

# CSE 643: Artificial Intelligence

## Assignment-1

### Career Advisory System

#### CODE

```
getCourses([Course | List]) :-  
    writeln('Enter Course'),  
    read(Course),  
    dif(Course, stop),  
    getCourses(List).
```

```
getCourses([]).
```

```
removeDuplicates([], []).  
removeDuplicates([Head | Tail], Result) :-  
    member(Head, Tail), !,  
    removeDuplicates(Tail, Result).  
removeDuplicates([Head | Tail], [Head | Result]) :-  
    removeDuplicates(Tail, Result).
```

```
getAcademicDetails :-  
    writeln("What is your branch at IIITD?"),  
    read(Branch), ignore(getCSE), ignore(getECE),  
    ignore(getBIO),  
    ignore(getDES),  
    ignore(getSSH),  
    ignore(getCGPA),  
    ignore(getBTP),  
    ignore(getExtraCredits),  
    choiceMaster(Branch).
```

```
getCSE :-  
    writeln("How many Computer Science course have you taken?"),  
    read(Num),  
    Num >= 6,  
    assert(academic_interest(cse)).
```

getECE :-

```
writeln("How many Electronics and Communication courses have you taken?"),
read(Num),
Num >= 6,
assert(academic_interest(ece)).
```

getMTH :-

```
writeln("How many Mathematics courses have you taken?"),
read(Num),
Num >= 6,
assert(academic_interest(mth)).
```

getBIO :-

```
writeln("How many Biology courses have you taken?"),
read(Num),
Num >= 6,
assert(academic_interest(bio)).
```

getDES :-

```
writeln("How many Design courses have you taken?"),
read(Num),
Num >= 6,
assert(academic_interest(des)).
```

getSSH :-

```
writeln("How many Social Science and Economics courses have you taken?"),
read(Num),
Num >= 6,
assert(academic_interest(ssh)).
```

getCGPA :-

```
writeln("What is your CGPA?"),
read(Num),
((Num >= 9,
  assert(cgpa(high)));
 (Num >= 8,
  assert(cgpa(above_average)));
 (Num >= 7,
  assert(cgpa(average)));
 (Num >= 6,
  assert(cgpa(below_average)));
 (assert(cgpa(low)))).
```

getBTP :-

```
writeln("Have you taken a BTP?"),  
read(Val),  
Val == yes,  
assert(btp(yes)).
```

getExtraCredits :-

```
writeln("Have you taken any extra credits?"),  
read(Val),  
Val == yes,  
assert(extraCredits(yes)).
```

init :-

```
retracteverything, getAcademicDetails.
```

retracteverything :-

```
ignore(retractall(academic_interest(_))),  
ignore(retractall(cgpa(_))),  
ignore(retractall(research(_))).
```

choiceMaster(\_) :-

```
writeln("Would you also like to explore careers outside your branch?"),  
read(Val),  
Val == yes,  
!,  
ignore(exploreCSE),  
ignore(exploreECE),  
ignore(exploreMTH),  
ignore(exploreBIO),  
ignore(exploreDES),  
ignore(exploreSSH).
```

choiceMaster(Branch) :-

```
branch(Branch).
```

branch(cse) :-

```
ignore(choiceAI),  
ignore(choiceDS),  
ignore(choiceSD),  
ignore(choiceCN),  
ignore(choiceCAOS),  
ignore(noMoreChoices).
```

branch(ece) :-

```
ignore(choiceNet),  
ignore(choiceEmbed),  
ignore(choiceChips),  
ignore(noMoreChoices).
```

```
branch(csam) :-  
    ignore(choiceCrypto),  
    ignore(choiceLogic),  
    ignore(choiceCalculus),  
    ignore(noMoreChoices).
```

```
branch(csb) :-  
    ignore(choiceBiology),  
    ignore(noMoreChoices).
```

```
branch(csd) :-  
    ignore(choiceGraphic),  
    ignore(choiceVideo),  
    ignore(choiceFront),  
    ignore(choiceHCD),  
    ignore(noMoreChoices).
```

```
branch(csss) :-  
    ignore(choiceEcon),  
    ignore(choiceSocio),  
    ignore(choicePsych),  
    ignore(choiceLiberal),  
    ignore(noMoreChoices).
```

```
exploreCSE :-  
    academic_interest(cse),  
    branch(cse).
```

```
exploreECE :-  
    academic_interest(ece),  
    branch(ece).
```

```
exploreMTH :-  
    academic_interest(mth),  
    branch(csam).
```

```
exploreBIO :-  
    academic_interest(bio),
```

```
branch(csb).
```

