

# AI ASSIGNMENT 1

## ADVISORY SYSTEM

### Functionality:

- The program runs for students of every branch and can suggest electives for all their semesters.
- Till the 4th semester, the offered electives are suggested and the derivation is straightforward.
- 5th sem onwards, the suggestions are made on a priority basis:
  - Their career plan is kept foremost
  - If the necessary courses according to the career choice have been done.
  - Marks obtained in the essential courses.
  - If BTP has been completed.
  - If credits are over the allowed number of credits
  - Finally, electives based on their interests.
- The system takes into account the necessary courses, relevance to career and finally the driving interest towards the courses.
- The freedom of electives has been taken care of. Interbranch electives are suggested as and when found suitable.

## 1. For the First Semester

Here no elective courses are available to anyone despite the branch. Thus, just a Hello to the user.

```
?- start.

Welcome to the Advisory! Let's discuss your dilemmas :)

Enter your name:
|: ananya.

Enter your branch(cse/csam/csai/csb/csd/csss/ece):
|: csd.

Enter your semester(1-8)
|: 1.

Hello ananya, csd branch!
You are in 1st year!!

Choose 1-3:
1.Show Electives
2.Restart
3.Terminate.
|: 1.

No electives to choose in 1st sem, see you next time!

Choose again!
1.Restart
2.Terminate.
|: 1.
```

## 2. For the Second Semester

Cse, Csss, Csai, Csam and Ece, are offered SSH electives based on their interest. Csd is not offered any choice.

```
Choose again!
1.Restart
2.Terminate.
|: 1.

Welcome to the Advisory! Let's discuss your dilemmas :)

Enter your name:
|: ananya.

Enter your branch(cse/csam/csai/csb/csd/csss/ece):
|: cse.

Enter your semester(1-8)
|: 2.

Hello ananya, cse branch!
You are in 1st year!!

Choose 1-3:
1.Show Electives
2.Restart
3.Terminate.
|: 1.

Which of the following is your area of interest?
1.Indian Social Sciences.
2.Finance
3.Philosophy/Ethics
|: 3.

You have these SSH courses to choose from!

Introduction to Philosophy
Theory and Practice of Engineering Ethics

Choose again!
1.Restart
2.Terminate.
|:
```

### 3. For the Third Semester

Cse, Csam and Ece, are offered SSH electives.

Cse, Csd and Ece are offered Math choices.

Csb, Csss, Csai are not offered any choice.

```
Enter your branch(cse/csam/csai/csb/csd/csss/ece):  
|: ece.
```

```
Enter your semester(1-8)  
|: 3.
```

```
Hello ananya, ece branch!  
You are in 2nd year!!
```

```
Choose 1-3:  
1.Show Electives  
2.Restart  
3.Terminate.  
|: 1.
```

```
What are you more interested in?:  
1. Social Sciences  
2. Programming  
|: 2.
```

```
You should go with the following course!  
Advanced Programming
```

```
Choose again!  
1.Restart  
2.Terminate.  
|: ■
```

## 4. For the Fourth Semester

Cse and Ece, are offered SSH electives.

Csd has to choose between math and SSH electives.

Csam, Csss and Csb are offered no choice.

Csai has been given a range of options.

I have implemented the prediction system by prompting the user to tell about their interest.

Based on that an electives are suggested.

```
Welcome to the Advisory! Let's discuss your dilemmas :)
Enter your name:
|: ananya.

Enter your branch(cse/csam/csai/csb/csd/csss/ece):
|: csai.

Enter your semester(1-8)
|: 4.

Hello ananya, csai branch!
You are in 2nd year!!

Choose 1-3:
1. Show Electives
2. Restart
3. Terminate.
|: 1.

What are you most likely to practice in future?
1. Artificial Intelligence
2. Algorithm Design
3. Software Development
|: 1.

You should go with the following electives:
Ethics in AI
Maths IV
Statistical Inference
```

```
Welcome to the Advisory! Let's discuss your dilemmas :)
Enter your name:
|: ananya.

Enter your branch(cse/csam/csai/csb/csd/csss/ece):
|: csai.

Enter your semester(1-8)
|: 4.

Hello ananya, csai branch!
You are in 2nd year!!

Choose 1-3:
1. Show Electives
2. Restart
3. Terminate.
|: 1.

What are you most likely to practice in future?
1. Artificial Intelligence
2. Algorithm Design
3. Software Development
|: 2.

You should go with the following electives:
Graph Theory
Introduction to Mathematical Logic
Theory of Computation
```

## 5. For the Fifth and Seventh Semester (5 & 7 have some electives)

Here the complexity of the program goes on to increase. All the branches are given a wide range of alternatives and options based on:

