

## AI ASSIGNMENT 1

This is the input that checks all possible cases if they are implemented completely.

```
Welcome to SWI-Prolog (threaded, 64 bits, version 8.2.1)
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).

?- main.
Please enter your name:
|: Rounak.

Please enter your stream:
Allowed are: [CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths]
|: ECE.

Please enter your year:
|: 3.

Please enter your courses:
The allowed domains are: [CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]
Type 1 if you have a course of that domain else 0.
Type "stop." to stop.
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: stop.

Do you want advisory or prediction?
|: prediction.

For each of the courses give grade point:
|: 10.
|: 10.
|: 10.
|: 10.
|: 10.
|: 10.
|: 10.
|: 10.
|: stop.

Have you done any internships?
Possible domains are: [CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: stop.
```

```
State research work in these possible domains (if any):
Possible domains are: [CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: stop.
State additional projects and additional works in those domains:
Possible domains are: [CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: stop.
If an A+ or exceptional achievement or interest in any domain, please state:
Possible domains are: [CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: stop.
If LORs or good relations with professors in a domain, please state:
Possible domains are: [CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: stop.
State you coding skills, if above average:
|: 1.
If any acknowledgeable participation in clubs in the domains: ,
Possible domains are: [CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: 1.
|: stop.
```

```

Any extra online or other courses done in those domains:
I: 1.
I: 1.
I: 1.
I: 1.
I: 1.
I: 1.
I: 1.
I: 1.
I: stop.
Can you work long hours?
I: 1.
Do you expect to go for a PhD?
I: 1.
Any chance for a startup or any idea?
I: 1.
Below are all possible predictions of your future :
Software Development Engineer
Possibility of Startup
Web Developer, Front-end/Back-end Developer.
Masters, Researcher, Professor in CSE fields.
PhD in CSE fields.
Hardware Engineer, Communications Engineer
Computer Engineer
PhD. in ECE core, Researcher, Robotics
UI/UX Design engineer, Graphic Designer.
Research in Design fields as app-development, new Graphic fonts
Public Speaker, Environmentalist, Social Server
Professor in the SSH field preferred
Psychologist, Philanthropist.
ML enthusiast in Biomedical fields
Computational Biology, Human Anatomy, Genome fields
Research in Computational Biology
Investment analysis fields, Data Analysis fields
Further Maths studies and fields
Professor in mathematics, further studies like Masters or PhD.
Analyst at Banking Firms, Cyber-Security fields in banks

true .

?- 

```

This output shows that the program is running for all cases. Now I will run this for specific cases like supposingly the student has done research in CSE domain only, has taken ECE courses, SSH courses as well and no other courses. He has good CGPA in CSE courses, average in ECE and SSH courses.

This is how the output looks like -

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

?- main.
Please enter your name:
|: Harsh.

Please enter your stream:
Allowed are: [CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths]
|: CSE.

Please enter your year:
|: 3.

Please enter your courses:
The allowed domains are: [CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]
Type 1 if you have a course of that domain else 0.
Type "stop." to stop.
|: 1.
|: 1.
|: 0.
|: 1.
|: 0.
|: 0.
|: 0.
|: 0.
|: stop.

Do you want advisory or prediction?
|: prediction.

For each of the courses give grade point:
|: 10.
|: 8.4.
|: 0.
|: 8.8.
|: 0.
|: 0.
|: 0.
|: 0.
|: stop.

Have you done any internships?
Possible domains are: [CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]
|: 1.
|: 0.
|: 0.
|: 0.
|: 0.
|: 0.
|: 0.
|: 0.
|: stop.
```

```
State research work in these possible domains (if any):
Possible domains are: [CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]
|: 1.
|: 0.
|: 0.
|: 0.
|: 0.
|: 0.
|: 0.
|: 0.
|: stop.
State additional projects and additional works in those domains:
Possible domains are: [CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]
|: 0.
|: 0.
|: 0.
|: 0.
|: 0.
|: 0.
|: 0.
|: 0.
|: stop.
If an A+ or exceptional achievement or interest in any domain, please state:
Possible domains are: [CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]
|: 1.
|: 0.
|: 0.
|: 0.
|: 0.
|: 0.
|: 0.
|: 0.
|: stop.
If LORs or good relations with professors in a domain, please state:
Possible domains are: [CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]
|: 1.
|: 0.
|: 0.
|: 0.
|: 0.
|: 0.
|: 0.
|: 0.
|: stop.
State you coding skills, if above average:
|: 1.
If any acknowledgeable participation in clubs in the domains: ,
Possible domains are: [CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]
|: 1.
|: 0.
|: 0.
|: 1.
|: 0.
|: 0.
|: 0.
|: stop.
```

