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AI Assignment 1

This is an Expert System made for the choice of electives for the students of IIIT Delhi. This can be used by any student in the college irrespective of their semester, and can be used either for advice or for getting insight about their future choices.

Logic of the program

The most part of the logic is based on the recursive ability of prolog, along with the usage of facts as abstract data structures.

```
elective('Machine Learning',5,['IP','LA','PNS','M3/RA'],['csai','cse'],'Research').
elective('Big Data Analytics',5,['DBMS'],['cse','csam'],'Jobs').
elective('Data Mining',5,['IP','DBMS','PS','M1'],['cse'],'Research').
elective('Mobile Computing',5,['IP','LA','PNS','M3/RA'],['cse'],'Research').
elective('Security and Privacy',5,[],['cse'],'Security').
elective('Communication Networks',5,['PS'],['ece'],'Research').
elective('Digital Signal Processing',5,['SNS'],['ece'],'Research').
elective('Internet of Things',5,[],['ece'],'Research').
elective('Foundations of Finance',5,[],['cse','ece','csam','csd','csb','csss','csai'],'Economics').
elective('Economics',5,[],['ece'],'Economics').
elective('Digital Hardware Design',5,['ELD'],['ece'],'Research').
elective('Theory of Deep Learning',5,['M1','M3','SML','ML'],['cse','ece'],'Research').
elective('Radar Systems',5,['SNS'],['ece'],'Research').
elective('Number Theory',5,[],['csam'],'Mathematical Research').
elective('Numerical Methods',5,['M1','M4'],['csam'],'Mathematical Research').
elective('Digital Image Processing',5,['M1','PS'],['cse','csd','csss'],'Design').
elective('Computer Vision',5,['M2'],['cse','csd'],'Design').
elective('Machine Learning in BioMedical Applications',5,[],['cse','csb'],'HealthCare Research').
```

This is a screenshot from the code of the system. What this essentially does is, make an abstract data structure called elective, and enlists it's name,semester number, prerequisites, branch and it's domain through the prolog fact system.

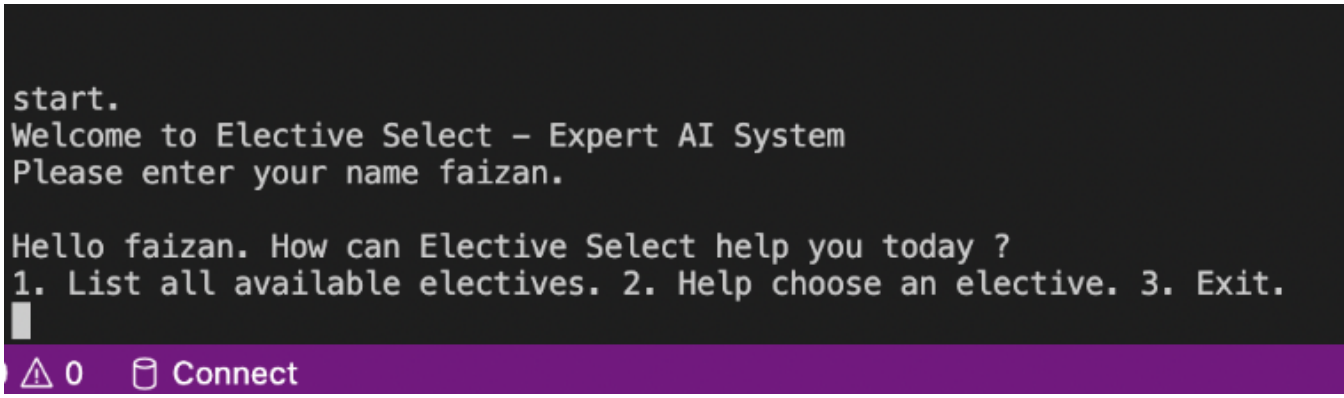
Couple this with the recursive nature of prolog, and some ‘recursive switch’ this can be leveraged to make an expert system.

```
    utility(Domain,Semester):-
        findall(Subject,(elective(Subject,Semester,_,_,Domain),checkPreReq(Subject)),List),printList(List).


checkPreReq(Subject):-
    elective(Subject,_,List,_,_),askPreReq(List,Can),(
        Can == 'True' -> write('')

    ).


askPreReq([],Can) :- Can = 'True'.
askPreReq([H|T],Can):-
    write('Did you score more than 7 in '),write(H),write(' ? If you didn\'t have the subject answer no. (y/n)'),nl,read(Ans),nl,
    (
        Ans == 'y' -> askPreReq(T,Can)

    ).
```

This code recursively asks the prerequisites for all the subjects which have the given Domain and Semester, and finally produces the desired elective.