- their career choice
- grades in previous courses
- btp and credits acquired

1. Checks if the student has minimum requirements for the career choice.
  - if not done then it is suggested to complete the basic courses.

```
Welcome to the Advisory! Let's discuss your dilemmas :)
```

```
Enter your name:
```

```
|: ananya.
```

```
Enter your branch(cse/csam/csai/csb/csd/csss/ece):
```

```
|: csss.
```

```
Enter your semester(1-8)
```

```
|: 5.
```

```
Hello ananya, csss branch!  
You are in 3rd year!!
```

```
Choose 1-3:
```

```
1. Show Electives
```

```
2. Restart
```

```
3. Terminate.
```

```
|: 1.
```

```
Where do you see yourself in 5 years...
```

```
What is your career choice?
```

```
1. Data Analysis
```

```
2. Artificial Intelligence
```

```
3. Software Development
```

```
4. Designing
```

```
5. Electrical
```

```
6. Research
```

```
|: 3.
```

```
Have you done all of the following courses? (yes/no)
```

```
Complex Analysis
```

```
Scientific Computing
```

```
Real Analysis II
```

```
|: no.
```

```
Following are the relevant courses!
```

```
Complex Analysis
```

```
Scientific Computing
```

```
Real Analysis II
```

## 2. Checks if grades are more than 7 in each of them

- if it is suggested to repeat the courses if grades are less than 7

```
Hello ananya, ece branch!
You are in 3rd year!!

Choose 1-3:
1.Show Electives
2.Restart
3.Terminate.
|: 1.

Where do you see yourself in 5 years...
What is your career choice?
1. Data Analysis
2. Artificial Intelligence
3. Software Development
4. Research
|: 1.

Have you done all of the following courses? (yes/no)
ML
Data Science
Math 3
PnS
|: yes.
It is suggested to repeat courses less than 7 grade. Do you want to consider repeating some?(y/n)
|: y.

Enter grades of each of them:
1. ML: |: 6
2. Data Science: |: 7.
3. Math 3: |: 8.
4. PnS: |: 8.

You have a low grade in this course. Try improving the grades in the same!
- Machine Learning

Choose again!
1.Restart
2.Terminate.
|: ■
```

## 3. Checks if BTP is completed or not

- if they don't want to repeat, BTP is asked
- if they have not done BTP, it is suggested to complete it
- also checks if Credits are enough for a BTP

```
Enter your semester(1-8)
|: 5.

Hello ananya, csam branch!
You are in 3rd year!!

Choose 1-3:
1.Show Electives
2.Restart
3.Terminate.
|: 1.

Where do you see yourself in 5 years...
What is your career choice?
1. Data Analysis
2. Artificial Intelligence
3. Software Development
4. Research
|: 3.

Have you done all of the following courses? (yes/no)
Data Structures and Algorithms
Algorithms Design and Analysis
DBMS
CN
|: yes.
It is suggested to repeat courses less than 7 grade. Do you want to consider repeating some?(y/n)
|: n.

Have you completed your BTP? (yes/no)
|: no.

How many credits have you already taken? (16/18/20/22/24)|: 18.

Go for a BTP in Software Development!

Choose again!
1.Restart
2.Terminate.
|: 1.
```

#### 4. Checks if Credits are not enough for a BTP or a course

- if they have Credits $\geq$ 22, they are not allowed to take up more courses

```
Hello ananya. csd branch!
You are in 3rd year!!

Choose 1-3:
1.Show Electives
2.Restart
3.Terminate.
|: 1.

Where do you see yourself in 5 years...
What is your career choice?
1. Data Analysis
2. Artificial Intelligence
3. Software Development
4. Research
|: 1.

Have you done all of the following courses? (yes/no)
ML
Data Science
Math 3
PnS
|: yes.
It is suggested to repeat courses less than 7 grade. Do you want to consider repeating some?(y/n)
|: n.

Have you completed your BTP? (yes/no)
|: yes.

How many credits have you already taken? (16/18/20/22/24)|: 22.

You can't take another course!

Choose again!
1.Restart
2.Terminate.
|: █
```

