

**Submitted To :** Ma'am Neha

**Name:** Khushi Chhatwani

**Course:** B.Sc (hons.) Computer Science, III Year,  
VI Semester

**College Roll no. :** CSC/21/55

**University Roll no. :** 21059570021

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

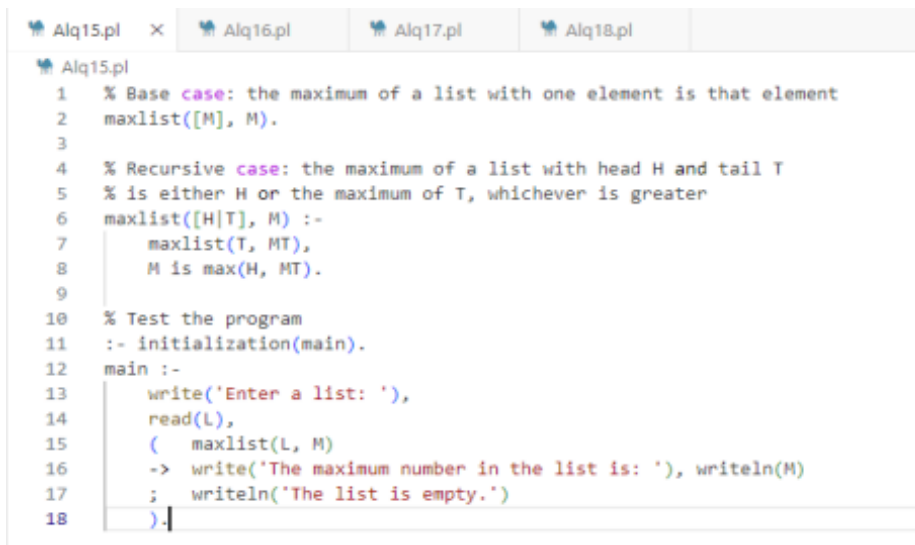
15. Write a Prolog program to implement `maxlist(L, M)` so that `M` is the maximum number in the list.

### Editor Code

```
% Base case: the maximum of a list with one element is that element
maxlist([M], M).
```

```
% Recursive case: the maximum of a list with head
H and tail T % is either H or the maximum of T,
whichever is greater
maxlist([H|T], M) :-
    maxlist(T, MT),
    M is max(H, MT).
```

```
% Test the program
:- initialization(main).
main :-
    write('Enter a list: '),
    read(L),
    ( maxlist(L, M)
    -> write('The maximum number in the list is: '), writeln(M)
    ; writeln('The list is empty.')
    ).
```



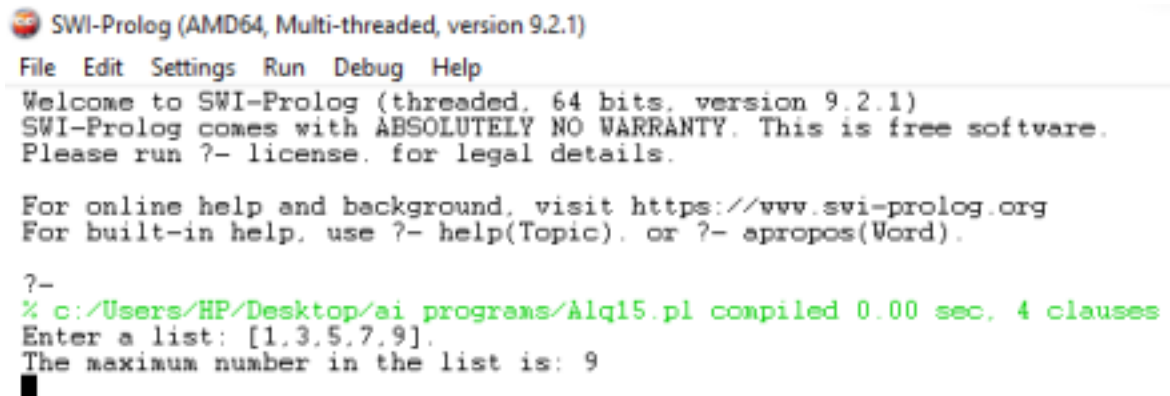
```
Alq15.pl
1 % Base case: the maximum of a list with one element is that element
2 maxlist([M], M).
3
4 % Recursive case: the maximum of a list with head H and tail T
5 % is either H or the maximum of T, whichever is greater
6 maxlist([H|T], M) :-
7     maxlist(T, MT),
8     M is max(H, MT).
9
10 % Test the program
11 :- initialization(main).
12 main :-
13     write('Enter a list: '),
14     read(L),
15     ( maxlist(L, M)
16     -> write('The maximum number in the list is: '), writeln(M)
17     ; writeln('The list is empty.')
18     ).
```

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## 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/Alq15.pl compiled 0.00 sec, 4 clauses
Enter a list: [1,3,5,7,9].
The maximum number in the list is: 9
■
```

16. Write a prolog program to implement insert\_nth (I, N, L, R) that inserts an item I into Nth position of list L to generate a list R.

## Editor Code

```
% Base case: Inserting at the beginning of the list
insert_nth(I, 1, L, [I|L]).