Sample runs

- Main Menu



  - Choosing 1. would print all the electives the college has to offer along with their semester number.
  - Choosing 2. would take you through a survey of questions that would help the program to predict your elective choices
  - Finally choosing 3. would exit the program. My favourite option.

- Listing all available options.
  The output is pretty straight forward and thus i feel there is no need to be verbose here.

```
Hello fiazan. How can Elective Select help you today ?
1. List all available electives. 2. Help choose an elective. 3. Exit.
1.

Here are the electives that the college has to offer :-
Machine Learning
Big Data Analytics
Data Mining
Mobile Computing
Security and Privacy
Communication Networks
Digital Signal Processing
Internet of Things
Foundations of Finance
Economics
Digital Hardware Design
Theory of Deep Learning
Radar Systems
Number Theory
Numerical Methods
Digital Image Processing
Computer Vision
Machine Learning in BioMedical Applications
Data Mining in HealthCare
```

- First Semester

  Since the students don't have any electives, the program doesn't do anything.

```
Hello faizan. How can Elective Select help you today ?
1. List all available electives. 2. Help choose an elective. 3. Exit.
2.

Choice is 2 faizan
Enter your branch of study: (cse/csai/csd/csam/csb/csss/ece)
cse.

Enter your semester of study (1/2/3/4/5/6/7/8)
1.

First Semester has no electives. Enjoy while you can.

yes
| ?-
```

- Second Semester

```
Enter your semester of study (1/2/3/4/5/6/7/8)
2.

Recommended ssh electives
Nations and Narrative
Money and Banking
Environment and ethics
```

Here ssh subjects are recommended. This is because a second year student doesn't have any more electives. The program goes on to ask the interest of the user, and finally gives the output for the elective.

```
Do you have interest in literature ? y/n
y.
You should choose Nation and Narratives for this semester
```

- Third Semester.

  Since the third semester has electives that are all based on society, the choice is left to the user. There is a technical elective as well for certain branches and user preferences are asked to determine the right elective.

```
You have 2 electives this semester. One is a ssh choice, the other is between a Maths and an Electronics subject.
Which subject motivates you more ? Maths or Electronics (m/e)
m.

Technical Elective for the third semester isMultivariate Calculus
Your ssh electives are
Research Methods in Social Science and Design
Sociology
KCES
Perceptions in Society
```

- Fourth Semester

  The fourth semester follows the same trend as students have very little flexibility in deciding their subjects. The program asks the user for their interest whenever possible.

```
Enter your semester of study (1/2/3/4/5/6/7/8)
4.

Do you want to go into Machine Learning ? (y/n)
n.

Do you want to go into computer hardware ? y/n
y.

Technical Elective for this semester should be Theory of Computation

Do you want to do a design course this sem ? (y/n)
y.

Second Elective for this semester should be Prototyping Interactive Systems
```

- Fifth/Sixth/Seventh/Eighth Semester

  Students have identical fifth,sixth,seventh and eighth semesters, hence they can be clubbed together. The program takes into account the interests of the user, the future path that the user desires, the prerequisites of all the subjects that he has to take, and whether he should do a btp given his future career path, and gives a reasonable elective suggestion. Here is the workflow of one such choice example.

```
Enter your semester of study (1/2/3/4/5/6/7/8)
6.

What is your future career trajectory
1. Research/ Higher Education
2. Software Engineering Jobs
3. MBA
4. Security
4.
Did you score more than 7 in CN ? If you didn't have the subject answer no. (y/n)
y.

Did you score more than 7 in FCS ? If you didn't have the subject answer no. (y/n)
y.

Network Security
Theory of Modern Cryptology
Topics of Advanced Cybersecurity
```

Here is another example with a btp choice.

```
Enter your semester of study (1/2/3/4/5/6/7/8)
6.

What is your future career trajectory
1. Research/ Higher Education
2. Software Engineering Jobs
3. MBA
4. Security
1.
What is your future Research Domain
1. HealthCare Research
2. Mathematical Research
3. Technical Research
4. Design Research
1.

Did you score more than 7 in MLBA ? If you didn't have the subject answer no. (y/n)
y
.

Computational Methods in Oncology Research
Computer aided drug design
BioStatistics

It is recommended that you should do a btp to improve chances of success in research
 Have you done a btp before ? y/n
y.
You' re all set. All the best for your elective.
```