```

State you coding skills, if above average:
|: 1.
If any acknowledged participation in clubs in the domains: ,
Possible domains are: [CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]
|: 1.
|: 0.
|: 0.
|: 1.
|: 0.
|: 0.
|: 0.
|: stop.
Any extra online or other courses done in those domains:
|: 1.
|: 1.
|: 0.
|: 1.
|: 0.
|: 0.
|: 0.
|: stop.
Can you work long hours?
|: 1.
Do you expect to go for a PhD?
|: 1.
Any chance for a startup or any idea?
|: 0.
Below are all possible predictions of your future :
Software Development Engineer
Web Developer, Front-end/Back-end Developer.
Masters, Researcher, Professor in CSE fields.
PhD in CSE fields.
Public Speaker, Environmentalist, Social Server

true .

?- █

```

As we can see, the student has Good CGPA, research profile and interest in CSE fields, his future is predicted in those fields. Also he has shown some interest, participation in SSH clubs as well, so we can predict a few fields in those areas too.

### **CODE -**

```
% Printing String.
print(String):-
    writeln(String).

% Reading list until user gives input.
read_list_until(L, End) :-
    ( read_element(E, End)->
        L = [E|L1],
        read_list_until(L1, End);
        L = []
    ).

% Reading element and checking if other than End.
read_element(E, End) :-
    read(E),
    dif(E, End).

% Counting number of elements in list
count([],0).
count([_|Tail], N) :- count(Tail, N1), N is N1 + 1.

% Inserting in list.
insert(X,Grades,[X|Grades]).

% Reading Grades.
getGrades(0,Grades).
getGrades(N,Grades):-
    read(X),
    insert(X,Grades,Answer),
    S is N-1,
    getGrades(S,Answer).

% Getting the element at the specified number in list.
getElement(X,[X|_],1).
getElement(X,[_|L],K):-
    getElement(X,L,K1), K is K1+1.

main:-
    getName.

% Getname
getName:-
    write('Please enter your name: '),nl,
    read(String),nl,
    getStream.

% Get stream
getStream:-
    write('Please enter your stream: '),nl,
```

```

write('Allowed are: [CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths]'),nl,
read(Stream),nl,
getYear.

```

% Get year and courses.

getYear:-

```

write('Please enter your year: '),nl,
read(Year),nl,
write('Please enter your courses: '),nl,
write('The allowed domains are:
[CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]'),nl,
write('Type 1 if you have a course of that domain else 0. '),nl,
write('Type "stop." to stop. '),nl,
read_list_until(L,stop),nl,
%write(L),nl,
getAdvisoryOrPrediction(L).

```

% Get Advisory or prediction.

getAdvisoryOrPrediction(L):-

```

write('Do you want advisory or prediction?'),nl,
read(Type),nl,
atom_string(Type,Type_String_real),
"advisory"=Type_String_real->startAdvisory(L);startPrediction(L).

```

% Get Grades in the Courses.

startPrediction(L):-

```

%write(L),nl,
count(L,N),
write('For each of the courses give grade point: '),nl,
read_list_until(Grades,stop),
%write(Grades),nl,
getSkills(Grades).

```

% Get Internships, Research, additional works.

getSkills(Grades):-

```

write('Have you done any internships?'),nl,
write('Possible domains are:
[CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]'),nl,
read_list_until(Internships,stop),
%write(Internships),nl,
write('State research work in these possible domains (if any): '),nl,
write('Possible domains are:
[CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]'),nl,
read_list_until(Research,stop),
%write(Research),nl,
write('State additional projects and additional works in those domains: '),nl,
write('Possible domains are:
[CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]'),nl,
read_list_until(AddWorks,stop),
%write(AddWorks),nl,
getAptitude(Grades,Internships,Research,AddWorks).

```



