

# Artificial Intelligence

## Assignment-1

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2019262

### Code for the Elective

The Elective Advisory System is in Prolog. I've implemented it for four years, so students can get recommendations for electives for all four years, first, second, third, and fourth.

Here is the Code for the Same.

```
write('Please Enter'), write(' your Course'), write(' branch '), read(X), assert(branch(X)),
write('Please Enter'), write(' your CGPA '), read(Marks), assert(cgpa(Marks)), nl,
write('Please Enter'), write(' your Roll no '), read(Roll), nl,
write('Answer the'), write(' Question with y/n only'), nl,
write('Do you have'), write(' the knowledge'), write('of Mathematics and'), write('Statistics'),
read(Y), Y == y, y == Y, Y == y,
assert(aa(ms)), nl,
write('Would you'), write(' mind planning'), write(' career in'), nl.

generate_electives:- future(ai), future(ml), cgpa(M), M >= 8, M >= 7.9, aa(math), future(higher_studies),
assert(recommended(artificial_intelligence_and_machinelearning)),
fail.

length_1(0, []).
length_1(L+1, [H|T]) :- length_1(L, T).

info_programming:-
    write('Programming ?'),
    read(Y), Y == y, y == Y, Y == y,
    assert(aa(programming)).
info_programming.

length_2(0, []).
length_2(L+1, [H|T]) :- length_2(L, T).

is_sorted([]).
is_sorted([_]).
is_sorted([X,Y|T]):- X <= Y, is_sorted([Y|T]).

generate_electives:- future(graphics), future(is),
    cgpa(M), M >= 6,
    assert(recommended(ethicalhacking)),
    fail.

is_sorted([]).
is_sorted([_]).
is_sorted([X,Y|T]):- X <= Y, is_sorted([Y|T]).

future_ml:-
    write('Machine Learning'), write(' Domain?'),
    read(Y), Y == y, y == Y, Y == y,
    assert(future(ml)).
future_ml.

generate_electives:- aa(ms), cgpa(M),
    M >= 7.5, M >= 7.4,
    future(ml),
    assert(recommended(machinelearning_Or_Statisticalmachinelarning)),
    fail.

future_ai:-
    write('Artificial Intelligence'), write(' Domain?'),
    read(Y),
    Y == y, y == Y, Y == y,
    assert(future(ai)).
future_ai.
```

```

generate_electives:- aa(ms), cgpa(M),
    M >= 7.5, M >= 7.4,
    future(ai),
    assert(recommended(artificialIntelligence_Or_IntelligentSystems)),
    fail.

future_data:-
    write('Data mining'),write(' and EDA ?'),
    read(Y),
    Y == y, y == Y, Y == y,
    assert(future(data)).
future_data.

is_sorted([]).
is_sorted([_]).
is_sorted([X,Y|T]):- X=<Y, is_sorted([Y|T])..

generate_electives:- aa(ms),aa(programming),
    cgpa(M),
    M >= 6.5, M >= 6.4,
    assert(recommended(program_analysis)),
    fail.

is_sorted([]).
is_sorted([_]).
is_sorted([X,Y|T]):- X=<Y, is_sorted([Y|T])..

```

```

future_networking:-
    write('Networking Domain ?'),
    read(Y),
    Y == y, y == Y, Y == y,
    assert(future(networking)).
future_networking.

generate_electives:- aa(ms),cgpa(M),
    M >= 6.5, M >= 6.4,
    future(data),
    assert(recommended(bigBataAnalytics)),
    fail.

future_graphics:-
    write('Graphic'),write(' designing'),write(' Domain?'),
    read(Y),
    Y == y, y == Y, Y == y,
    assert(future(graphics)).
future_graphics.

generate_electives:- aa(ms),
    cgpa(M),
    M >= 6.5, M >= 6.4,
    future(data),
    assert(recommended(dataMining)),
    fail.