% Recursive case: Inserting at a position other than
the beginning insert_nth(I, N, [H|T], [H|R]) :-
    N > 1, % Ensure we're not trying to insert at a position
    less than 1 N1 is N - 1, % Decrement the position
    insert_nth(I, N1, T, R). % Recursive call with the decremented
position and the tail of the list

% Predicate to read list from user
read_list(L) :-
    write('Enter the list (in square brackets): '),
    read(L).

% Predicate to read position from user
read_position(N) :-
    write('Enter the position: '),
```

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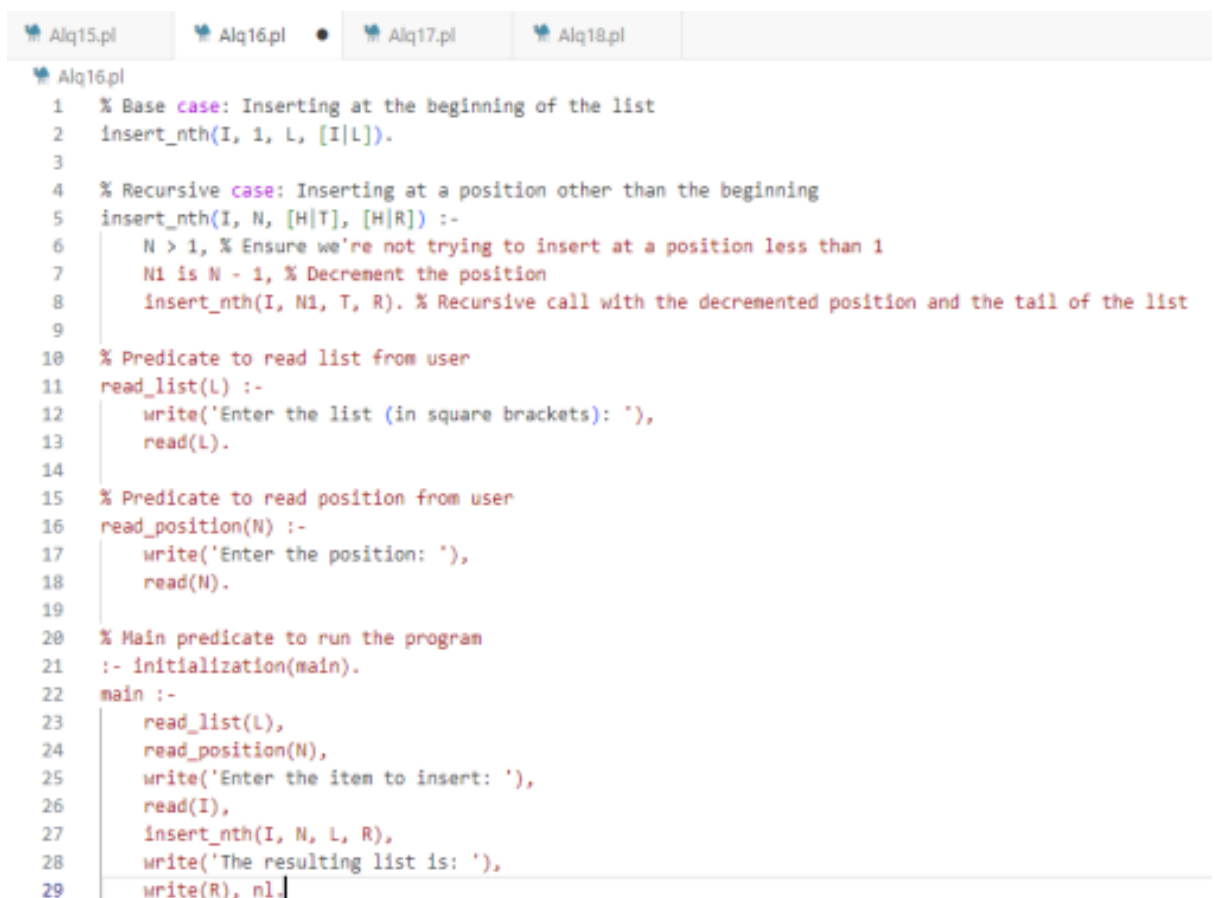
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## PRACTICAL FILE - Core Paper XIII: Artificial Intelligence

```
read(N).

