Experiment No.: 8

Demonstrate recursion in Prolog using Tower of Hanoi problem.

Output:

```
SWI-Prolog (AMD64, Multi-threaded, version 9.2.6)
File  Edit  Settings  Run  Debug  Help
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For built-in help, use ?- help(Topic). or ?- apropos(Word).

?-
% c:/Users/nayan/Documents/Btech/3-4 year/7 sem/AI/Lab/Practicals/Practical-8/practical-8.pl compiled 0.00 sec, 3 clauses
?-
|    move(3,source,target,aux).
Move top disk from source to target
Move top disk from source to aux
Move top disk from target to aux
Move top disk from source to target
Move top disk from aux to source
Move top disk from aux to target
Move top disk from source to target
true
```

```
?- trace.
true.

[trace]  ?-  move(3,source,target,aux).
   Call: (12) move(3, source, target, aux) ? creep
   Call: (13) 3>1 ? creep
   Exit: (13) 3>1 ? creep
   Call: (13) _30348 is 3+ -1 ? creep
   Exit: (13) 2 is 3+ -1 ? creep
   Call: (13) move(2, source, aux, target) ? creep
   Call: (14) 2>1 ? creep
   Exit: (14) 2>1 ? creep
   Call: (14) _34414 is 2+ -1 ? creep
   Exit: (14) 1 is 2+ -1 ? creep
   Call: (14) move(1, source, target, aux) ? creep
   Call: (15) write('Move top disk from ') ? creep
Move top disk from
   Exit: (15) write('Move top disk from ') ? creep
   Call: (15) write(source) ? creep
source
   Exit: (15) write(source) ? creep
   Call: (15) write(' to ') ? creep
 to
   Exit: (15) write(' to ') ? creep
   Call: (15) write(target) ? creep
target
   Exit: (15) write(target) ? creep
   Call: (15) nl ? creep

   Exit: (15) nl ? creep
   Exit: (14) move(1, source, target, aux) ? creep
   Call: (14) move(1, source, aux, _45794) ? creep
   Call: (15) write('Move top disk from ') ? creep
Move top disk from
   Exit: (15) write('Move top disk from ') ? creep
   Call: (15) write(source) ? creep
source
   Exit: (15) write(source) ? creep
   Call: (15) write(' to ') ? creep
 to
   Exit: (15) write(' to ') ? creep
   Call: (15) write(aux) ? creep
aux
   Exit: (15) write(aux) ? creep
   Call: (15) nl ? creep

   Exit: (15) nl ? creep
   Exit: (14) move(1, source, aux, _54656) ? creep
   Call: (14) move(1, target, aux, source) ? creep
   Call: (15) write('Move top disk from ') ? creep
Move top disk from
   Exit: (15) write('Move top disk from ') ? creep
   Call: (15) write(target) ? creep
target
   Exit: (15) write(target) ? creep
   Call: (15) write(' to ') ? creep
 to
   Exit: (15) write(' to ') ? creep
```

```
aux
   Exit: (15) write(aux) ? creep
   Call: (15) write(' to ') ? creep
 to
   Exit: (15) write(' to ') ? creep
   Call: (15) write(source) ? creep
source
   Exit: (15) write(source) ? creep
   Call: (15) nl ? creep

   Exit: (15) nl ? creep
   Exit: (14) move(1, aux, source, target) ? creep
   Call: (14) move(1, aux, target, _25246) ? creep
   Call: (15) write('Move top disk from ') ? creep
Move top disk from
   Exit: (15) write('Move top disk from ') ? creep
   Call: (15) write(aux) ? creep
aux
   Exit: (15) write(aux) ? creep
   Call: (15) write(' to ') ? creep
 to
   Exit: (15) write(' to ') ? creep
   Call: (15) write(target) ? creep
target
   Exit: (15) write(target) ? creep
   Call: (15) nl ? creep

   Exit: (15) nl ? creep
   Exit: (14) move(1, aux, target, _34108) ? creep
   Call: (14) move(1, source, target, aux) ? creep
   Call: (15) write('Move top disk from ') ? creep
Move top disk from
   Exit: (15) write('Move top disk from ') ? creep
   Call: (15) write(source) ? creep
source
   Exit: (15) write(source) ? creep
   Call: (15) write(' to ') ? creep
 to
   Exit: (15) write(' to ') ? creep
   Call: (15) write(target) ? creep
target
   Exit: (15) write(target) ? creep
   Call: (15) nl ? creep

   Exit: (15) nl ? creep
   Exit: (14) move(1, source, target, aux) ? creep
   Exit: (13) move(2, aux, target, source) ? creep
   Exit: (12) move(3, source, target, aux) ? creep
true ;
[trace]  ?- notrace.
true.

[debug]  ?- nodebug.
true.

?- move(4,source,target,aux).
Move top disk from source to aux
Move top disk from source to target
Move top disk from aux to target
Move top disk from source to aux
Move top disk from target to source
Move top disk from target to aux
Move top disk from source to aux
Move top disk from source to target
Move top disk from aux to target
Move top disk from aux to source
Move top disk from target to source
Move top disk from aux to target
Move top disk from source to aux
Move top disk from source to target
Move top disk from aux to target
true
```