```

```

future_informationsecurity:-
    write('Information'),
    write(' Security'),
    write(' Domain?'),
    read(Y),
    Y == y, y == Y, Y == y,
    assert(future(is)).
future_informationsecurity.

generate_electives:-
    aa(ms),aa(programming),
    cgpa(M),
    M >= 6.5, M >= 6.4,
    assert(recommended(graduateAlgorithm_Or_ModernAlgorithmDesign)),
    fail.

future_higherstudies:-
    nl,
    write('Do you have'),write(' any plans to do'),write(' Masters in future ? ')
    ,read(Y),
    Y == y, y == Y, Y == y,
    assert(interested(higher_studies)).
future_higherstudies.

generate_electives:-
    future(graphics),
    future(is),
    cgpa(M),
    M >= 6,
    assert(recommended(computerArchitecture)),

convert_to_list([Px|Tail]):-
    retract(recommended(Px)),
    convert_to_list(Tail).
convert_to_list([]).

generate_electives:-
    future(networking),
    cgpa(M),
    M >= 6.5, M >= 6.4,
    aa(maths),
    assert(recommended(embeddedsystems)),
    fail.

length_1(0,[]).
length_1(L+1, [H|T]) :- length_1(L,T).

generate_electives:-
    future(networking),
    cgpa(M),
    M >= 6.5, M >= 6.4,
    aa(maths),
    assert(recommended(mobilecomputing_and_embeddedsystems_and_mobileandcellularnetworksecurity)),
    fail.

length_1(0,[]).
length_1(L+1, [H|T]) :- length_1(L,T).

generate_electives:-
    future(networking),
    cgpa(M),
    M >= 6.5, M >= 6.4,
    aa(maths),
    assert(recommended(mobilecomputing_and_embeddedsystems_and_mobileandcellularnetworksecurity)),
    fail.

length_1(0,[]).
length_1(L+1, [H|T]) :- length_1(L,T).

```

```

generate_electives:- future(networking),
    cgpa(M),
    M >= 6.5, M >= 6.4,
    aa(math),
    assert(recommended(wirelessnetworks_and_networksecurity_and_distributedsystems)),
    fail.

member(X, [X|_]).           % member(X, [Head|Tail]) is true if X = Head
                           % that is, if X is the head of the list
member(X, [_|Tail]) :- % or if X is a member of Tail,
    member(X, Tail).      % ie. if member(X, Tail) is true.

generate_electives:-
    nl,nl,writeln('-----Thank You For Your Valuable Time-----'),nl.

start_3:-
    retractall(aa(_)),retractall(branch(_)),retractall(cgpa(_)),retractall(future(_)),
    student_info_3,
    generate_electives_3,
    convert_to_list(Electives),
    nl,
    write('The recommended list'),
    write('of electives'),
    write(' is as following: ' ),nl,
    write(Electives).

student_info_3:-
    course_grades_3.

student_info_3:-
    course_grades_3,
    info_programming_3,
    future_ml_3,
    future_ai_3,
    future_networking_3,
    future_informationsecurity_3,
    future_graphics_3,
    future_data_3,
    future_higherstudies_3.

is_sorted([]).
is_sorted([_]).
is_sorted([X,Y|T]):-X=<Y,is_sorted([Y|T]).

course_grades_3:-
    write('Enter your'),write(' branch '),read(X),assert(branch(X)),
    write('Enter your'),write(' Undergraduate CGPA '),read(Marks),assert(cgpa(Marks)),nl,
    write('Enter Your'),write(' Roll No'),read(ROLL),
    write('Please answer'),write(' with y or n only.'),nl,
    write('Do you have a'),write(' strong grasp of mathematics'),write(' and statistics?'),read(Y),Y == y, y
    assert(aa(ms)),nl,
    write('Are you'),write(' considering a career in:'),nl.

is_sorted([]).
is_sorted([_]).
is_sorted([X,Y|T]):-X=<Y,is_sorted([Y|T]).

info_programming_3:-