% Main predicate to run the program
:- initialization(main).
main :-
    read_list(L),
    read_position(N),
    write('Enter the item to insert: '),
    read(I),
    insert_nth(I, N, L, R),
    write('The resulting list is: '),
    write(R), nl.
```



```
Alq15.pl  Alq16.pl  Alq17.pl  Alq18.pl
Alq16.pl
1  % Base case: Inserting at the beginning of the list
2  insert_nth(I, 1, L, [I|L]).
3
4  % Recursive case: Inserting at a position other than the beginning
5  insert_nth(I, N, [H|T], [H|R]) :-
6      N > 1, % Ensure we're not trying to insert at a position less than 1
7      N1 is N - 1, % Decrement the position
8      insert_nth(I, N1, T, R). % Recursive call with the decremented position and the tail of the list
9
10 % Predicate to read list from user
11 read_list(L) :-
12     write('Enter the list (in square brackets): '),
13     read(L).
14
15 % Predicate to read position from user
16 read_position(N) :-
17     write('Enter the position: '),
18     read(N).
19
20 % Main predicate to run the program
21 :- initialization(main).
22 main :-
23     read_list(L),
24     read_position(N),
25     write('Enter the item to insert: '),
26     read(I),
27     insert_nth(I, N, L, R),
28     write('The resulting list is: '),
29     write(R), nl.
```

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## Output

```
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?-
% c:/Users/HP/Desktop/ai programs/Alq16.pl compiled 0.00 sec, 6 clauses
Enter the list (in square brackets): [2,4,6,8,12].
Enter the position: | 5.
Enter the item to insert: | 10.
The resulting list is: [2,4,6,8,10,12]
■
```

17. Write a Prolog program to implement delete\_nth (N, L, R) that removes the element on Nth position from a list L to generate a list R.

## Editor Code

```
% Predicate to delete an item at a specific position in a list
delete_nth(1, [_|T], T). % Base case: Deleting the first item of the
list delete_nth(N, [H|T], [H|R]) :- % Recursive case: Deleting an
item at a position other than the beginning
    N > 1, % Ensure we're not trying to delete at a position
    less than 1 N1 is N - 1, % Decrement the position
    delete_nth(N1, T, R). % Recursive call with the decremented
position and the tail of the list

% Predicate to read list from user
read_list(L) :-
    write('Please enter the list (in square brackets): '),
    nl, % New line for better readability
    read(L).

% Predicate to read position from user
read_position(N) :-
    write('Please enter the position of the item you want to
delete: '), nl, % New line for better readability
    read(N).
```

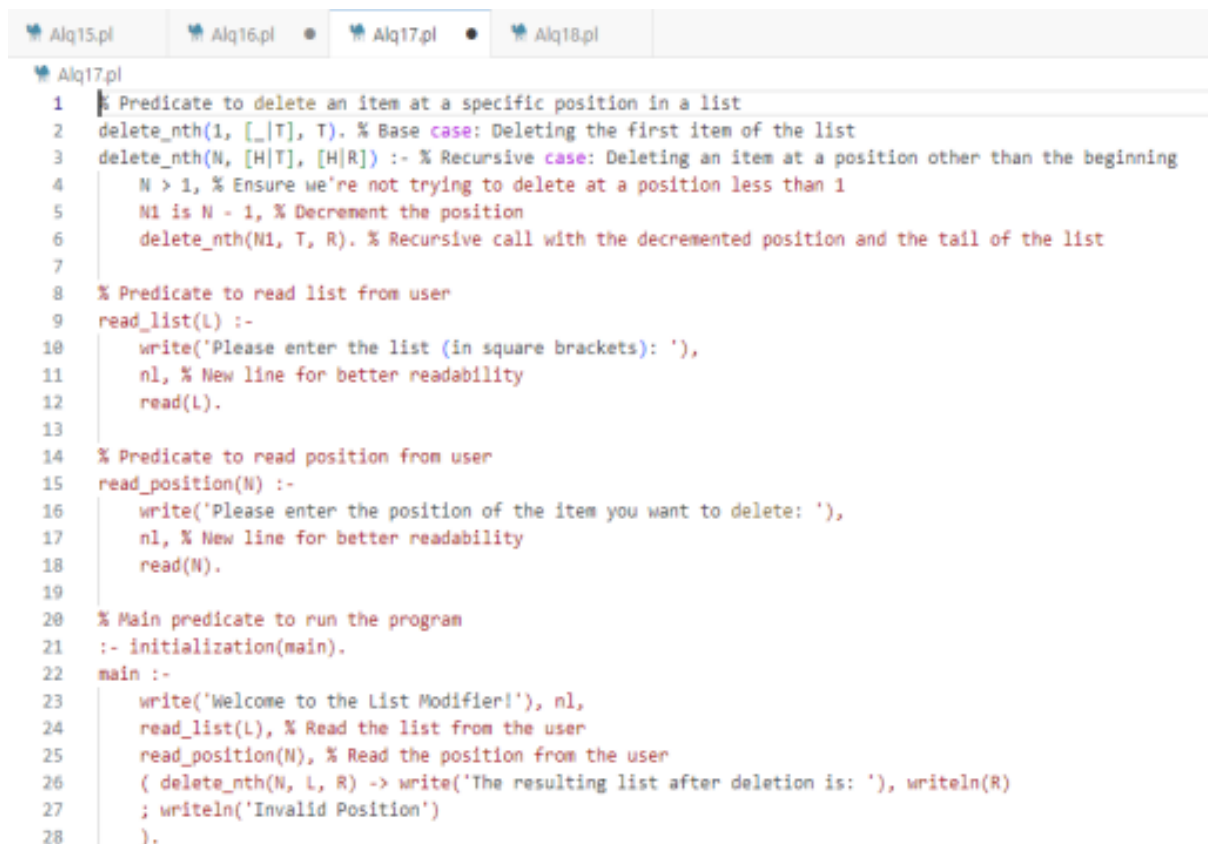
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## PRACTICAL FILE - Core Paper XIII: Artificial Intelligence