```

% Get Exceptional achievement, LORs, Coding_Skill, Clubs, Online Courses.
getAptitude(Grades,Internships,Research,AddWorks):-
    write('If an A+ or exceptional achievement or interest in any domain, please state: '),nl,
    write('Possible domains are:
[CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]'),nl,
    read_list_until(Exceptional,stop),
    %write(Exceptional),nl,
    write('If LORs or good relations with professors in a domain, please state: '),nl,
    write('Possible domains are:
[CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]'),nl,
    read_list_until(LORs,stop),
    %write(LORs),nl,
    write('State you coding skills, if above average: '),nl,
    read(Coding_Skill),
    %write(Coding_Skill),nl,
    write('If any acknowledgeable participation in clubs in the domains: '),nl,
    write('Possible domains are:
[CSE,ECE,Design,SSH,Computational_Biology,Applied_Maths,Finance]'),nl,
    read_list_until(Clubs,stop),
    %write(Clubs),nl,
    write('Any extra online or other courses done in those domains: '),nl,
    read_list_until(Other_Courses,stop),
    %write(Other_Courses),nl,

ingenuityConsideration(Grades,Ingenuity,Research,AddWorks,Exceptional,LORs,Coding_Skill,Clubs,Other_Courses).

% Considering Ingenuity.
ingenuityConsideration(Grades,Internships,Research,AddWorks,Exceptional,LORs,Coding_Skill,Clubs,Other_Courses):-
    write('Can you work long hours?'),nl,
    read(Long_Hours),
    write('Do you expect to go for a PhD?'),nl,
    read(PhD),
    write('Any chance for a startup or any idea?'),nl,
    read(Startup),

printPrediction(Grades,Internships,Research,AddWorks,Exceptional,LORs,Coding_Skill,Clubs,Other_Courses,Long_Hours,PhD,Startup).

% Printing Prediction of opportunities, future
printPrediction(Grades,Internships,Research,AddWorks,Exceptional,LORs,Coding_Skill,Clubs,Other_Courses,Long_Hours,PhD,Startup):-
    getElement(GradeCSE,Grades,1),
    write('Below are all possible predictions of your future : '),nl,
    addCodingJob(Coding_Skill,GradeCSE),
    addStartup(Startup,Long_Hours),

considerCSE(Grades,Internships,Research,AddWorks,Exceptional,LORs,Coding_Skill,Clubs,Other_Courses,Long_Hours,PhD,Startup),

```

```
considerECE(Grades,Internships,Research,AddWorks,Exceptional,LORs,Coding_Skill,Clubs,Other_Courses,Long_Hours,PhD,Startup),
```

```
considerDesign(Grades,Internships,Research,AddWorks,Exceptional,LORs,Coding_Skill,Clubs,Other_Courses,Long_Hours,PhD,Startup),
```

```
considerSSH(Grades,Internships,Research,AddWorks,Exceptional,LORs,Coding_Skill,Clubs,Other_Courses,Long_Hours,PhD,Startup),
```

```
considerCB(Grades,Internships,Research,AddWorks,Exceptional,LORs,Coding_Skill,Clubs,Other_Courses,Long_Hours,PhD,Startup),
```

```
considerAM(Grades,Internships,Research,AddWorks,Exceptional,LORs,Coding_Skill,Clubs,Other_Courses,Long_Hours,PhD,Startup),
```

```
considerFinance(Grades,Internships,Research,AddWorks,Exceptional,LORs,Coding_Skill,Clubs,Other_Courses,Long_Hours,PhD,Startup).
```

```
% Prediction for CSE profiles.
```

```
considerCSE(Grades,Internships,Research,AddWorks,Exceptional,LORs,Coding_Skill,Clubs,Other_Courses,Long_Hours,PhD,Startup):-
```

```
    getElement(GradeCSE,Grades,1),
```

```
    getElement(InternCSE,Internships,1),
```

```
    getElement(ResearchCSE,Research,1),
```

```
    getElement(AddCSE,AddWorks,1),
```

```
    getElement(ExceptionalCSE,Exceptional,1),
```

```
    getElement(LORsCSE,LORs,1),
```

```
    getElement(ClubsCSE,Clubs,1),
```

```
    getElement(OtherCSE,Other_Courses,1),
```

```
((GradeCSE>=8.5,(InternCSE==1;ExceptionalCSE==1;(OtherCSE==1,ClubsCSE==1)))->
```