```

```

info_programming_3:-  

    write('Programming?'),  

    read(Y),  

    Y == y, y == Y, Y == y,  

    assert(aa(programming)).  

info_programming_3.  

  

length_1(0,[]).  

length_1(L+1, [H|T]) :- length_1(L,T).  

  

generate_electives_3:- aa(ms),  

    cgpa(M), M >= 7.5, M >= 7.4,  

    future(ml),  

    assert(recommended(machinelearning_Or_Statisticalmachinelarning)),  

    fail.  

  

future_ml_3:-  

    write('Machine learning'),write(' field?'),  

    read(Y),  

    Y == y, y == Y, Y == y,  

    assert(future(ml)).  

future_ml_3.  

  

length_2(0,[]).  

length_2(L+1, [H|T]) :- length_1(L,T).  

  

generate_electives_3:- aa(ms),  

    cgpa(M),  

    M >= 7.5, M >= 7.4,  

    future(ai),  

    assert(recommended(artificialIntelligence_Or_IntelligentSystems)),  

    fail.  

  

member(X, [X|_]).           % member(X, [Head|Tail]) is true if X = Head  

                           % that is, if X is the head of the list  

member(X, [_|Tail]) :-   % or if X is a member of Tail,  

    member(X, Tail).      % ie. if member(X, Tail) is true.  

  

generate_electives_3:- future(networking),  

    cgpa(M),  

    M >= 6.5, M >= 6.4,  

    aa(maths),  

    assert(recommended(mobilecomputing_and_embeddedsystems_and_mobileandcellularnetworksecurity)),  

    fail.  

  

future_ai_3:-  

    write('Artificial Intelligence field?'),  

    read(Y),  

    Y == y, y == Y, Y == y,  

    assert(future(ai)).  

future_ai_3.  

  

generate_electives_3:- aa(ms),aa(programming),  

    cgpa(M),  

    M >= 6.5, M >= 6.4,

```

```

generate_electives_3:- aa(ms),aa(programming),
    cgpa(M),
    M >= 6.5, M >= 6.4,
    assert(recommended(program_analysis)),
    fail.

future_data_3:-
    write('Data mining'),write(' and warehousing Field?'),
    read(Y),
    Y == y, y == Y, Y == y,
    assert(future(data)).
future_data_3.

generate_electives_3:- aa(ms),aa(programming),
    cgpa(M),
    M >= 6.5, M >= 6.4,
    assert(recommended(graduateAlgorithm_Or_ModernAlgorithmDesign)),
    fail.

future_networking_3:-
    write('Networking field?'),
    read(Y),
    Y == y, y == Y, Y == y,
    assert(future(networking)).
future_networking_3.

generate_electives_3:- aa(ms),cgpa(M),
    M >= 6.5, M >= 6.4,
    future(data),

```

```

generate_electives_3:- aa(ms),cgpa(M),
    M >= 6.5, M >= 6.4,
    future(data),
    assert(recommended(dataMining)),
    fail.

member(X, [X|_]).           % member(X, [Head|Tail]) is true if X = Head
|   |   |   |   | % that is, if X is the head of the list
member(X, [_|Tail]) :- % or if X is a member of Tail,
    member(X, Tail).      % ie. if member(X, Tail) is true.


```

```

generate_electives_3:- future(networking),
    cgpa(M),
    M >= 6.5, M >= 6.4,
    aa(maths),
    assert(recommended(embeddedsystems)),
    fail.


```

```

future_graphics_3:-
    write('Graphic designing?'),
    read(Y),
    Y == y, y == Y, Y == y,
    assert(future(graphics)).
future_graphics_3.


```

```

generate_electives_3:- aa(ms),cgpa(M),
    M >= 6.5, M >= 6.4,
    future(data),
    assert(recommended(bigDataAnalytics)),

```

```

generate_electives_3:- aa(ms),cgpa(M),
M >= 6.5, M >= 6.4,
future(data),
assert(recommended(bigBataAnalytics)),
fail.

future_informationsecurity_3:-
write('Information Security?'),
read(Y),
Y == y, y == Y, Y == y,
assert(future(is)).
future_informationsecurity_3.

generate_electives_3:- future(networking),
cgpa(M),
M >= 6.5, M >= 6.4,
aa(maths),
assert(recommended(wirelessnetworks_and_networksecurity_and_distributedsystems)),
fail.

length_3(0,[[]]).
length_3(L+1, [H|T]) :- length_1(L,T).

generate_electives_3:- future(graphics),
future(is),
cgpa(M),
M >= 6,M>=5.9,
assert(recommended(computerArchitecture)),
fail.

