Prolog Programming

Report:

After many grueling hours of work to complete this difficult programming assignment regarding the Prolog programming language, I was finally able to complete all of the assigned problems, ranging from task 0 to task 3. I managed to complete this programming assignment alone, with the help of a couple references online. The first major resource that helped me were the lecture slides available to me on the canvas learning management system website. The specific slideshows were "Class22-Rules&FileI:O.pptx", published by Professor Krishna. Among these slides were the helpful code to import csv files into prolog and read from the csv, then asserting all the employees based on row data. The next resource that helped me a lot were Union College's resources on prolog programming, available on their website at, "https://cs.union.edu/~striegnk/learn-prolog-now/html/node88.html#sec.l10.cut". These helped me significantly with if-then-else branches and with doing comparisons, as well as the atom operations that are needed to change an atom to a list of characters, or to a number to perform operations on them. The hardest problem for me was probably number 10 because I could not figure out how to separate the salary from the original atom that had a comma, a dollar sign, and a space at the end. However, once I learned about the include() predicate and hard coded the items to leave out, I was able to figure it out.

Rule 1:

```
?- read_csv_and_store.
true.

?- is_seattle_employee('Emily Davis').
true.

?- is_seattle_employee('Logan Foreman').
false.

?- is_seattle_employee(X).
X = 'Emily Davis' ;
X = 'Camila Rogers' ;
X = 'Isabella Xi' ;
X = 'Camila Silva' ;
X = 'Leonardo Dixon' ;
X = 'Wyatt Chin' .

?-
```

Rule 2:

```
Prolog — cssc2319@edoras:~/Assignment4 — ssh -x -y cssc2319@edora...
|
|
|
|
|
|
|    .

ERROR: Stream user_input:70:1 Syntax error: Unexpected end of clause
?- is_senior_manager_in_IT('Emily Davis').
true.

?- is_senior_manager_in_IT('Logan Foreman').
false.

?- is_senior_manager_in_IT(X).
X = 'Emily Davis' ;
X = 'Elias Alvarado' ;
X = 'Peyton Huang' ;
X = 'Ava Ayala' ;
X = 'Mia Lam' ;
X = 'Ezekiel Reed' .

?-
```

Rule 3:

```
Prolog — cssc2319@edoras:~/Assignment4 — ssh -x -y cssc2319@edora...
|
|
|
|
|
|
|
|
|    .

ERROR: Stream user_input:106:1 Syntax error: Unexpected end of clause
?- is_director_finance_miami('Luna Sanders').
false.

?- is_director_finance_miami('Emily Davis').
false.

?- is_director_finance_miami(X).
X = 'Miles Mehta' ;
X = 'Andrew Coleman' ;
X = 'Dylan Chin' ;
false.

?-
```

Rule 4:

```
Prolog — cssc2319@edoras:~/Assignment4 — ssh -x -y cssc2319@edoras.sdsu.edu — 9...

?- is_asian_US_manufacturing_40M('Nathan Pham','Manufacturing','Male','Asian',45).
true.

?- is_asian_US_manufacturing_40M('Logan Foreman','Manufacturing','Male','Asian',45).
false.

?- is_asian_US_manufacturing_40M(X,Y,Z,A,B).
X = 'Austin Vo',
Y = 'Manufacturing',
Z = 'Male',
A = 'Asian',
B = 55 ;
X = 'Nathan Pham',
Y = 'Manufacturing',
Z = 'Male',
A = 'Asian',
B = 45 ;
X = 'Dylan Thao',
Y = 'Manufacturing',
Z = 'Male',
A = 'Asian',
B = 53 .

?-
```

Rule 5:

```
Prolog — cssc2319@edoras:~/Assignment4 — ssh -x -y cssc2319@edoras.sdsu.edu — 9...
X = 'Dylan Thao',
Y = 'Manufacturing',
Z = 'Male',
A = 'Asian',
B = 53 .

?- greet('E02387').
Hello, Emily Davis, Sr. Manger of IT, Research & Development!
true.

?- greet('E00549').
Hello, Isabella Xi, Vice President of Marketing, Research & Development!
true.

?- greet(X).
Hello, Full Name, Job Title of Department, Business Unit!
X = 'EEID' ;
Hello, Emily Davis, Sr. Manger of IT, Research & Development!
X = 'E02387' ;
Hello, Theodore Dinh, Technical Architect of IT, Manufacturing!
X = 'E04105' ;
Hello, Luna Sanders, Director of Finance, Speciality Products!
X = 'E02572' .

?-
```