```
    write('Web Developer, Front-end/Back-end Developer.').nl;
```

```
    write('')),
```

```
((GradeCSE>=9,(ResearchCSE==1;AddCSE==1;LORsCSE==1))->
```

```
    write('Masters, Researcher, Professor in CSE fields.').nl;
```

```
    write('')),
```

```
((GradeCSE>=9,(ResearchCSE==1;AddCSE==1;LORsCSE==1;PhD==1))->
```

```
    write('PhD in CSE fields.').nl;
```

```
    write('')).
```

```
% Prediction for ECE profiles.
```

```
considerECE(Grades,Internships,Research,AddWorks,Exceptional,LORs,Coding_Skill,Clubs,Other_Courses,Long_Hours,PhD,Startup):-
```

```
    getElement(GradeECE,Grades,2),
```

```
    getElement(GradeCSE,Grades,1),
```

```
    getElement(InternECE,Internships,2),
```

```
    getElement(InternCSE,Internships,1),
```

```
    getElement(ResearchECE,Research,2),
```

```
    getElement(AddECE,AddWorks,2),
```

```
    getElement(ExceptionalECE,Exceptional,2),
```

```
    getElement(LORsECE,LORs,2),
```

```
    getElement(ClubsECE,Clubs,2),
```

```

getElement(OtherECE,Other_Courses,2),
((GradeECE>=8.7,(InternECE==1;ExceptionalECE==1;(OtherECE==1,ClubsECE==1)))->
    write('Hardware Engineer,Communications Engineer'),nl;
    write(")),
((GradeECE>=8.7,(InternCSE==1;InternECE==1;ExceptionalECE==1))->
    write('Computer Engineer'),nl;
    write(")),
((GradeECE>=8.7,(ResearchECE==1;ExceptionalECE==1;LORsECE==1;AddECE==1))->
    write('PhD. in ECE core, Researcher, Robotics'),nl;
    write(")).

```

% Prediction for Design Profiles.

considerDesign(Grades,Internships,Research,AddWorks,Exceptional,LORs,Coding\_Skill,Clubs,Other\_Courses,Long\_Hours,PhD,Startup):-

```

    getElement(GradeDesign,Grades,3),
    getElement(InternDesign,Internships,3),
    getElement(ResearchDesign,Research,3),
    getElement(AddDesign,AddWorks,3),
    getElement(ExceptionalDesign,Exceptional,3),
    getElement(LORsDesign,LORs,3),
    getElement(ClubsDesign,Clubs,3),
    getElement(OtherDesign,Other_Courses,3),
    ((GradeDesign>=8.5,(InternDesign==1;ExceptionalDesign==1;
(OtherDesign==1,ClubsDesign==1)))->
        write('UI/UX Design engineer,Graphic Designer. '),nl;
        write(")),
    ((GradeDesign>=9,(ResearchDesign==1;LORsDesign==1))->
        write('Research in Design fields as app-development, new Graphic fonts'),nl;
        write(")).

```

% Prediction for SSH Profiles.

considerSSH(Grades,Internships,Research,AddWorks,Exceptional,LORs,Coding\_Skill,Clubs,Other\_Courses,Long\_Hours,PhD,Startup):-

```

    getElement(GradeSSH,Grades,4),
    getElement(InternSSH,Internships,4),
    getElement(ResearchSSH,Research,4),
    getElement(AddSSH,AddWorks,4),
    getElement(ExceptionalSSH,Exceptional,4),
    getElement(LORsSSH,LORs,4),
    getElement(ClubsSSH,Clubs,4),
    getElement(OtherSSH,Other_Courses,4),
    ((GradeSSH>=8.3,
(InternSSH==1;OtherSSH==1;AddSSH==1;ExceptionalSSH==1;ClubsSSH==1))->
        write('Public Speaker, Environmentalist, Social Server'),nl;
        write(")),
    ((GradeSSH>=8.5,(ExceptionalSSH==1,LORsSSH==1,ResearchSSH==1))->
        write('Professor in the SSH field preferred'),nl,
        write('Psychologist, Philanthropist. '),nl;
        write(")).

```

% Prediction for CB Profiles.

