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

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Practical file for Core Paper XIII: Artificial
Intelligence

1. Write a prolog program to calculate the sum of two numbers .

Editor Code

```
:- initialization(main).
```

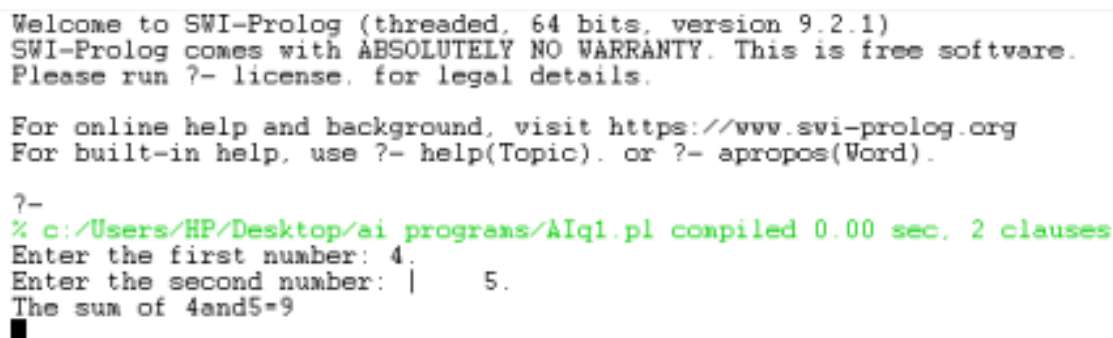
```
main :-
```

```
    write('Enter the first number: '),
    read(X),
    write('Enter the second number: '),
    read(Y),
    Sum is X + Y,
    write('The sum of
'), write(X), write(' '), write('and'), write(' '), write(Y), write('='), write(Sum), n
1.
```

A screenshot of a Prolog editor window titled 'AIq1.pl'. The code is as follows:

```
1  :- initialization(main).
2
3  main :-
4      write('Enter the first number: '),
5      read(X),
6      write('Enter the second number: '),
7      read(Y),
8      Sum is X + Y,
9      write('The sum of '), write(X), write(' '), write('and'), write(' '), write(Y), write('='), write(Sum), nl.
10
```

Output

A screenshot of the Prolog output window. It shows the following text:

```
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/AIq1.pl compiled 0.00 sec, 2 clauses
Enter the first number: 4.
Enter the second number: | 5.
The sum of 4and5=9
■
```

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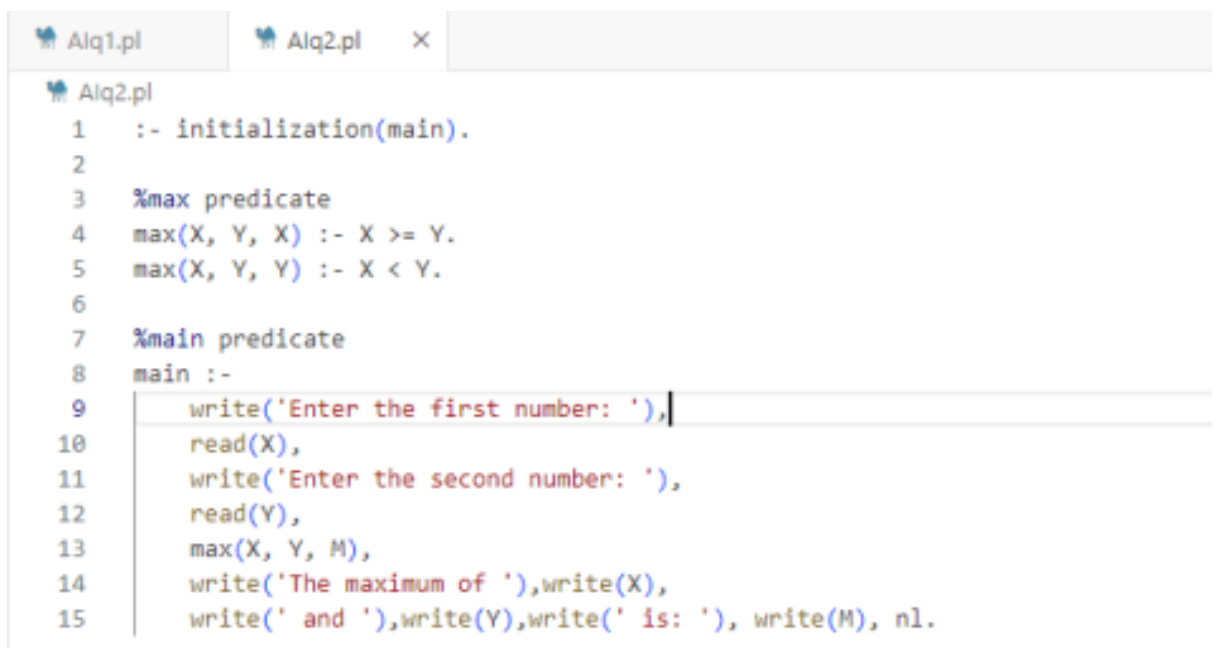
2. Write a Prolog program to implement max(X, Y, M) so that M is the maximum of two numbers X and Y.