#### 5. Asks the student about Interests

- if they have done BTP, then Interests are asked

```
File Edit Settings Run Debug Help
Where do you see yourself in 5 years...
What is your career choice?
1. Data Analysis
2. Artificial Intelligence
3. Software Development
4. Research
|: 3.

Have you done all of the following courses? (yes/no)
Data Structures and Algorithms
Algorithm Design and Analysis
DBMS
CN
|: yes.
It is suggested to repeat courses less than 7 grade. Do you want to consider repeating some?(y/n)
|: n.

Have you completed your BTP? (yes/no)
|: yes.

How many credits have you already taken? (16/18/20/22/24)|: 16.

Looks like you have it all sorted! You have
- done the necessary courses,
- completed them with good grades
- and have taken up a BTP as well!
Let's find out your interest and walk on the path of Software Development!

What interests you most?
1. Networks
2. Design
3. Maths
4. Psychology/Social Sciences
5. Biology
6. Electrical
|: 4.

Following are the relevant courses!Cognitive Psychology
Social Psychology
Information Technology and Society
Advanced Sociological Theory
```



## 6. Finally checks if they have Research and completed BTP, then Extra-curriculars are asked

- if they are willing to go for Research, further electives are suggested based on Extra-curriculars

```
SWI-Prolog (AMD64, Multi-threaded, version 8.4.3)
File Edit Settings Run Debug Help

Welcome to the Advisory! Let's discuss your dilemmas :)
Enter your name:
|: ananya.

Enter your branch(cse/csam/csai/csb/csd/csss/ece):
|: cse.

Enter your semester(1-8)
|: 5.

Hello ananya, cse branch!
You are in 3rd year!!

Choose 1-3:
1.Show Electives
2.Restart
3.Terminate.
|: 1.

Where do you see yourself in 5 years...
What is your career choice?
1. Data Analysis
2. Artificial Intelligence
3. Software Development
4. Research
|: 4.

Have you done all of the following courses? (yes/no)
ML
Data Science
Math 3
PnS
|: yes.
It is suggested to repeat courses less than 7 grade. Do you want to consider repeating some?(y/n)
|: n.

Have you completed your BTP? (yes/no)
|: yes.

SWI-Prolog (AMD64, Multi-threaded, version 8.4.3)
File Edit Settings Run Debug Help
Have you completed your BTP? (yes/no)
|: yes.

How many credits have you already taken? (16/18/20/22/24)|: 18.

Looks like you have it all sorted! You have
- done the necessary courses
- completed them with good grades
- and have taken up a BTP as well!
Let's find out your interest and walk on the path of _10802!

What interests you most?
1. Networks
2. Design
3. Maths
4. Psychology/Social Sciences
5. Biology
6. Electrical
|: 4.

Following are the relevant courses!
Cognitive Psychology
Social Psychology
Information Technology and Society
Advanced Sociological Theory

What do you do in extra-curricular activities(in leisure time)!
1. Socialize
2. Finance
3. Observe nature|: 1.

Following are the relevant courses!
1. Entrepreneurial Khichadi
2. Neuroscience of Decision Making
3. Gender and Media
4. Environmental Science

Choose again!
1.Restart
2.Terminate.
|: 2.

true .
```

## 6. For the Sixth and Eighth Semester (6 & 8 have same electives)

Here the complexity of the program goes on to increase. All the branches are given a wide range of alternatives and options based on:

- their career choice
- grades in previous courses
- btp and credits acquired

1. Checks if the student has minimum requirements for the career choice.
  - if not done then it is suggested to complete the basic courses.
2. Checks if grades are more than 7 in each of them
  - if it is suggested to repeat the courses if grades are less than 7
3. Checks if BTP is completed or not
  - if they don't want to repeat, BTP is asked
  - if they have not done BTP, it is suggested to complete it
  - also checks if Credits are enough for a BTP
4. Checks if Credits are not enough for a BTP or a course
  - if they have Credits  $\geq 22$ , they are not allowed to take up more courses
5. Asks the student about Interests
  - if they have done BTP, then Interests are asked
6. Finally checks if they have Research and completed BTP, then Extra-curriculars are asked
  - if they are willing to go for Research, further electives are suggested based on Extra-curriculars

Functionality is same as the 5th and 7th semesters, just the electives are different according to the semesters, 6 and 8.