```

```

future_higherstudies_3:-
    nl,
    write('Do you'), write(' want to study'), write(' further? '),
    read(Y),
    Y == y, Y == Y, Y == y,
    assert(interested(higher_studies)).
future_higherstudies_3.

generate_electives_3:-
    future(graphics),
    future(is),
    cgpa(M),
    M >= 6,
    assert(recommended(ethicalhacking)),
    fail.

length_4(0, []).
length_4(L+1, [H|T]) :- length_1(L, T).

generate_electives_3:-
    future(graphics),
    cgpa(M),
    M >= 6,
    assert(recommended(computerGraphics)),
    fail.

member(X, [X|_]).           % member(X, [Head|Tail]) is true if X = Head
                            % that is, if X is the head of the list
member(X, [_|Tail]) :-      % or if X is a member of Tail,
    member(X, Tail).        % ie. if member(X, Tail) is true.

```



```

%Semester1
course(1,'communication_Skills','COM101','','1,'Mandatory').
course(2,'introduction_to_Programming','CSE101','','1,'Mandatory').
course(3,'introduction_to_HCI','DES101','','1,'Mandatory').
course(4,'digital_Circuits','ECE111','','1,'Mandatory').
course(5,'mathI','MTH100','','1,'Mandatory').

sem_list(1,['Communication Skills','Introduction to Programming','Introduction to HCI','Digital Circuits','Math-I']). 
sem_list(2,['Data Structures and Algorithms','Basic Electronics','Probablity & Statistics','Introduction to Probability and Statistics']).

sem_list1(3,'csb',[ 'Cell Biology and Biochemistry','Genetics and Molecular Biology']).
sem_list1(3,'csam',[ 'Discrete Mathematics','Number Theory','Math-III','Real-Ananlysis-1','Discrete Structures']).
sem_list1(3,'csd',[ 'Design Perspectives']).
sem_list1(3,'ece',[ 'Circuit Theory and Devices','Embedded Logic Design','Signals and Systems']).

sem_list1(4,'csb',[ 'Practical Bioinformatics','Introduction to Quantitative Biology']).
sem_list1(4,'csam',[ 'Theory of Computation','Maths-IV','Abstract Algebra-I','Introduction to Mathematical Logic']).
sem_list1(4,'csd',[ 'Human Computer Interaction','Design of Interactive Systems']).
sem_list1(4,'ece',[ 'Integrated Electronics','Fields and Waves','Principles of Communication Systems']).

%Semester2
course(6,'Data Structures and Algorithms','CSE102','CSE101',2,'Data Structures').
course(7,'Basic Electronics','ECE113','ECE111',2,'Electronics').
course(8,'Probablity & Statistics','MTH201','MTH100',2,'Mathematics').
course(9,'Computer Organisation','CSE112','ECE111',2,'Operating Systems').
course(10,'Introduction to Intelligent Systems','CSE140','CSE101',2,'Artificial Intelligence').
course(11,'Design Drawing and Visualisation','DES107','DES101',2,'Design').

%Semester2
course(6,'Data Structures and Algorithms','CSE102','CSE101',2,'Data Structures').
course(7,'Basic Electronics','ECE113','ECE111',2,'Electronics').
course(8,'Probablity & Statistics','MTH201','MTH100',2,'Mathematics').
course(9,'Computer Organisation','CSE112','ECE111',2,'Operating Systems').
course(10,'Introduction to Intelligent Systems','CSE140','CSE101',2,'Artificial Intelligence').
course(11,'Design Drawing and Visualisation','DES107','DES101',2,'Design').
course(12,'Visual Design Communication','DES202','DES101',2,'Design').
course(13,'Introduction to Sociology and Anthropology','SOC101','SSH101',2,'Social Science').
course(14,'Critical Thinking and Readings in Social Sciences','SSH101','SSH101',2,'Social Science').
course(15,'Foundations of Biology','BI0101','BI0101',2,'Biology').
course(16,'Democracy in India: Principles and Practices','SSH261','SSH101',2,'Social Science').
course(17,'Introduction to Digital Ethnography','SOC213','SOC101',2,'Social Science').
course(18,'Money and Banking','EC0223','EC0101',2,'Economics').
course(19,'Nation and her Narratives','SSH215','SSH101',2,'Literature').
course(20,'Theory and Practice of Engineering Ethics','SSH222','SSH101',2,'Social Science').
course(21,'Introduction to Philosophy','SSH121','SSH101',2,'Social Science').

%Third Sem courses
course(22,'Cell Biology and Biochemistry','BI0211',[ 'BI0101'],3,'Biology').
course(23,'Genetics and Molecular Biology','BI0214',[ 'BI0101'],3,'Biology').
course(24,'Discrete Mathematics','CSE121',[ 'CSE102'],3,'Mathematics').
course(25,'Number Theory','MTH211',[ 'MTH100'],3,'Mathematics').
course(26,'Math-III','MTH203',[ 'MTH100'],3,'Mathematics').
course(27,'Real-Ananlysis-1','MTH240',[ 'MTH101'],3,'Mathematics').
course(28,'Discrete Structures','MTH210',[ 'MTH101','CSE102'],3,'Mathematics').
course(29,'Design Perspectives','DES201',[ 'DES101','DES202'],3,'Design').
course(30,'Circuit Theory and Devices','ECE215',[ 'ECE111'],3,'Electronics').
course(31,'Embedded Logic Design','ECE270',[ 'ECE111'],3,'Electronics').

