CSE643: Artificial Intelligence
Assignment-5

- Generated an AI-A5.ipynb which consists of the python code required to execute the prolog commands.
- A CA.txt file is generated once the program is executed and contains the information that is generated on answering the questions asked during execution of python code.
- The code and output are as follows:

CODE:(Python: AI-A5.ipynb)

```
import nltk
from nltk.tokenize import word_tokenize
from nltk.stem import PorterStemmer
inplist = []
print("Welcome to the Career Advisory System")
inp1 = input("Mention the stream you wish to persue your career in
:\nSelect one option:\n1.cse\n2.ese\n3.cb\n")
tok1 = word_tokenize(inp1)
print("\n\n Stream Chosen:", tok1)

ps = PorterStemmer()
for wod in tok1:
   inplist.append(wod)

print("\n.. list is... ", inplist)
print('\n')

f = open("CA.txt", 'w')

#CSE
if "cse" in inplist:
 f.write("stream(cse).\n")
 inp2 = input("Choose your interest:\n1. Artificial
Intelligence(ai)\n2.Data Engineering(de)\n3.Information
Security(is)\n4.Mobile Computing(mc)\n")
 tok2 = word_tokenize(inp2)
 print("\n\n Interest Chosen:", tok2)
 for wod in tok2:
   inplist.append(wod)
 print("\n.. list is ", inplist)
```

```
 print('\n')
 ##choosen ai
 if "ai" in inplist:
   f.write("interest(ai).\n")
   inp3 = input("Also choose specialisation as:\n1. Artificial
Intelligence Research(air)\n2. Software Engineering(se)\n3. Natural
Language Processing(nlp)\n4. User Experience(ue)\n5. Data
Analytics(da)\n")
   tok3 = word_tokenize(inp3)
   print("\n\n Sp Chosen:", tok3)
   for i in tok3:
     inplist.append(i)
   print("\n.. list is ", inplist)
   print('\n')
   if "air" in inplist:
     f.write("specialization(air).\n")
   if "se" in inplist:
     f.write("specialization(se).\n")
   if "nlp" in inplist:
     f.write("specialization(nlp).\n")
   if "ue" in inplist:
     f.write("specialization(ue).\n")
   if "da" in inplist:
     f.write("specialization(da).\n")

 ##choosen de
 if "de" in inplist:
   f.write("interest(de).\n")

 ##choosen is
 if "is" in inplist:
   f.write("interest(is).\n")
   inp3 = input("Also choose specialisation as:\n1. Security
Architect(sa)\n2. Security Consultant(sc)\n3. Penetration Tester(pt)\n4.
Chief Information Security Officer(ciso)\n5. Cryptographer(c)\n6. Security
Analyst(san)\n7. Security Engineer(sece)\n")
   tok3 = word_tokenize(inp3)
   print("\n\n Sp Chosen:", tok3)
   for i in tok3:
     inplist.append(i)
```

```
    print("\n.. list is ", inplist)
    print('\n')
    if "sa" in inplist:
      f.write("specialization(sa).\n")
    if "sc" in inplist:
      f.write("specialization(sc).\n")
    if "pt" in inplist:
      f.write("specialization(pt).\n")
    if "ciso" in inplist:
      f.write("specialization(ciso).\n")
    if "c" in inplist:
      f.write("specialization(c).\n")
    if "san" in inplist:
      f.write("specialization(san).\n")
    if "sece" in inplist:
      f.write("specialization(sece).\n")
  ##choosen mc
 if "mc" in inplist:
    f.write("interest(mc).\n")

##ECE
if "ece" in inplist:
    f.write("stream(ese).")

##CB
if "cb" in inplist:
    f.write("stream(cb).")
#Closing the file
f.close()
```

OUTPUT:

```
Welcome to the Career Advisory System
Mention the stream you wish to persue your career in :
Select one option:
1.cse
2.ese
3.cb
I would like to choose cse


 Stream Chosen: ['I', 'would', 'like', 'to', 'choose', 'cse']
```

```
.. list is...  ['I', 'would', 'like', 'to', 'choose', 'cse']


Choose your interest:
1. Artificial Intelligence(ai)
2.Data Engineering(de)
3.Information Security(is)
4.Mobile Computing(mc)
ai interests me


 Interest Chosen: ['ai', 'interests', 'me']

.. list is  ['I', 'would', 'like', 'to', 'choose', 'cse', 'ai',
'interests', 'me']


Also choose specialisation as:
1. Artificial Intelligence Research(air)
2. Software Engineering(se)
3. Natural Language Processing(nlp)
4. User Experience(ue)
5. Data Analytics(da)
I am more into nlp


 Sp Chosen: ['I', 'am', 'more', 'into', 'nlp']

.. list is  ['I', 'would', 'like', 'to', 'choose', 'cse', 'ai',
'interests', 'me', 'I', 'am', 'more', 'into', 'nlp']
```

- The prolog code is in CA.pl file which consists of facts and rules for Career Advisory System.