exploreDES :-

```
    academic_interest(des),  
    branch(csd).
```

exploreSSH :-

```
    academic_interest(ssh),  
    branch(csss).
```

choiceAI :-

```
    writeln("Have you taken a course on or know propositional and predicate/first-order logic?"),  
    read(Val),  
    Val == yes,  
    writeln("Have you heard of Logic Programming?"),  
    read(Val),  
    Val == yes,  
    writeln("Are you interested in Artificial Intelligence?"),  
    read(Val),  
    Val == yes,  
    writeln("Have you taken an AI course or worked on any AI projects?"),  
    read(Val),  
    Val == yes,  
    writeln("Since you have a knowledge of propositional, predicate/first-order logic, logic  
programming and an interest in Artificial Intelligence and have also taken an AI course/ worked  
on AI projects, you may consider a career in AI."),  
    outcome.
```

choiceDS :-

```
    writeln("Do you have a knowledge of statistics?"),  
    read(Val),  
    Val == yes,  
    writeln("Do you know languages like Python or R?"),  
    read(Val),  
    Val == yes,  
    writeln("Are you interested in Data Science/ Machine Learning?"),  
    read(Val),  
    Val == yes,  
    writeln("Have you participated in contests like Kaggle?"),  
    read(Val),  
    Val == yes,  
    writeln("Have you taken a DS/ML course or worked on any DS/ML projects?"),  
    read(Val),
```

```
Val == yes,  
writeln("Since you have a knowledge of statistics and know languages like Python or R which  
are very popular in the DS & ML fields, you have also have an interest in DS/ML having  
participated in Kaggle contests, also taken a course/ worked on DS/ML projects. you may  
consider a career in Data Science or Machine Learning."),  
outcome.
```

choiceSD :-

```
writeln("Have you used Object Oriented Programming?"),  
read(Val),  
Val == yes,  
writeln("Do you like to create applications?"),  
read(Val),  
Val == yes,  
writeln("Do you know Java or C++?"),  
read(Val),  
Val == yes,  
writeln("Do you have a good knowledge of DSA?"),  
read(Val),  
Val == yes,  
writeln("Do you know recognise terms like Docker, GitHub, Full Stack, SQL, NO SQL?"),  
read(Val),  
Val == yes,  
writeln("Since you like creating huge full stack applications with a knowledge of current  
technologies, you should consider a career in Software Engineering like mobile application  
development, web development, video game development, etc."),  
writeln(" "),  
writeln("Now looking for other options.").
```

choiceCN :-

```
writeln("Do you know the difference between WWW and the Internet?"),  
read(Val),  
Val == yes,  
writeln("Do you know how the Internet works?"),  
read(Val),  
Val == yes,  
writeln("Do you know about private or public key encryption?"),  
read(Val),  
Val == yes,  
writeln("Are you interested in Computer Network or Network Security?"),  
read(Val),  
Val == yes,
```

```
writeln("Since you have a good grip over concepts of networks and their security, you also  
have an interest in the field, you should consider a career in Computer Networks."),  
outcome.
```

choiceCAOS :-

```
writeln("Do you know about ARM/x86 architectures?"),  
read(Val),  
Val == yes,  
writeln("Have you used Linux?"),  
read(Val),  
Val == yes,  
writeln("Do you know OS concepts like scheduling, bootstrapping, paging, etc?"),  
read(Val),  
Val == yes,  
writeln("Have you taken a course on Operating Systems or Computer Organisation?"),  
read(Val),  
Val == yes,  
writeln("Since you have a good knowledge of computer architecture and operating systems,  
you may want to consider following a career path in the Computer Architecture and Operating  
Systems."),  
outcome.
```

choiceNet :-

```
writeln("Do you know about wireless, satellite communication technologies?"),  
read(Val),  
Val == yes,  
writeln("Have you ever worked with/ fixed networking equipment?"),  
read(Val),  
Val == yes,  
writeln("Are you interested in working in the telecom industry?"),  
read(Val),  
Val == yes,  
writeln("Since you have a good knowledge of networking hardware, wireless communication  
technologies, you should consider a career in the Telecommunications field."),  
outcome.
```