Editor Code

```
:- initialization(main).

%max predicate
max(X, Y, X) :- X >= Y.
max(X, Y, Y) :- X < Y.

%main predicate
main :-
    write('Enter the first number: '),
    read(X),
    write('Enter the second number: '),
    read(Y),
    max(X, Y, M),
    write('The maximum of '),write(X),
    write(' and '),write(Y),write(' is: '), write(M), nl.
```

A screenshot of a Prolog editor window. The window has two tabs at the top: 'Alq1.pl' and 'Alq2.pl'. The 'Alq2.pl' tab is active. The code in the editor is as follows:

```
1  :- initialization(main).
2
3  %max predicate
4  max(X, Y, X) :- X >= Y.
5  max(X, Y, Y) :- X < Y.
6
7  %main predicate
8  main :-
9      write('Enter the first number: '),
10     read(X),
11     write('Enter the second number: '),
12     read(Y),
13     max(X, Y, M),
14     write('The maximum of '),write(X),
15     write(' and '),write(Y),write(' is: '), write(M), nl.
```

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Output

```
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?-
% c:/Users/HP/Desktop/ai programs/AIq2.pl compiled 0.00 sec. 4 clauses
Enter the first number: 3.
Enter the second number: | 7.
The maximum of 3 and 7 is: 7
```

3. Write a program in PROLOG to implement factorial (N, F) where F represents the factorial of a number N.

Editor Code

```
:- initialization(main).

%factorial predicate
factorial(0, 1).
factorial(N, F) :-
    N > 0,
    N1 is N - 1,
    factorial(N1, F1),
    F is N * F1.

%main predicate
main :-
    write('Enter a number: '),
    read(N),
    factorial(N, F),
    write('The factorial of '), write(N), write(' is: '), write(F), nl.
```

PRACTICAL FILE - Core Paper XIII: Artificial Intelligence

```
Alq1.pl  Alq2.pl  Alq3.pl  X
Alq3.pl
1  :- initialization(main).
2
3  %factorial predicate
4  factorial(0, 1).
5  factorial(N, F) :-
6      N > 0,
7      N1 is N - 1,
8      factorial(N1, F1),
9      F is N * F1.
10
11 %main predicate
12 main :-
13     write('Enter a number: '),
14     read(N),
15     factorial(N, F),
16     write('The factorial of '), write(N), write(' is: '), write(F), nl.
```

Output

```
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?-
% c:/Users/HP/Desktop/ai programs/Alq3.pl compiled 0.00 sec, 4 clauses
Enter a number: 5.
The factorial of 5 is: 120
```

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4. Write a program in PROLOG to implement `generate_fib(N,T)` where T represents the Nth term of the fibonacci series.

Editor Code

```
:- initialization(main).

%generate_fib predicate
generate_fib(1, 0).
generate_fib(2, 1).
generate_fib(N, T) :-
    N > 1,
    N1 is N - 1,
    N2 is N - 2,
    generate_fib(N1, T1),
    generate_fib(N2, T2),
    T is T1 + T2.

%main predicate
main :-
    write('Enter a number: '),
    read(N),
    generate_fib(N, T),
    write('The '), write(N), write('th term of the Fibonacci series
is: '), write(T), nl.
```

PRACTICAL FILE - Core Paper XIII: Artificial Intelligence

```
Alq1.pl  Alq2.pl  Alq3.pl  Alq4.pl  X
Alq4.pl
1  :- initialization(main).
2
3  %generate_fib predicate
4  generate_fib(1, 0).
5  generate_fib(2, 1).
6  generate_fib(N, T) :-
7      N > 1,
8      N1 is N - 1,
9      N2 is N - 2,
10     generate_fib(N1, T1),
11     generate_fib(N2, T2),
12     T is T1 + T2.
13
14 %main predicate
15 main :-
16     write('Enter a number: '),
17     read(N),
18     generate_fib(N, T),
19     write('The '), write(N), write('th term of the Fibonacci series is: '), write(T), nl.
```

Output

```
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?-
% c:/Users/HP/Desktop/ai programs/Alq4.pl compiled 0.00 sec, 5 clauses
Enter a number: 5.
The 5th term of the Fibonacci series is: 3
■
```

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5. Write a Prolog program to implement GCD of two numbers.

EDITOR CODE :

```
:- initialization(main).  
% base case  
gcd(X, 0, X):- !.  
  
% recursive case  
gcd(X, Y, Z):-  
    R is X mod Y,  
    gcd(Y, R, Z).  
  
% main predicate to read input and compute gcd  
main:-  
    write('Enter first number: '),  
    read(X),  
    write('Enter second number: '),  
    read(Y),  
    gcd(X, Y, GCD),  
    write('The GCD of '), write(X), write(' and '), write(Y), write(''  
is: '), write(GCD), nl.
```

A screenshot of a Prolog editor window. The window has a title bar with several tabs: 'Alq1.pl', 'Alq2.pl', 'Alq3.pl', 'Alq4.pl', 'Alq5.pl', and a close button 'X'. The 'Alq5.pl' tab is active. The editor displays the Prolog code for calculating the GCD of two numbers. The code is as follows:

```
1  :- initialization(main).  
2  % base case  
3  gcd(X, 0, X):- !.  
4  
5  % recursive case  
6  gcd(X, Y, Z):-  
7      R is X mod Y,  
8      gcd(Y, R, Z).  
9  
10 % main predicate to read input and compute gcd  
11 main:-  
12     write('Enter first number: '),  
13     read(X),  
14     write('Enter second number: '),  
15     read(Y),  
16     gcd(X, Y, GCD),  
17     write('The GCD of '), write(X), write(' and '), write(Y), write(' is: '), write(GCD), nl.
```

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Output

```
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?-
% c:/Users/HP/Desktop/ai programs/AIq5.pl compiled 0.00 sec, 4 clauses
Enter first number: 6.
Enter second number: | 7.
The GCD of 6 and 7 is: 1
```