```

```

start_1(NAME):-
    format('Hey ~q !and you are in 1st Year and you does not have any Electives',[NAME]),nl,
    write('However Your courses for Semester1 and Semester 2 are :- '),nl,
    write('*****-----Semester1-----*****'),nl,
    sem_list(1,X),
    write(X),nl,
    write('*****-----Semester2-----*****'),nl,
    sem_list(2,Y),
    write(Y).

```

```

start_2(NAME):-
    format('Hey ~q ! you are in 2nd Year and you does not have any Electives',[NAME]),nl,
    write('However your courses for Semester 3 and Semester4 are :- '),nl,
    write('*****-----Semester3-----*****'),nl,
    write('-----CSB-----'),nl,
    sem_list1(3,'csb',X),
    write(X),nl,
    write('-----CSAM-----'),nl,
    sem_list1(3,'csam',Y),
    write(Y),nl,
    write('-----ECE-----'),nl,
    sem_list1(3,'ece',Z),
    write(Z),nl,
    write('-----CSD-----'),nl,
    sem_list1(3,'csd',P),
    write(P),nl,nl,

    write('*****-----Semester4-----*****'),nl,
    write('-----CSB-----'),nl,
    sem_list1(4,'csb',K),
    write(K),nl,
    write('-----CSAM-----'),nl,
    sem_list1(4,'csam',L),
    write(L),nl,
    write('-----ECE-----'),nl,
    sem_list1(4,'ece',M),
    write(M),nl,
    write('-----CSD-----'),nl,
    sem_list1(4,'csd',N),
    write(N),nl

