: '),
10     read(L2),
11     conc(L1, L2, L3),
12     write('Given L1 : '), write(L1), nl,
13     write('Given L2 : '), write(L2), nl,
14     write('The concatenated list L3 is: '), write(L3), write('.').
```

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## Output

A screenshot of the SWI-Prolog (AMD64, Multi-threaded, version 9.2.1) terminal. The window has a menu bar with 'File', 'Edit', 'Settings', 'Run', 'Debug', and 'Help'. The text in the terminal shows the welcome message, a disclaimer about the warranty, and instructions for online and built-in help. It then shows the execution of a Prolog program 'AIq9.pl' which prompts for two lists. The first list is [1,2,3,4,5,6,7,8] and the second list is [4,5,6,7,8,9]. The program then displays 'Given L1 : [1,2,3,4,5,6,7,8]' and 'Given L2 : [4,5,6,7,8,9]'.

```
SWI-Prolog (AMD64, Multi-threaded, version 9.2.1)
File Edit Settings Run Debug Help
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For built-in help, use ?- help(Topic). or ?- apropos(Word).

?-
% c:/Users/HP/Desktop/ai programs/AIq9.pl compiled 0.00 sec, 4 clauses
Enter the first list: [1,2,3,4,5,6,7,8].
Enter the second list: | [4,5,6,7,8,9].
Given L1 : [1,2,3,4,5,6,7,8]
Given L2 : [4,5,6,7,8,9]
```

10. Write a Prolog program to implement reverse (L, R) where List L is original and List R is reversed list.

### EDITOR CODE :

```
:- initialization(main).

reverse(L, R) :- rev(L, [], R).

rev([], R, R).
rev([H|T], Acc, R) :- rev(T, [H|Acc], R).

main :-
    write('Enter a list: '),
    read(L),
    reverse(L, R),
    write('Given List L : '), write(L), nl, nl,
    write('The reversed list is: '), write(R),
    break.
```

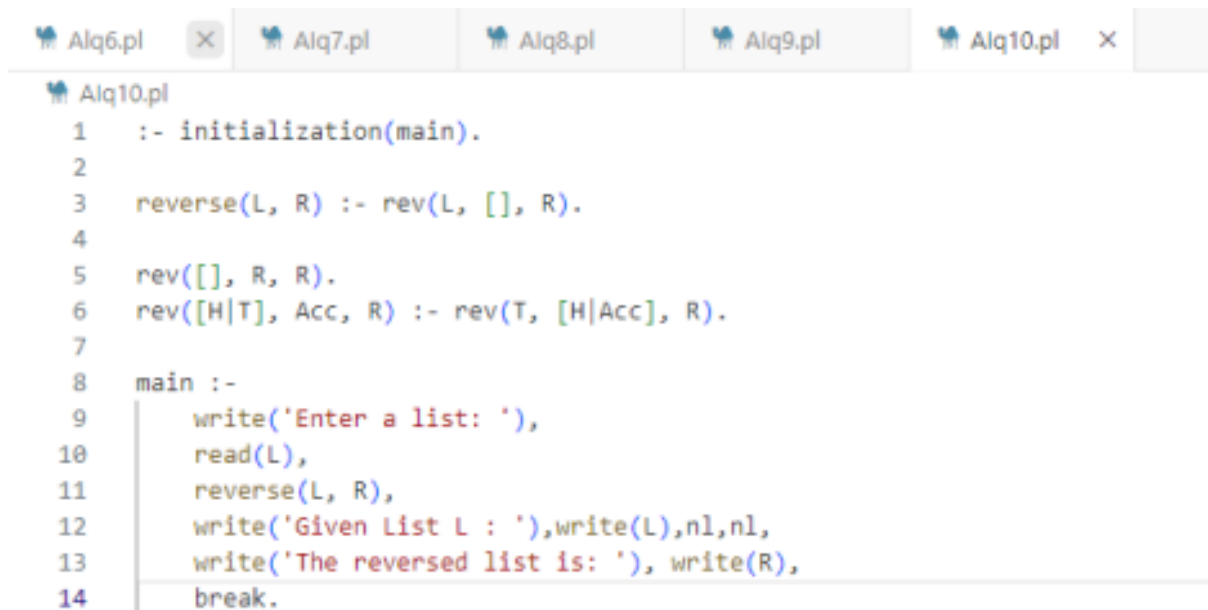
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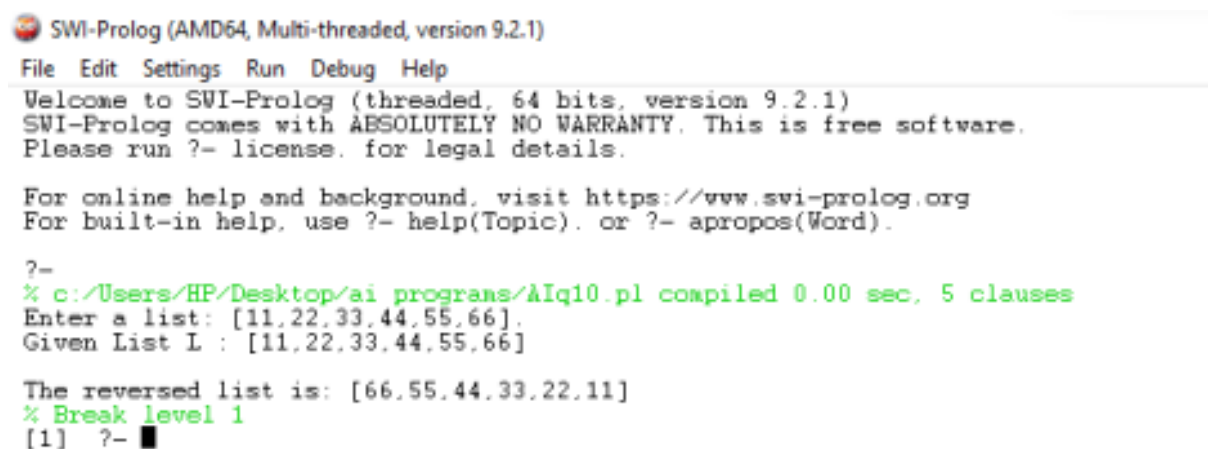
## PRACTICAL FILE - Core Paper XIII: Artificial Intelligence



The screenshot shows a Prolog IDE with several tabs: Alq6.pl, Alq7.pl, Alq8.pl, Alq9.pl, and Alq10.pl. The Alq10.pl tab is active, displaying the following Prolog code:

```
1 :- initialization(main).
2
3 reverse(L, R) :- rev(L, [], R).
4
5 rev([], R, R).
6 rev([H|T], Acc, R) :- rev(T, [H|Acc], R).
7
8 main :-
9     write('Enter a list: '),
10    read(L),
11    reverse(L, R),
12    write('Given List L : '), write(L), nl, nl,
13    write('The reversed list is: '), write(R),
14    break.
```

## Output



The screenshot shows the SWI-Prolog (AMD64, Multi-threaded, version 9.2.1) terminal output. The output includes the following text:

```
SWI-Prolog (AMD64, Multi-threaded, version 9.2.1)
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For built-in help, use ?- help(Topic). or ?- apropos(Word).

?-
% c:/Users/HP/Desktop/ai programs/AIq10.pl compiled 0.00 sec, 5 clauses
Enter a list: [11,22,33,44,55,66].
Given List L : [11,22,33,44,55,66]

The reversed list is: [66,55,44,33,22,11]
% Break level 1
[1] ?- █
```

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