AI ASSIGNMENT 5

<u>Deliverables:</u>
- A python file' program.py' which needs to be run and implements the NL interface for electives advisory system.
- A prolog file 'A1_ElectivesAdvisory.pl' that contains the prolog code for Assignment 1. It is consulted from the python file
- A report containing the screenshot of the outputs and other important details of the submission

<u>How to run the program:</u>
- After unzipping the submitted folder, go to the terminal, and run the python file using the command: python program.py. Ensure that the following libraries are present:
  - nltk → pip install nltk
  - pyswip → pip install pyswip
  - punkt module of nltk → In Python shell or IDLE (not the normal terminal), nltk.download('punkt')
  - punkt module of nltk → In Python shell or IDLE (not the normal terminal), nltk.download(stopwords)

<u>Explanation of code:</u>
- First the input regarding the Branch, Semester type(monsoon/winter), courses done and the departments from which you want to choose courses are selected using.
- Several NL functionalities (clearly defined in comments) are used on the input, before logically processing it. These include, sentence tokenization, word tokenization, stemming and removal of stop words.
- A bit of pre-preprocessing is done after which the details are sent to the Prolog Code. Input about the interests in various sub-domains being offered in the choice of departments.
- In that input also NL processing is done, which is sent to prolog code for determining the exact recommended electives which are printed on the terminal.

Screenshots:

Execution 1:


```
visheshrangwani@Visheshs-MacBook-Air Assignment 5 % python program.py
Enter details of your branch, other branches of interest, semester type and the courses done:
I am from CSE branch. I am looking for couses of winter semester. I have done courses m1, m2, ip, dm, cn, os, pr. I am also interestted in courses from CSB and ECE.

List of interests you can pursue next semester:
Cyber Security
Networks
General CSE courses
ML
Biology related Data Science
Bio-Algorithms
Communication ECE
Electronics Design

Enter your interests from the above list:
I am interested in Cyber Security, Networks, Electronics Design and Data Science related Biology courses
Courses suggested for you are: [vdf,tmc,nssii,wn,bdmh,dsg]
You are suggested to take the following courses:

vdf: VLSI Design Flow
        Course Instructor: Prof Sneh Surabh
        Credits: 4
        Course Review by Seniors: High workload but great course for anyone interested in VLSI.

tmc: Theory of Modern cryptography
        Course Instructor: Prof Donghoon Chang
        Credits: 4
        Course Review by Seniors: Review Not Available

nssii: Networks and System Security II
        Course Instructor: Prof Sambuddho Chakravarty
        Credits: 4
        Course Review by Seniors: Review Not Available

wn: Wireless Network
        Course Instructor: Prof Arani Bhattacharya
        Credits: 4
        Course Review by Seniors: Review Not Available

bdmh: Big Data Mining in Healthcare
        Course Instructor: Prof G P S Raghava
        Credits: 4
        Course Review by Seniors: Review Not Available

dsg: Data science in Genomics
        Course Instructor: Prof Vibhor Kumar
        Credits: 4
        Course Review by Seniors: Review Not Available

Metadata
{'ece', 'cse', 'csb'}
winter
visheshrangwani@Visheshs-MacBook-Air Assignment 5 %
```

Execution 2:


```
visheshrangwani@Visheshs-MacBook-Air Assignment 5 % python program.py
Enter details of your branch, other branches of interest, semester type and the courses done:
I am from CSE branch. I am looking for couses of monsoon semester. I have done courses m1, m2, ip, dm, cn, os, pr. I am also interestted in courses from CSSS and CSD

List of interests you can pursue next semester:
Cyber Security
Core Computer Science
Algorithms
ML
Economics
Sociology
Psychology
Entrepreneurship

Enter your interests from the above list:
I am interested in Economics, Psychology, Core CS concepts and Cyber Security related courses
Courses suggested for you are: [iag,davp,fcs,ns,ac,ca,gmt,ff,ndm,cmm]
You are suggested to take the following courses:

iag: Introduction to Animation and Graphics
        Course Instructor: Prof Anoop Ratn
        Credits: 4
        Course Review by Seniors: Review Not Available

davp: Digital Audio & Video Production Workflow
        Course Instructor: Prof Aman Samuel
        Credits: 4
        Course Review by Seniors: Review Not Available

fcs: Foundations of Computer Security
        Course Instructor: Prof Arun Balaji Buduru
        Credits: 4
        Course Review by Seniors: Moderate Course. Surprise Quizzes. Open Book Exams

ns: Network Security
        Course Instructor: Prof B N Jain
        Credits: 4
        Course Review by Seniors: Reviews not available

ac: Applied Cryptography
        Course Instructor: Prof Subhabrata Samajder
        Credits: 4
        Course Review by Seniors: Interesting but tough course. A lot of proof based mathematics involved

ca: Computer Architecture
        Course Instructor: Prof Sujay Deb
        Credits: 4
        Course Review by Seniors: Application based course. Learn about GemS. Theory used in project. Lot of evaluation components.

gmt: Game Theory
        Course Instructor: Prof Kiriti Kanjilal
        Credits: 4
        Course Review by Seniors: Introductory course. Intro to to the notations and basic ideas.
```
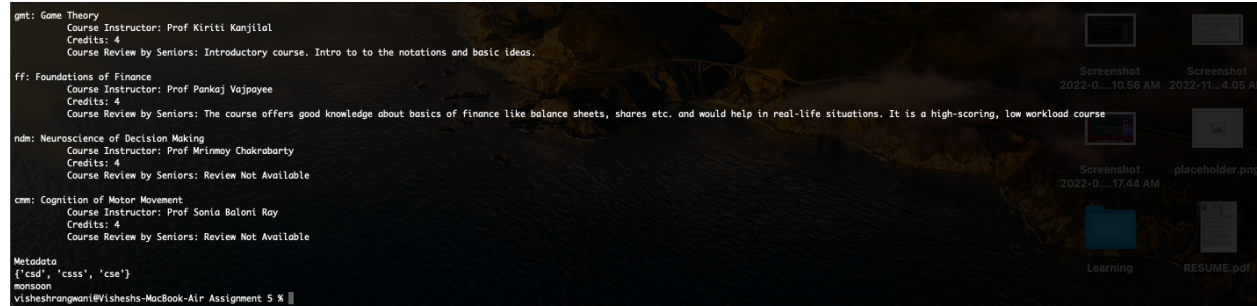
Execution 3:
(Same input as 1st of Assignment 1)