## ABOUT THE CODE

### Functionality:

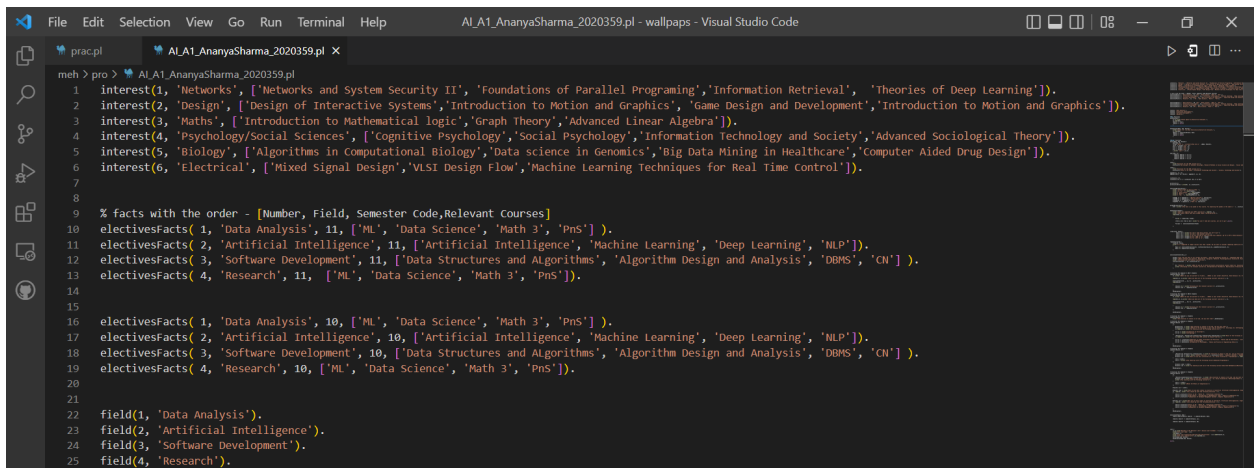
- Lists, Input/ Output, Recursion, Backtracking and Binding have been used.
- Use of Lists
- Recursion and Backtracking in append to list, calculate size, print list

```
append1([], L2, L2).
append1([H|T], L2, [H|L3]):- append1(T, L2, L3).

listSize([], 0).
listSize([_|Y], N ):- listSize(Y, N1), N is N1+1.

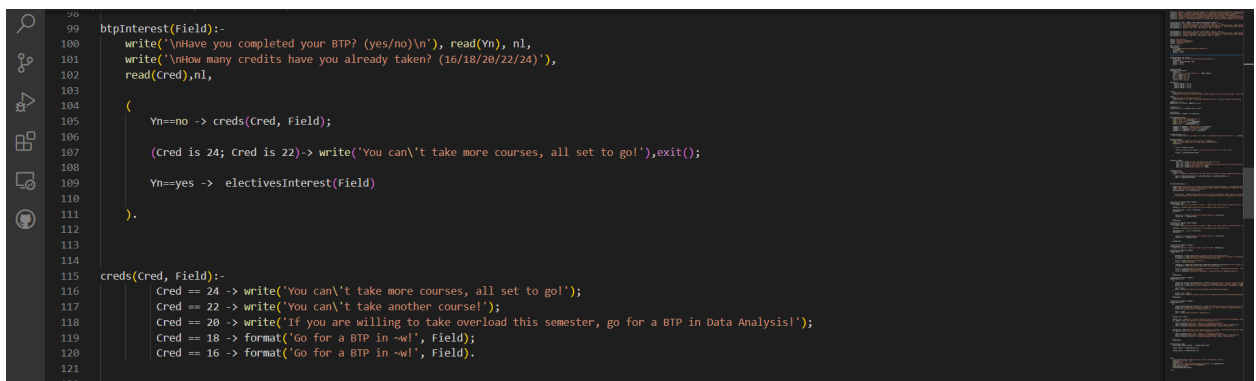
printList([]).
printList([H|T]):- write(H), nl, printList(T).
```