```

## Screenshots of the Program

```
?- start.  
.....Welcome To Electives Advisory System.....  
.....Please answer the questions given below.....  
  
Please Enter your Name :-  
|: pankaj].  
Hi pankaj ! Welcome Once Again  
Please Enter your Year  
|: 1.  
Hey _2070 land you are in 1st Year and you does not have any Electives  
However Your courses for Semester1 and Semester 2 are :-  
*****-----Semester1-----*****  
[Communication Skills,Introduction to Programming,Introduction to HCI,Digital Circuits,Math-I]  
*****-----Semester2-----*****  
[Data Structures and Algorithms,Basic Electronics,Probability & Statistics,Introduction to Intelligent Systems,Design Drawing and Visualisation,Visual Design Communication,Introduction to Sociology and Anthropology,Critical Thinking and Readings in Social Sciences,Foundations of Biology,Democracy in India: Principles and Practices,Introduction to Digital Ethnography,Money and Banking,Nation and her Narratives/Theory and Practice of Engineering Ethics,Introduction to Philosophy]  
-----Thank You For Your Valuable Time-----  
  
The recommended list of electives is as following:  
[]  
true.
```

```
?- start.  
.....Welcome To Electives Advisory System.....  
.....Please answer the questions given below.....  
  
Please Enter your Name :-  
|: pankaj.  
Hi pankaj ! Welcome Once Again  
Please Enter your Year  
|: 3.  
Enter your branch |: csam.  
Enter your Undergraduate CGPA |: 9.  
  
Enter Your Roll No|: 2019262.  
Please answer with y or n only.  
Do you have a strong grasp of mathematics and statistics?|: y.  
  
Are you considering a career in:  
Programming?: y.  
Machine learning field?: y.  
Artificial Intelligence field?: y.  
Networking field?: n.  
Information Security?: n.  
Graphic designing?: y.  
Data mining and warehousing Field?: y.  
  
Do you want to study further? |: y.  
  
-----Thank You For Your Valuable Time-----  
  
The recommended list of electives is as following:  
[machinelearning_Or_StatisticalMachineLearning,artificialIntelligence_Or_IntelligentSystems,program_analysis,graduateAlgorithm_Or_ModernAlgorithmDesign,dataMining,bigDataAnalytics,computerGraphics]
```

```
?- start.  
.....Welcome To Electives Advisory System.....  
.....Please answer the questions given below.....  
  
Please Enter your Name :-  
|: pankaj.  
Hi pankaj ! Welcome Once Again  
Please Enter your Year  
|: 4.  
Please Enter your Course branch |: csam.  
Please Enter your CGPA |: 9.  
  
Please Enter your Roll no |: 2019262.  
  
Answer the Question with y/n only  
Do you have the knowledge of Mathematics and Statistics|: y.  
  
Would you mind planning career in  
Programming ?: n.  
Machine Learning Domain?: n.  
Artificial Intelligence Domain?: n.  
Networking Domain ?: y.  
Information Security Domain?: y.  
Graphic designing Domain?: y.  
Data mining and EDA ?: n.  
  
Do you have any plans to do Masters in future ? |: n.  
  
-----Thank You For Your Valuable Time-----  
  
The recommended list of electives is as following:  
[computerGraphics,ethicalhacking,computerArchitecture]  
true .
```

```
.....Welcome To Electives Advisory System.....  
.....Please answer the questions given below.....
```

```
Please Enter your Name :-
```

```
[|: pankaj.
```

```
Hi pankaj ! Welcome Once Again
```

```
Please Enter your Year
```

```
[|: 2.
```

```
Hey _3596 ! you are in 2nd Year and you does not have any Electives
```

```
However your courses for Semester 3 and Semester4 are :-
```

```
*****-----Semester3-----*****
```

```
-----CSB-----
```

```
[Cell Biology and Biochemistry,Genetics and Molecular Biology]
```

```
-----CSAM-----
```

```
[Discrete Mathematics,Number Theory,Math-III,Real-Ananlysis-1,Discrete Structures]
```

```
-----ECE-----
```

```
[Circuit Theory and Devices,Embedded Logic Design,Signals and Systems]
```

```
-----CSD-----
```

```
[Design Perspectives]
```

```
*****-----Semester4-----*****
```

```
-----CSB-----
```

```
[Practical Bioinformatics,Introduction to Quantitative Biology]
```

```
-----CSAM-----
```

```
[Theory of Computation,Maths-IV,Abstract Algebra-I,Introduction to Mathematical Logic,Graph Theory]
```

```
-----ECE-----
```

```
[Integrated Electronics,Fields and Waves,Principles of Communication Systems]
```

```
-----CSD-----
```

```
[Human Computer Interaction,Design of Interactive Systems]
```

```
-----Thank You For Your Valuable Time-----
```