Rule 6:

```
Prolog — cssc2319@edoras:~/Assignment4 — ssh -x -y cssc2319@edoras.sdsu.edu — 9...

?- retract(employee('EEID',_,_,_,_,_,_,_,_,_,_,_,_,_,_)).
false.

?- retract(employee('EEID',_,_,_,_,_,_,_,_,_,_,_,_,_,_)).
true.

?- years_until_retirement('Emily Davis',55,Years).
Years = 10.

?- years_until_retirement('Logan Foreman',55,Years).
false.

?- years_until_retirement(Name,Age,Years).
Name = 'Emily Davis',
Age = 55,
Years = 10 ;
Name = 'Theodore Dinh',
Age = 59,
Years = 6 ;
Name = 'Luna Sanders',
Age = 50,
Years = 15 .

?-
```

Rule 7:

```
Prolog — cssc2319@edoras:~/Assignment4 — ssh -x -y cssc2319@edoras.sdsu.edu — 9...
Age = 50,
Years = 15 .

?- is_rd_black_midAge('Emily Davis',BU,ETH,AGE).
false.

?- is_rd_black_midAge(Name,B,E,Age).
Name = 'Eva Coleman',
B = 'Research & Development',
E = 'Black',
Age = 37 ;
Name = 'Gianna Williams',
B = 'Research & Development',
E = 'Black',
Age = 27 .

?- is_rd_black_midAge('Gianna Williams',B,E,Age).
B = 'Research & Development',
E = 'Black',
Age = 27.

?- is_rd_black_midAge('Logan Foreman',B,E,Age).
false.

?-
```

Rule 8:

```
Prolog — cssc2319@edoras:~/Assignment4 — ssh -x -y cssc2319@edoras.sdsu.edu — 9...
Age = 27.

?- is_rd_black_midAge('Logan Foreman',B,E,Age).
false.

?- is_ITorFin_PHXorMIAorAUS(Name, Department, City).
Name = 'Austin Vo',
Department = 'Finance',
City = 'Phoenix' ;
Name = 'Ruby Barnes',
Department = 'IT',
City = 'Phoenix' ;
Name = 'Luke Martin',
Department = 'Finance',
City = 'Miami' .

?- is_ITorFin_PHXorMIAorAUS('Austin Vo', Department, City).
Department = 'Finance',
City = 'Phoenix' ;
false.

?- is_ITorFin_PHXorMIAorAUS('Logan Foreman', Department, City).
false.

?-
```

Rule 9:

```
Prolog — cssc2319@edoras:~/Assignment4 — ssh -x -y cssc2319@edoras.sdsu.edu — 9...
?- is_female_senior_role('Emily Davis', 'Sr. Manger').
true.

?- is_female_senior_role('Emily Davis', Role).
Role = 'Sr. Manger'.

?- is_female_senior_role(Name, Role).
Name = 'Emily Davis',
Role = 'Sr. Manger' ;
Name = 'Madeline Walker',
Role = 'Sr. Analyst' ;
Name = 'Savannah Ali',
Role = 'Sr. Manger' ;
Name = 'Everleigh Ng',
Role = 'Sr. Manger' ;
Name = 'Camila Silva',
Role = 'Sr. Manger' ;
Name = 'Sadie Washington',
Role = 'Sr. Manger' ;
Name = 'Peyton Huang',
Role = 'Sr. Manger' ;
Name = 'Ava Ayala',
Role = 'Sr. Manger' .

?-
```

Rule 10:

```
Prolog — cssc2319@edoras:~/Assignment4 — ssh -x -y cssc2319@edoras.sdsu.edu — 9...
?- is_highly_paid_senior_manager('Emily Davis', Salary).
Salary = '$141,604 '.

?- is_highly_paid_senior_manager('Logan Foreman', Salary).
false.

?- is_highly_paid_senior_manager(Name, Salary).
Name = 'Emily Davis',
Salary = '$141,604 ' ;
Name = 'Savannah Ali',
Salary = '$157,333 ' ;
Name = 'Everleigh Ng',
Salary = '$146,742 ' ;
Name = 'Camila Silva',
Salary = '$154,828 ' ;
Name = 'Elias Alvarado',
Salary = '$146,140 ' ;
Name = 'Sadie Washington',
Salary = '$122,350 ' ;
Name = 'Peyton Huang',
Salary = '$125,633 ' ;
Name = 'John Chow',
Salary = '$135,062 '
Unknown action: / (h for help)
Action? .
```