- Binding and facts



```
File Edit Selection View Go Run Terminal Help AI_A1_AnanyaSharma_2020359.pl - wallpaps - Visual Studio Code
prac.pl AI_A1_AnanyaSharma_2020359.pl X
meh > pro > AI_A1_AnanyaSharma_2020359.pl
1 interest(1, 'Networks', ['Networks and System Security II', 'Foundations of Parallel Programming', 'Information Retrieval', 'Theories of Deep Learning']).
2 interest(2, 'Design', ['Design of Interactive Systems', 'Introduction to Motion and Graphics', 'Game Design and Development', 'Introduction to Motion and Graphics']).
3 interest(3, 'Maths', ['Introduction to Mathematical logic', 'Graph Theory', 'Advanced Linear Algebra']).
4 interest(4, 'Psychology/Social Sciences', ['cognitive Psychology', 'Social Psychology', 'Information Technology and Society', 'Advanced Sociological Theory']).
5 interest(5, 'Biology', ['Algorithms in Computational Biology', 'Data science in Genomics', 'Big Data Mining in Healthcare', 'Computer Aided Drug Design']).
6 interest(6, 'Electrical', ['Mixed Signal Design', 'VLSI Design Flow', 'Machine Learning Techniques for Real Time Control']).
7
8
9 % facts with the order - [Number, Field, Semester Code, Relevant Courses]
10 electivesFacts( 1, 'Data Analysis', 11, ['ML', 'Data Science', 'Math 3', 'Pns'] ).
11 electivesFacts( 2, 'Artificial Intelligence', 11, ['Artificial Intelligence', 'Machine Learning', 'Deep Learning', 'MLP'] ).
12 electivesFacts( 3, 'Software Development', 11, ['Data Structures and Algorithms', 'Algorithm Design and Analysis', 'DBMS', 'CN'] ).
13 electivesFacts( 4, 'Research', 11, ['ML', 'Data Science', 'Math 3', 'Pns'] ).
14
15
16 electivesFacts( 1, 'Data Analysis', 10, ['ML', 'Data Science', 'Math 3', 'Pns'] ).
17 electivesFacts( 2, 'Artificial Intelligence', 10, ['Artificial Intelligence', 'Machine Learning', 'Deep Learning', 'MLP'] ).
18 electivesFacts( 3, 'Software Development', 10, ['Data Structures and Algorithms', 'Algorithm Design and Analysis', 'DBMS', 'CN'] ).
19 electivesFacts( 4, 'Research', 10, ['ML', 'Data Science', 'Math 3', 'Pns'] ).
20
21
22 field(1, 'Data Analysis').
23 field(2, 'Artificial Intelligence').
24 field(3, 'Software Development').
25 field(4, 'Research').
```

- Credits evaluation



```
99 btpInterest(Field):-
100     write('\nHave you completed your BTP? (yes/no)\n'), read(Yn), nl,
101     write('\nHow many credits have you already taken? (16/18/20/22/24)'),
102     read(Cred), nl,
103
104     (
105         Yn==no -> creds(Cred, Field);
106
107         (Cred is 24; Cred is 22)-> write('You can\'t take more courses, all set to go!'), exit();
108
109         Yn==yes -> electivesInterest(Field)
110     ).
111
112
113
114
115 creds(Cred, Field):-
116     Cred == 24 -> write('You can\'t take more courses, all set to go!');
117     Cred == 22 -> write('You can\'t take another course!');
118     Cred == 20 -> write('If you are willing to take overload this semester, go for a BTP in Data Analysis!');
119     Cred == 18 -> format('Go for a BTP in ~w!', Field);
120     Cred == 16 -> format('Go for a BTP in ~w!', Field).
121
122
```

- Semester wise code

```

145
146 % Electives For Semester 5 AND 7 Students
147 semester(Branch, 11):-
148     nl, write('\nWhere do you see yourself in 5 years... \nWhat is your career choice?\n1. Data Analysis \n2. Artificial Intelligence\n3. Software Development\n4. Research\n5. Entrepreneurship\n6. Freelancing\n7. Consulting\n8. Academia\n9. Government Service\n10. Other\n\n'), nl,
149     read(ch),nl, nl,write('\nHave you done all of the following courses? (yes/no)\n'), nl,
150
151     read(ch),nl, nl,write('\nHave you done all of the following courses? (yes/no)\n'), nl,
152
153     electivesFacts(Ch, _, 11, X) , printList(X),
154     read(choice),
155
156     (
157         Choice== no -> write('Following are the relevant courses!\n'), printList(X);
158         Choice== yes -> repeatcourse(Ch)
159     ),
160     menuDisplay().
161
162 % Electives For Semester 6 AND 8 Students
163 semester(Branch, 10):-
164     nl, write('\nWhere do you see yourself in 5 years... \nWhat is your career choice?\n1. Data Analysis \n2. Artificial Intelligence\n3. Software Development\n4. Research\n5. Entrepreneurship\n6. Freelancing\n7. Consulting\n8. Academia\n9. Government Service\n10. Other\n\n'), nl,
165     read(ch),nl, nl,write('\nHave you done all of the following courses? (yes/no)\n'), nl,
166
167     read(ch),nl, nl,write('\nHave you done all of the following courses? (yes/no)\n'), nl,
168
169     electivesFacts(Ch, _, 10, X) , printList(X),
170     read(choice),
171
172     (
173         Choice== no -> write('Following are the relevant courses!\n'), printList(X);
174         Choice== yes -> repeatcourse(Ch)
175     ),
176     menuDisplay().

```

- Semester Classification

```

255
256 electives(Branch, Sem):-
257     (Sem==1;Sem==2;Sem==3; Sem==4) -> semester(Branch, Sem);
258
259     (Sem==5; Sem==7) -> semester(Branch, 11);
260
261     (Sem==6; Sem==8) -> semester(Branch, 10).
262
263
264

```