choiceEmbed :-

```
writeln("Do you like working with miniature mechanical and electronic components like  
Arduino, Raspberry Pi, logic boards, etc?"),  
read(Val),  
Val == yes,  
writeln("Do you have a knowledge of IoT (Internet Of Things)?"),  
read(Val),
```

```
Val == yes,  
writeln("Do you know C/C++ programming?"),  
read(Val),  
Val == yes,  
writeln("Since you have worked with miniature electronic components, have a knowledge of  
IoT and C/C++ programming, you should consider a career in embedded systems."),  
outcome.
```

choiceChips :-

```
writeln("Do you know VLSI (Verilog)?"),  
read(Val),  
Val == yes,  
writeln("Do you know DSP (Digital Signal Processing)?"),  
read(Val),  
Val == yes,  
writeln("Do you have a good knowledge and interest in Digital Circuits?"),  
read(Val),  
Val == yes,  
writeln("Do you also have some knowledge of Computer Architecture and Organisation?"),  
read(Val),  
Val == yes,  
writeln("You have all the required prerequisites, VLSI, DSP, DC, CA, CO for a career in  
Integrated Circuit Design."),  
outcome.
```

choiceCrypto :-

```
writeln("Do you have a good grasp on Discrete Structures?"),  
read(Val),  
Val == yes,  
writeln("Do you know/ have taken a course on Number Theory?"),  
read(Val),  
Val == yes,  
writeln("Do you have knowledge of field theory and ring theory?"),  
read(Val),  
Val == yes,  
writeln("Are you interested in Computer/Network security?"),  
read(Val),  
Val == yes,  
writeln("With your extensive knowledge of discrete math and a keen interest in  
computer/network security, you should consider a career in applied cryptography."),  
outcome.
```

choiceLogic :-



```

    writeln("Do you have prefer theoretical knowledge rather than dwelling over implementation
details?"),
    read(Val),
    Val == yes,
    (cgpa(high); cgpa(above_average)),
    writeln("Do you know first-order, second-order logic, higher-order logic and type theory?"),
    read(Val),
    Val == yes,
    writeln("Do you also know about other forms of logic like epistemic, temporal, fuzzy logic?"),
    read(Val),
    Val == yes,
    writeln("You should consider going into mathematical research, particularly mathematical
logic. You also have a high enough cgpa to pursue a career in the field."),
    writeln(" "),
    writeln("Now looking for other options. ").

```

choiceCalculus :-

```

    (cgpa(average); cgpa(above_average); cgpa(high)),
    writeln("Are you quick in arithmetic?"),
    read(Val),
    Val == yes,
    writeln("Do you have taken a course/ good knowledge of Linear Algebra?"),
    read(Val),
    Val == yes,
    writeln("Do you have taken a course/ good knowledge of Probability?"),
    read(Val),
    Val == yes,
    writeln("Do you have taken a course/ good knowledge of Calculus?"),
    read(Val),
    Val == yes,
    writeln("Are you also interested in Economics"),
    read(Val),
    Val == yes,
    writeln("Your good knowledge of foundational mathematics courses and quick arithmetic skills
along with an interest in Economics, a career in finance would suit you particularly investment
banking."),
    writeln(" "),
    writeln("Now looking for other options. ").

```

choiceBiology :-

```

    writeln("Are you interested in medicine, healthcare, drug and vaccine, etc."),
    read(Val),
    Val == yes,

```

```
writeln("Are you proficient in running mathematical models and simulations?"),
read(Val),
Val == yes,
writeln("Do you have knowledge of/ taken a course in advanced algorithms?"),
read(Val),
Val == yes,
writeln("With your interest in medicine and healthcare, proficiency in mathematical modelling
and simulations, knowledge/course in advanced algorithms, you should take a look at
Computational Biology."),
outcome.
```

choiceEcon :-

```
writeln("Do you know who is John Nash?"),
read(Val),
Val == yes,
writeln("Are you interested to go into Economics research?"),
read(Val),
Val == yes,
writeln("Have you taken a course on Game Theory?"),
read(Val),
Val == yes,
writeln("You should look into Mathematical Economics particularly Game Theory"),
writeln(" "),
writeln("Now looking for other options.").
```

choicePsych :-

```
writeln("Do you think you have an innate ability to empathise with people?"),
read(Val),
Val == yes,
writeln("Do you think Emotional Intelligence is important?"),
read(Val),
Val == yes,
writeln("Are you good at communicating with people?"),
read(Val),
Val == yes,
writeln("With your people skills and ability to empathise with others along with being aware of
concepts like Emotional Intelligence, you should explore a career in Psychology."),
outcome.
```