CODE: Prolog

```
listAI :- printlist(['1. Artificial Intelligence Research(air)', '2. Software
Engineering(se)', '3. Natural Language Processing(nlp)', '4. User Experience(ue)', '5.
Data Analytics(da)']).

listSE :-printlist(['1. Technical ability', '2. Problem solving', '3. Numeracy', '4.
Creativity', '5. IT']).

listNLP :- printlist(['1. Programming', '2. Probability and Statistics', '3. Linear
Algebra', '4. Algorithm Design and Analysis']).
```

```
listUE :- printlist(['1. UX research', '2. Collaboration', '3. Wireframing and UI prototyping', '4. UX writing', '5. Visual communication', '6. User empathy', '7. Interaction design', '8. Coding']).

listDA :- printlist(['1. Statistical analysis', '2. Machine learning', '3. Computer science', '4. Programming', '5. Data storytelling', '6. Business intuition', '7. Analytical thinking', '8. Critical thinking', '9. Inquisitiveness', '10. Interpersonal skills']).

listAIR :- printlist(['1. Various level of math, including probability, statistics, algebra, calculus, logic and algorithms','2. Bayesian networking or graphical modeling, including neural nets', '3. Physics, engineering and robotics', '4. Programming languages and coding', '5. Cognitive science theory']).

listDEElectives :- printlist(['1. Data Mining', '2. Database System Implementation', '3. Information Retrieval', '4. Big Data Analytics', '5. Introduction to spatial Computing', '6. Statistical Machine Learning', '7. Machine Learning', '8. Natural Language Processing', '9. GPU Computing', '10. Probabilistic Graphical Models', '11. Data Warehousing', '12. Cloud Computing and Virtualization', '13. Collaborative Filtering', '14. Privacy in Location-based Services', '15. Semantic Web', '16. Web Intelligence and Big Data Analytics', '17. Business Intelligence and Data Warehousing', '18. Financial Data Analytics', '19. Information Integration and Data Analytics', '20. Distributed Data Mining', '21. Database Methods in Information Retrieval', '22. Mining Large Networks']).

listIS :- printlist(['1. Security Architect(sa)','2. Security Consultant(sc)', '3. Penetration Tester(pt)', '4. Chief Information Security Officer(ciso)', '5. Cryptographer(c)', '6. Security Analyst(san)', '7. Security Engineer(sece)']).

listMC :- printlist(['1. Distributed Systems Security', '2. Mobile Computing', '3. Embedded Systems', '4. Ad Hoc Wireless Networks', '5. Cellular Data Networks', '6. Network Security', '7. Introduction to Spatial Computing', '8. Smart Sensing for Internet of Things', '9. Programming Cloud Services for Mobile Applications', '10. Mobile and Cellular Network Security', '11. Advanced Topics in Mobile Computing', '12. Network Anonymity and Privacy']).

printlist([A|List]) :-
   write(A), nl,
   printlist(List).

printlist([]).
```

```
begin :- sp(P).


sp(cse) :-
   consult('/Users/yuktigoswami/Desktop/AI
Assignments/AI-A5-Yukti-Goswami-MT21109/CA.txt'),
   stream(cse),
   interest(X),
   choices(X).

sp(cb) :-
   consult('/Users/yuktigoswami/Desktop/AI
Assignments/AI-A5-Yukti-Goswami-MT21109/CA.txt'),
   stream(cb),
   nl,
   write('For computational biology you can refer to these subjects:'), nl,
   write('1. Foundations of Modern Biology'), nl,
   write('2. Algorithms in Computational Biology'), nl,
   write('3. Cell Biology and Biochemistry'), nl,
   write('4. Introduction to Mathematical Biology'), nl.

sp(ece) :-
   consult('/Users/yuktigoswami/Desktop/AI
Assignments/AI-A5-Yukti-Goswami-MT21109/CA.txt'),
   stream(ece),
   nl,
   write('For ece below mentioned are various specializations that you can choose
according to your interest:'), nl,
   write('1. Communication and Signal Processing'), nl,
   write('2. VLSI & Embedded Systems'), nl,
   write('3. Cyber-Physical Systems'), nl,
   write('4. Machine Learning'), nl.



choices(ai) :-
   specialization(Z),
   nl,
   write('Careers that you can pursue in Artificial Intelligence:'), nl,
   listAI, nl, nl,
   field(Z).
```

```
choices(is) :-
   specialization(Z),
   nl,
   write('Careers that you can pursue in Information Security:'), nl,
   listIS, nl, nl,
   field(Z).

choices(de) :-
   nl,
   write('To become a Data Engineer, you can choose some following courses depending
upon your interest:'), nl,
   listDEElectives, nl, nl.

choices(mc) :-
   nl,
   write('To do mobile computing, you can choose some following courses depending upon