Input 1:
I am from CSE branch. I am looking for electives for monsoon semester. I have done m1, ip, dc, hci, dsa, co, m2, ap, os, dm, sns, ada courses. I am also interested in courses of CSB and ECE.

Input 2:
I am interested in Cyber Security, Algorithms, ML, Bio-ALgorithms, and Software ECE.

```
ac: Applied Cryptography
        Course Instructor: Prof Subhabrata Samajder
        Credits: 4
        Course Review by Seniors: Interesting but tough course. A lot of proof based mathematics involved

ai: Artificial Intelligence
        Course Instructor: Prof C. Anantram
        Credits: 4
        Course Review by Seniors: Heavy Course in terms of Assignments but solves real world problems.

nlp: Natural Language Processing
        Course Instructor: Prof Md. Shad Akhtar
        Credits: 4
        Course Review by Seniors: An introductory course for people who want to start NLP and related courses. The course begins by explaining basic statistical NLP concepts, then moves on to working with NLP systems using DL methods
. A basic understanding of ML is good

rl: Reinforcement Learning
        Course Instructor: Prof Sanjit Kaul
        Credits: 4
        Course Review by Seniors: Heavy course with a lot of Mathematics. Score in exams is difficult but assignments are easier.

mlba: Machine Learning for Biomedical Applications
        Course Instructor: Prof G.P.S. Raghava
        Credits: 4
        Course Review by Seniors: Review Not Available

bip: Biomedical Image Processing
        Course Instructor: Prof Vibhor Kumar
        Credits: 4
        Course Review by Seniors: Review Not Available

Metadata
{'ece', 'cse', 'csb'}
monsoon
visheshrangwani@Visheshs-MacBook-Air Assignment 5 % clear

visheshrangwani@Visheshs-MacBook-Air Assignment 5 %
```

```
visheshrangwani@Visheshs-MacBook-Air Assignment 5 % python program.py
Enter details of your branch, other branches of interest, semester type and the courses done:
I am from CSE branch. I am looking for electives for monsoon semester. I have done m1, ip, dc, hci, dsa, co, m2, ap, os, dm, sns, ada courses. I am also interested in courses of CSB and ECE.

List of interests you can pursue next semester:
Cyber Security
Core Computer Science
Algorithms
ML
Theoretical Bio
Bio-Algorithms
Hardware ECE
Software ECE

Enter your interests from the above list:
I am interested in Cyber Security, Algorithms, ML, Bio-Algorithms, and Software ECE.
Courses suggested for you are: [dpm,dsp,tgi,aag,mad,fcs,ac,ai,nlp,rl,mlba,bip]
You are suggested to take the following courses:

dpm: Data Processing and Management
        Course Instructor: Prof Pravesh Biyani
        Credits: 4
        Course Review by Seniors: Review Not Available

dsp: Digital Signal Processing
        Course Instructor: Prof Manuj Mukherjee
        Credits: 4
        Course Review by Seniors: Fundamental and easier course of ECE department.

tgi: Tomographic Imaging (Computerized Tomography)
        Course Instructor: Prof Prabhat Munshi
        Credits: 4
        Course Review by Seniors: Review Not Available

aag: Approximation Algorithms
        Course Instructor: Prof Syamantak Das
        Credits: 4
        Course Review by Seniors: Review Not Available

mad: Modern Algorithm Design
        Course Instructor: Prof Diptapriyo Majumdar
        Credits: 4
        Course Review by Seniors: Review Not Available

fcs: Foundations of Computer Security
        Course Instructor: Prof Arun Balaji Buduru
        Credits: 4
        Course Review by Seniors: Moderate Course. Surprise Quizzes. Open Book Exams

ac: Applied Cryptography
        Course Instructor: Prof Subhabrata Samajder
        Credits: 4
        Course Review by Seniors: Interesting but tough course. A lot of proof based mathematics involved
```