Rule 11:

```
Prolog — cssc2319@edoras:~/Assignment4 — ssh -x -y cssc2319@edoras.sdsu.edu — 9...
Salary = '$146,140 ' ;
Name = 'Sadie Washington',
Salary = '$122,350 ' ;
Name = 'Peyton Huang',
Salary = '$125,633 ' ;
Name = 'John Chow',
Salary = '$135,062 '
Unknown action: / (h for help)
Action? .

?- is_prime_age('Joshua Gupta', Age).
false.

?- is_prime_age(Name, Age).
Name = 'Theodore Dinh',
Age = 59 ;
Name = 'Easton Bailey',
Age = 29 ;
Name = 'Eli Jones',
Age = 59 .

?- is_prime_age('Eli Jones', Age).
Age = 59.

?-
```

Rule 12:

```
Prolog — cssc2319@edoras:~/Assignment4 — ssh -x -y cssc2319@edoras.sdsu.edu — 9...
Name = 'Eli Jones',
Age = 59 .

?- is_prime_age('Eli Jones', Age).
Age = 59.

?- average_salary(Job_Title, Salary).
Salary = 113217.365.

?- average_salary('Finance', Salary).
false.

?- average_salary('Sr. Manger', Salary).
Salary = 141067.76363636364.

?- average_salary('Fake Job Title', Salary).
false.

?- average_salary('Director', Salary).
Salary = 171633.85123966943.

?- average_salary(X, Salary).
Salary = 113217.365.

?-
```

Rule 13:

```
Prolog — cssc2319@edoras:~/Assignment4 — ssh -x -y cssc2319@edoras.sdsu.edu — 9...
false.

?- average_salary('Director', Salary).
Salary = 171633.85123966943.

?- average_salary(X, Salary).
Salary = 113217.365.

?- total_salary(Name,Salary).
Name = 'Emily Davis',
Salary = 162844.6 ;
Name = 'Theodore Dinh',
Salary = 99975 ;
Name = 'Luna Sanders',
Salary = 195718.8 ;
Name = 'Penelope Jordan',
Salary = 90856.91 .

?- total_salary('Logan Foreman',Salary).
false.

?- total_salary('Logan Rivera',Salary).
Salary = 221167.36000000002.

?-
```

Rule 14:

```
Prolog — cssc2319@edoras:~/Assignment4 — ssh -x -y cssc2319@edoras.sdsu.edu — 9...

?- total_salary('Logan Rivera',Salary).
Salary = 221167.36000000002.

?- takehome_salary(Name,Job_Title,Take_home_salary).
Name = 'Emily Davis',
Job_Title = 'Sr. Manger',
Take_home_salary = 113991.22
Unknown action: ' (h for help)
Action? ;
Name = 'Theodore Dinh',
Job_Title = 'Technical Architect',
Take_home_salary = 74981.25 ;
Name = 'Luna Sanders',
Job_Title = 'Director',
Take_home_salary = 137003.16 .

?- takehome_salary('Emily Davis',Job_Title,Take_home_salary).
Job_Title = 'Sr. Manger',
Take_home_salary = 113991.22.

?- takehome_salary('Logan Foreman',Job_Title,Take_home_salary).
false.

?-
```

Rule 15:

```
Prolog — cssc2319@edoras:~/Assignment4 — ssh -x -y cssc2319@edoras.sdsu.edu — 9...
Take_home_salary = 113991.22.

?- takehome_salary('Logan Foreman',Job_Title,Take_home_salary).
false.

?- total_years('Ruby Barnes', Years).
Years = 3.

?- total_years('Logan Rivera', Years).
Years = 21.

?- total_years('Logan Foreman', Years).
false.

?- total_years(Name, Years).
Name = 'Emily Davis',
Years = 5 ;
Name = 'Theodore Dinh',
Years = 26 ;
Name = 'Luna Sanders',
Years = 17 ;
Name = 'Penelope Jordan',
Years = 4 ;
Name = 'Austin Vo',
Years = 28
```