```

considerCB(Grades,Internships,Research,AddWorks,Exceptional,LORs,Coding_Skill,Clubs,Other_
Courses,Long_Hours,PhD,Startup):-
    getElement(GradeCB,Grades,5),
    getElement(GradeCSE,Grades,1),
    getElement(InternCB,Internships,5),
    getElement(ResearchCB,Research,5),
    getElement(AddCB,AddWorks,5),
    getElement(ExceptionalCB,Exceptional,5),
    getElement(LORsCB,LORs,5),
    getElement(ClubsCB,Clubs,5),
    getElement(OtherCB,Other_Courses,5),
    (((GradeCB>=8.5;GradeCSE>=9),(InternCB==1;ExceptionalCB==1;
(OtherCB==1,ClubsCB==1)))->
        write('ML enthusiast in Biomedical fields'),nl,
        write('Computational Biology, Human Anatomy, Genome fields'),nl;
        write(")),
    (((GradeCB>=8.5;GradeCSE>=9),(ResearchCB==1;LORsCB==1;ExceptionalCB==1))->
        write('Research in Computational Biology'),nl;
        write(")).

```

% Prediction for AM Profiles.

```

considerAM(Grades,Internships,Research,AddWorks,Exceptional,LORs,Coding_Skill,Clubs,Other
_Courses,Long_Hours,PhD,Startup):-
    getElement(GradeAM,Grades,6),
    getElement(GradeCSE,Grades,1),
    getElement(InternAM,Internships,6),
    getElement(ResearchAM,Research,6),
    getElement(AddAM,AddWorks,6),
    getElement(ExceptionalAM,Exceptional,6),
    getElement(LORsAM,LORs,6),
    getElement(ClubsAM,Clubs,6),
    getElement(OtherAM,Other_Courses,6),
    ((GradeAM>=8.5,GradeCSE>=8.5,(InternAM==1;
(OtherAM==1,ClubsAM==1);ExceptionalAM==1))->
        write('Investment analysis fields, Data Analysis fields'),nl;
        write(")),
    ((GradeAM>=9,AddAM==1,OtherAM==1)->
        write('Further Maths studies and fields'),nl;
        write(")),
    ((GradeAM>=9,(ResearchAM==1;LORsAM==1))->
        write('Professor in mathematics, further studies like Masters or PhD. '),nl;
        write(")).

```

% Prediction for Finance Profiles.

```

considerFinance(Grades,Internships,Research,AddWorks,Exceptional,LORs,Coding_Skill,Clubs,Ot
her_Courses,Long_Hours,PhD,Startup):-
    getElement(GradeFinance,Grades,7),
    getElement(GradeCSE,Grades,1),
    getElement(InternFinance,Internships,7),
    getElement(ResearchFinance,Research,7),
    getElement(AddFinance,AddWorks,7),
    getElement(ExceptionalFinance,Exceptional,7),

```

```

getElement(LORsFinance,LORs,7),
getElement(ClubsFinance,Clubs,7),
getElement(OtherFinance,Other_Courses,7),
((GradeFinance>=9,GradeCSE>=8.5,(InternFinance==1;
(OtherFinance==1,ClubsFinance==1);ExceptionalFinance==1))->
    write('Analyst at Banking Firms, Cyber-Security fields in banks'),nl;
    write(")),
((GradeFinance>=9,InternFinance==1,(OtherFinance==1;ClubsFinance==1))->
    write('Investment Banker'),nl;
    write("),nl).

% Prediction for an SDE job.
addCodingJob(Coding_Skill,GradeCSE):-
    Coding_Skill==1,GradeCSE>=8.5->
        write('Software Development Engineer'),nl;
        write("").

% Prediction for Startup.
addStartup(Startup,Long_Hours):-
    Startup==1,Long_Hours==1->
        write('Possibility of Startup'),nl;
        write("").

% Prediction for PhD after job.
addPhD(PhD):-
    ((PhD==1)->
        write('Possibility of PhD during job or after graduation. '),nl;
        write(")).

```

This includes all of the prolog features used and taught in class as well as some other features. There is ingenuity and medium complexity of the prolog features and in output. Also, the prediction is done considering opportunities, scenarios and real-life situations.