your interest:'), nl,
   listMC, nl, nl.

field(air) :-
   nl,
   write('Basic computer technology and math backgrounds form the backbone of most
artificial intelligence. This coursework involves study of:'), nl,
   listAIR, nl.

field(se) :-
   nl,
   write('Software developers - sometimes called programmers - design, build and test
computer programmes. You may work on information databases, programmes that control
robotic systems, or cloud and mobile applications. You may write computer programmes
from scratch or amend existing \'off-the-shelf\' programmes to meet the needs of the
project. Therefore Software Engineering requires:'), nl,
   listSE, nl.


field(nlp) :-
   nl,
   write('To opt for NLP as your career you should have knowledge of:'), nl,
   listNLP, nl.

field(ue) :-
   nl,
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   write('To become a UX specialist you should have knowledge of:'), nl,
   listUE, nl.

field(da) :-
   nl,
   write('Data scientists play a key role in helping organizations make sound
decisions. As such, they need \'soft skills\' in the following areas:'), nl,
   listDA, nl.

field(sa) :-
   nl,
   write('The Security Architect takes care of planning, implementing, and testing
security systems. They are responsible for protecting the data from hackers, malware,
and DDoS attacks. Since this is a senior-level position, adequate training with
certification will be expected. The job of the security architect is to protect the
network using proper firewalls.'), nl,
   nl.

field(sc) :-
   nl,
   write('The Security Consultant is a flexible and tech-savvy person who protects the
organizations data and capital. They understand and analyze various security systems
in all fields. The Security Consultant determines the different tests, like
vulnerability, to protect the computer, network, and data. They are also capable of
providing technical guidance when required.'), nl,
   nl.

field(pt) :-
   nl,
   write('A Penetration Tester finds the weaknesses and loopholes in the system that
hackers can use. They are also called Ethical Hackers. They have a range of tools to
test the network, web application, or product. They also document the research and
findings to be helpful in the future.'),
   nl.


field(ciso) :-
   nl,
   write('This is an advanced-level job for which you will be required to handle a
Security Officers team. You have the power to create your own security measure. You
will also be required to collaborate with other stakeholders in determining the
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security of the system since this is an advanced role. There is an absolute necessity for proper training and certification.'), nl,
   nl.

field(c) :-
   nl,
   write('Cryptographers are security system professionals who are responsible for writing a code that hackers can't crack. It is a mid-senior-level job that you will enjoy if you love coding.'), nl,
   nl.

field(san) :-
   nl,
   write('As a Security Analyst, you will be required to plan and execute various security measures. You analyze and document the security of the system and find the areas that are prone to attacks. This is an entry-level job if you aspire to become a cybersecurity professional.'), nl,
   nl.


field(sece) :-
   nl,
   write('A Security Engineer is responsible for rebuilding the security system for the organization. They build the necessary arrangements to safeguard the system. This is an entry-level job if you aspire to become a cybersecurity professional.'), nl,
   nl.
```
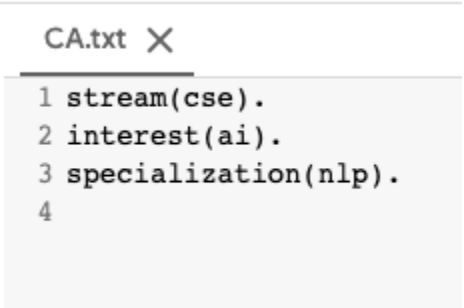

OUTPUT:

When the CA.txt file contains information as follows then the output generated is shown in the screen shot.



```
| ?- begin.
compiling /Users/yuktigoswami/Desktop/AI Assignments/AI-A5-Yukti-Goswami-
MT21109/CA.txt for byte code...
/Users/yuktigoswami/Desktop/AI Assignments/AI-A5-Yukti-Goswami-MT21109/CA
.txt compiled, 3 lines read - 582 bytes written, 5 ms

Careers that you can pursue in Artificial Intelligence:
1. Artificial Intelligence Research(air)
2. Software Engineering(se)
3. Natural Language Processing(nlp)
4. User Experience(ue)
5. Data Analytics(da)



To opt for NLP as your career you should have knowledge of:
1. Programming
2. Probability and Statistics
3. Linear Algebra
4. Algorithm Design and Analysis
```