choiceLiberal :-

```
writeln("Do you like participating in debates?"),
read(Val),
Val == yes,
```

```
writeln("Do you think critical thinking is important?"),
read(Val),
Val == yes,
writeln("Do you keep yourself aware of what's happening in the world?"),
read(Val),
Val == yes,
writeln("You seem to be interested in liberal arts. Therefore, you are recommended to pursue
research in the SSH field."),
writeln(" "),
writeln("Now looking for other options.").
```

choiceGraphic :-

```
writeln("Do you know how to use Photoshop or Illustrator?"),
read(Val),
Val == yes,
writeln("Do you know the Gestalt principles?"),
read(Val),
Val == yes,
writeln("Have you ever done some freelance work/Fiverr?"),
read(Val),
Val == yes,
writeln("With the above graphic design skills and knowledge, you should become a graphic
designer."),
writeln(" "),
writeln("Now looking for other options.").
```

choiceVideo :-

```
writeln("Have you used Premiere Pro or Da Vinci Resolve?"),
read(Val),
Val == yes,
writeln("Do you know the theory behind non-linear editing?"),
read(Val),
Val == yes,
writeln("Do you have any knowledge of cinematography?"),
read(Val),
Val == yes,
writeln("You have good video editing skills, you may look for a career in cinematography or
editing, director of photography would also be a nice fit."),
writeln(" "),
writeln("Now looking for other options.").
```

choiceFront :-

```
writeln("Do you know HTML, CSS and JavaScript?"),
```

```

    read(Val),
    Val == yes,
    writeln("Have you used any web frameworks like Bootstrap and React?"),
    read(Val),
    Val == yes,
    writeln("Are you ready to work in a field where technology may change daily and you will have
to adapt?"),
    read(Val),
    Val == yes,
    writeln("With your web development skills and design eye along with your adaptability, you
should look for a career in Front End Web Development."),
    writeln(" "),
    writeln("Now looking for other options. ").

```

choiceHCD :-

```

    writeln("Have you taken a course in Human Computer Interaction?"),
    read(Val),
    Val == yes,
    writeln("Have you undergone a complete design process when developing a service or a
product?"),
    read(Val),
    Val == yes,
    writeln("Have you taken a course in Design Thinking?"),
    read(Val),
    Val == yes,
    writeln("With your knowledge of a design process and critical design thinking along with
having taken a course in HCI, you should seriously a careed in HCD (Human Centered
Design)."),
    outcome.

```

outcome :-

```

    cgpa(high),
    btp(yes),
    extraCredits(yes),
    writeln("You should go the research route due to your high CGPA, having taken extra credits
and done a BTech project."),
    writeln(" "),
    writeln("Now looking for other options. ").

```

outcome :-

```

    ((cgpa(above_average), (btp(yes); extraCredits(yes)));
    cgpa(high)),

```

```
writeln("You should consider doing a Masters in the field and then make a decision whether  
to go into industry or research."),  
writeln(" "),  
writeln("Now looking for other options.").
```

outcome :-

```
(cgpa(above_average); cgpa(average)),  
writeln("You should consider working in the industry."),  
writeln(" "),  
writeln("Now looking for other options.").
```