Execution 4:
(Same input as 2nd of Assignment 1)

Input 1:

I have done m1, ip, hci, dc, dsa, os, co, m2, ra1, nt, m3, dm, cn. I am from CSAM branch. I am looking for courses for winter semester. I would also like to do courses from CSE and CSSS branch.

Input 2:

I am interested in Networks, ML, economics, entrepreneurship courses.

```
        Course Instructor: Prof Rakesh Chaturvedi
        Credits: 4
        Course Review by Seniors: Review Not Available

lo: Linear Optimization
        Course Instructor: Prof Subhashree Mohapatra
        Credits: 4
        Course Review by Seniors: Review Not Available

wn: Wireless Network
        Course Instructor: Prof Arani Bhattacharya
        Credits: 4
        Course Review by Seniors: Review Not Available

pn: Programmable Networking
        Course Instructor: Prof Rinku Shah
        Credits: 4
        Course Review by Seniors: Review Not Available

mlw: Machine Learning (Winter Semester)
        Course Instructor: Prof Saket Anand
        Credits: 4
        Course Review by Seniors: Tough but Doable Course. Absolute Grading. Must Refer to Online resources. Lot of coding and theory as well

dl: Deep Learning
        Course Instructor: Prof Md. Shad Akhtar
        Credits: 4
        Course Review by Seniors: 600 Level course and a lot of effort is expected. Must be really interested in DL before taking the course else wont be able to cope. Must have experience in ML field

sml: Statistical Machine Learning
        Course Instructor: Prof A V Subramanyam
        Credits: 4
        Course Review by Seniors: Intensive course with tougher grading.

ma: Macroeconomics
        Course Instructor: Prof Kiriti Kanjilal
        Credits: 4
        Course Review by Seniors: Interesting couse content and deals with topics like unemployment, inflation, GDP, and government policies.

ciips: Creativity, Innovation, and Inventive Problem Solving
        Course Instructor: Prof Anuj Grover
        Credits: 4
        Course Review by Seniors: Review Not Available

ef: Entrepreneurial Finance
        Course Instructor: Prof Pankaj Vajpayee
        Credits: 4
        Course Review by Seniors: Review Not Available

Metadata
{'csss', 'cse', 'csam'}
winter
visheshrangwani@Visheshs-MacBook-Air Assignment 5 % python program.py
```

```
visheshrangwani@Visheshs-MacBook-Air Assignment 5 % python program.py
Enter details of your branch, other branches of interest, semester type and the courses done:
I have done m1, ip, hci, dc, dsa, os, co, m2, ra1, nt, m3, dm, cn. I am from CSAM branch. I am looking for courses for winter semester. I would also like to do courses from CSE and CSSS branch.

List of interests you can pursue next semester:
Cyber Security
Networks
General CSE courses
ML
Economics
Sociology
Psychology
Entrepreneurship

Enter your interests from the above list:
I am interested in Networks, ML, economics, entrepreneurship courses.
Courses suggested for you are: [ifa,si,coo,lo,wn,pn,mlw,dl,sml,ma,ciips,ef]
You are suggested to take the following courses:

ifa: Introduction to Functional Analysis
        Course Instructor: Prof Satish Pandey
        Credits: 4
        Course Review by Seniors: Review Not Available

si: Statistical Inference
        Course Instructor: Prof Monika Arora
        Credits: 4
        Course Review by Seniors: Content can seem a little overwhelming, since it is relatively new and wide to grasp. Difficult Marking in theoretical exams. Easy Assignments.

coo: Convex Optimization
        Course Instructor: Prof Rakesh Chaturvedi
        Credits: 4
        Course Review by Seniors: Review Not Available

lo: Linear Optimization
        Course Instructor: Prof Subhashree Mohapatra
        Credits: 4
        Course Review by Seniors: Review Not Available

wn: Wireless Network
        Course Instructor: Prof Arani Bhattacharya
        Credits: 4
        Course Review by Seniors: Review Not Available

pn: Programmable Networking
        Course Instructor: Prof Rinku Shah
        Credits: 4
        Course Review by Seniors: Review Not Available

mlw: Machine Learning (Winter Semester)
        Course Instructor: Prof Saket Anand
        Credits: 4
        Course Review by Seniors: Tough but Doable Course. Absolute Grading. Must Refer to Online resources. Lot of coding and theory as well
```