

# AI Lab1

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## Code

```
%parent data
parent(ramesh,nitin).
parent(ramesh,ajit).
parent(ramesh,savita).
parent(ramesh,sachin).
parent(rajni,savita).
parent(rajni,nitin).
parent(rajni,sachin).
parent(rajni,ajit).
parent(sachin,sara).
parent(sachin,arjun).
parent(anjali,sara).
parent(anjali,arjun).
%gender data
male(ramesh).
male(nitin).
male(ajit).
male(sachin).
male(arjun).
female(rajni).
female(savita).
female(anjali).
female(sara).

%functions for questions 3
grandparent(X,Y) :- parent(X,Z),parent(Z,Y). %grandparent relation
mother(X,Y) :- parent(X,Y),female(X). %mother relation
father(X,Y) :- parent(X,Y),male(X). %father relation
brother(X,Y) :- parent(Z,X),parent(Z,Y),male(X),X\=Y. %brother relation
sister(X,Y) :- parent(Z,X),parent(Z,Y),female(X),X\=Y. %sister relation

%functions for question 5
has_atleast_two_children(X) :- parent(X, Y1), parent(X, Y2),Y1 \= Y2,(sister(Y1, Y2) ; brother(Y1, Y2)).
grandchild(X,Y) :- grandparent(Y,X).
aunt(X,Y):-parent(Z,Y),sister(X,Z).
uncle(X,Y) :- parent(Z,Y),brother(X,Z).

%successor relation recursive function
successor(X, Y) :- parent(Y, X). %base case
successor(X, Y) :- parent(Y, Z), successor(X, Z). %recursive case
```

# Output Screenshots

```
SWI-Prolog (AMD64, Multi-threaded, version 9.0.4)
File Edit Settings Run Debug Help
Welcome to SWI-Prolog (threaded, 64 bits, version 9.0.4)
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/MR DEV/.vscode/SEN-V/AI/Lab/Lab1/main.pl compiled 0.00 sec, 32 clauses
?-
| parent(nitin,sara).
false.

?- parent(X,sachin).
X = ramesh ;
X = rajni.

?- parent(rajni,X).
X = savita ;
X = nitin ;
X = sachin ;
X = ajit.

?- parent(X,Y).
X = ramesh.
Y = nitin ;
X = ramesh.
Y = ajit ;
X = ramesh.
Y = savita ;
X = ramesh.
Y = sachin ;
X = rajni.
Y = savita ;
X = rajni.
Y = nitin ;
X = rajni.
Y = sachin ;
X = rajni.
Y = ajit ;
X = sachin.
Y = sara ;
X = sachin.
Y = arjun ;
X = anjali.
Y = sara ;
X = anjali.
Y = arjun.

?- grandparent(X,sara).
X = ramesh ;
X = rajni.
false.

?- parent(anjali,X).
X = sara ;
X = arjun.

?- successor(X,ramesh).
X = nitin ;
X = ajit ;
X = savita ;
X = sachin ;

?-

```

```
SWI-Prolog (AMD64, Multi-threaded, version 9.0.4)
File Edit Settings Run Debug Help
V = arjun ;
X = anjali.
Y = sara ;
X = anjali.
Y = arjun.

?- grandparent(X,sara).
X = ramesh ;
X = rajni.
false.

?- parent(anjali,X).
X = sara ;
X = arjun.

?- successor(X,ramesh).
X = nitin ;
X = ajit ;
X = savita ;
X = sachin ;
X = sara ;
X = arjun.
false.

?- sister(X,Y).
X = savita.
Y = nitin ;
X = savita.
Y = ajit ;
X = savita.
Y = sachin ;
X = savita.
Y = nitin ;
X = savita.
Y = sachin ;
X = savita.
Y = ajit ;
X = sara.
Y = arjun ;
X = sara.
Y = arjun.
false.

?- brother(X,Y).
X = nitin.
Y = ajit ;
X = nitin.
Y = savita ;
X = nitin.
Y = sachin ;
X = ajit.
Y = nitin ;
X = ajit.
Y = savita ;
X = ajit.
Y = sachin ;
X = sachin.
Y = nitin ;
X = sachin.
Y = ajit ;
X = sachin.
Y = savita ;
X = nitin.

```

```
SWI-Prolog (AMD64, Multi-threaded, version 9.0.4)
File Edit Settings Run Debug Help
Y = savita ;
X = nitin ;
Y = sachin ;
X = ajit ;
Y = nitin ;
X = ajit ;
Y = savita ;
X = ajit ;
Y = sachin ;
X = sachin ;
Y = nitin ;
X = sachin ;
X = sachin ;
Y = ajit ;
X = sachin ;
Y = savita ;
X = nitin ;
Y = savita ;
X = nitin ;
X = nitin ;
Y = sachin ;
X = nitin ;
Y = ajit ;
X = sachin ;
Y = savita ;
X = sachin ;
Y = nitin ;
X = sachin ;
Y = ajit ;
X = ajit ;
Y = savita ;
X = nitin ;
X = ajit ;
Y = sachin ;
X = erjun ;
Y = sara ;
X = erjun ;
Y = sara ;
false.
?- has_atleast_two_children(ramesh).
true.
?- has_atleast_two_children(sara).
false.
?- grandchild(X,Y).
X = sara ;
Y = ramesh ;
X = erjun ;
Y = ramesh ;
X = sara ;
Y = rajni ;
X = erjun ;
Y = rajni ;
false.
?- aunt(X,Y).
X = savita ;
Y = sara ;
X = savita ;
Y = sara ;
X = savita ;
Y = erjun ;
X = erjun ;
Y = erjun ;
false.
?- uncle(X,Y).
X = nitin ;
Y = sara ;
X = ajit ;
Y = sara ;
X = nitin ;
Y = sara ;
X = ajit ;
Y = sara ;
X = nitin ;
Y = erjun ;
X = erjun ;
Y = erjun ;
X = nitin ;
Y = erjun ;
X = erjun ;
Y = erjun ;
X = ajit ;
Y = erjun ;
false.
?-
```

```
SWI-Prolog (AMD64, Multi-threaded, version 9.0.4)
File Edit Settings Run Debug Help
true.
?- has_atleast_two_children(sara).
false.
?- grandchild(X,Y).
X = sara ;
Y = ramesh ;
X = erjun ;
Y = ramesh ;
X = sara ;
Y = rajni ;
X = erjun ;
Y = rajni ;
false.
?- aunt(X,Y).
X = savita ;
Y = sara ;
X = savita ;
Y = sara ;
X = savita ;
Y = erjun ;
X = erjun ;
Y = erjun ;
false.
?- uncle(X,Y).
X = nitin ;
Y = sara ;
X = ajit ;
Y = sara ;
X = nitin ;
Y = sara ;
X = ajit ;
Y = sara ;
X = nitin ;
Y = erjun ;
X = erjun ;
Y = erjun ;
X = nitin ;
Y = erjun ;
X = erjun ;
Y = erjun ;
X = ajit ;
Y = erjun ;
false.
?-
```