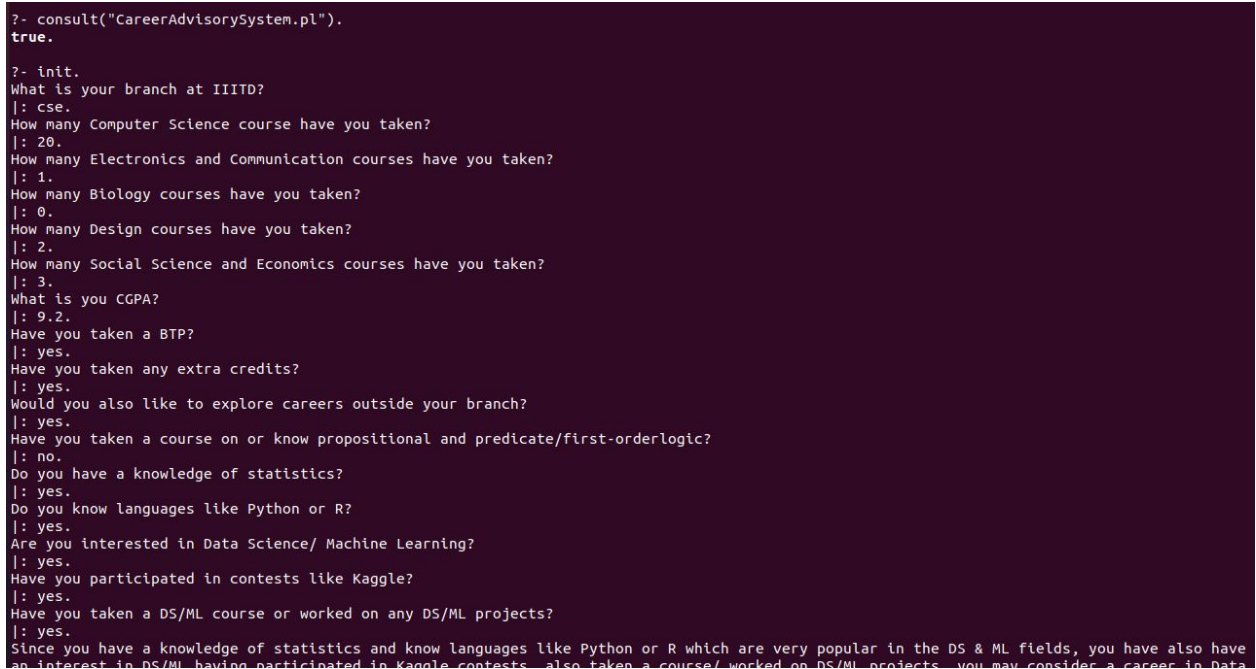
outcome :-

```
(cgpa(below_average); cgpa(low)),  
writeln("To find a good career in the field, you should work on improving your CGPA."),  
writeln(" "),  
writeln("Now looking for other options.").
```

noMoreChoices :-

```
writeln("Unfortunately, there are no more career paths left to recommend.").
```

## SCREENSHOTS OF WORKING



```
?- consult("CareerAdvisorySystem.pl").  
true.  
  
?- init.  
What is your branch at IIITD?  
|: cse.  
How many Computer Science course have you taken?  
|: 20.  
How many Electronics and Communication courses have you taken?  
|: 1.  
How many Biology courses have you taken?  
|: 0.  
How many Design courses have you taken?  
|: 2.  
How many Social Science and Economics courses have you taken?  
|: 3.  
What is your CGPA?  
|: 9.2.  
Have you taken a BTP?  
|: yes.  
Have you taken any extra credits?  
|: yes.  
Would you also like to explore careers outside your branch?  
|: yes.  
Have you taken a course on or know propositional and predicate/first-order logic?  
|: no.  
Do you have a knowledge of statistics?  
|: yes.  
Do you know languages like Python or R?  
|: yes.  
Are you interested in Data Science/ Machine Learning?  
|: yes.  
Have you participated in contests like Kaggle?  
|: yes.  
Have you taken a DS/ML course or worked on any DS/ML projects?  
|: yes.  
Since you have a knowledge of statistics and know languages like Python or R which are very popular in the DS & ML fields, you have also have  
an interest in DS/ML having participated in Kaggle contests, also taken a course/ worked on DS/ML projects, you may consider a career in Data
```

```
I: yes.  
Since you have a knowledge of statistics and know languages like Python or R which are very popular in the DS & ML fields, you have also have  
an interest in DS/ML having participated in Kaggle contests, also taken a course/ worked on DS/ML projects. you may consider a career in Data  
Science or Machine Learning.  
You should go the research route due to your high CGPA, having taken extra credits and done a BTech project.  
  
Now looking for other options.  
Have you used Object Oriented Programming?  
I: no.  
Do you know the difference between WWW and the Internet?  
I: yes.  
Do you know how the Internet works?  
I: yes.  
Do you know about private or public key encryption?  
I: yes.  
Are you interested in Computer Network or Network Security?  
I: yes.  
Since you have a good grip over concepts of networks and their security, you also have an interest in the field, you should consider a career  
in Computer Networks.  
You should go the research route due to your high CGPA, having taken extra credits and done a BTech project.  
  
Now looking for other options.  
Do you know about ARM/x86 architectures?  
I: no.  
Unfortunately, there are no more career paths left to recommend.  
true.  
?- ☐
```