```
% Main predicate to run the program
:- initialization(main).
main :-
    write('Welcome to the List Modifier!'), nl,
    read_list(L), % Read the list from the user
    read_position(N), % Read the position from the user
    ( delete_nth(N, L, R) -> write('The resulting list after
deletion is: '), writeln(R)
    ; writeln('Invalid Position')
    ).
```



```
Alq15.pl Alq16.pl Alq17.pl Alq18.pl
Alq17.pl
1 % Predicate to delete an item at a specific position in a list
2 delete_nth(1, [_|T], T). % Base case: Deleting the first item of the list
3 delete_nth(N, [H|T], [H|R]) :- % Recursive case: Deleting an item at a position other than the beginning
4     N > 1, % Ensure we're not trying to delete at a position less than 1
5     N1 is N - 1, % Decrement the position
6     delete_nth(N1, T, R). % Recursive call with the decremented position and the tail of the list
7
8 % Predicate to read list from user
9 read_list(L) :-
10     write('Please enter the list (in square brackets): '),
11     nl, % New line for better readability
12     read(L).
13
14 % Predicate to read position from user
15 read_position(N) :-
16     write('Please enter the position of the item you want to delete: '),
17     nl, % New line for better readability
18     read(N).
19
20 % Main predicate to run the program
21 :- initialization(main).
22 main :-
23     write('Welcome to the List Modifier!'), nl,
24     read_list(L), % Read the list from the user
25     read_position(N), % Read the position from the user
26     ( delete_nth(N, L, R) -> write('The resulting list after deletion is: '), writeln(R)
27     ; writeln('Invalid Position')
28     ).
```

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## Output

```
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?-
% c:/Users/HP/Desktop/ai programs/Alq17.pl compiled 0.00 sec, 6 clauses
Welcome to the List Modifier!
Please enter the list (in square brackets):
| [11,22,33,42,44,55,66].
Please enter the position of the item you want to delete:
| 4.
The resulting list after deletion is: [11,22,33,44,55,66]
```

18. Write a program in PROLOG to implement merge (L1, L2, L3) where L1 is first ordered list and L2 is second ordered list and L3 represents the merged list.

## Editor Code

```
merge([], L, L).
merge(L, [], L).
merge([H1|T1], [H2|T2], [H1|T]) :- H1 <= H2, merge(T1,
[H2|T2], T). merge([H1|T1], [H2|T2], [H2|T]) :- H1 >
H2, merge([H1|T1], T2, T).

main :-
    write('Enter first list: '),
    read(L1),
    write('Enter second list: '),
    read(L2),
    merge(L1, L2, L3),
    write('Merged list: '),
    write(L3).

:-initialization(main).
```

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## PRACTICAL FILE - Core Paper XIII: Artificial Intelligence

```
Alq15.pl  Alq16.pl  Alq17.pl  Alq18.pl  X
Alq18.pl
1  merge([], L, L).
2  merge(L, [], L).
3  merge([H1|T1], [H2|T2], [H1|T]) :- H1 <= H2, merge(T1, [H2|T2], T).
4  merge([H1|T1], [H2|T2], [H2|T]) :- H1 > H2, merge([H1|T1], T2, T).
5
6  main :-
7      write('Enter first list: '),
8      read(L1),
9      write('Enter second list: '),
10     read(L2),
11     merge(L1, L2, L3),
12     write('Merged list: '),
13     write(L3).
14
15 :-initialization(main).
```

## 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/Alq18.pl compiled 0.00 sec, 6 clauses
Enter first list: [1,2,3,4,5,6].
Enter second list: [7,8,9,10,11,12].

Merged list: [1,2,3,4,5,6,7,8,9,10,11,12]
|
```

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