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### Logical Programming in Prolog

I was able to complete the assignment with my partner from another section, Justin Messick. We collaborated and wrote code together in real life on some of the later tasks which were more difficult than the beginning ones. During this assignment, I did not use many online resources besides the lecture slides on prolog from Canvas. I asked ChatGPT for simple examples of how to use prolog built-ins like `atom_concat`, `string_split`, etc (I did not ask for a complete implementation of any rules). My partner Justin consulted the online prolog documentation, Stack Overflow, and also used ChatGPT to get examples of prolog code.

## Rule #1

```
?- is_seattle_employee('Emily Davis'). is_seattle_employee('Luna Sanders').  
  
true.  
  
false.  
  
?- is_seattle_employee(X).  
X = 'Emily Davis' ;  
X = 'Camila Rogers' ;  
X = 'Isabella Xi' ;  
X = 'Camila Silva' ;  
X = 'Leonardo Dixon' ;  
X = 'Wyatt Chin' ;  
X = 'Angel Powell' ;  
X = 'John Moore' ;  
X = 'Gabriel Holmes' ;  
X = 'Eva Coleman' ;  
X = 'Lucy Alexander' |
```

## Rule #2

```
?- is_senior_manager_in_IT('Emily Davis'). is_senior_manager_in_IT('Luna Sanders').  
  
true.  
  
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' ;  
X = 'Clara Kang' ;  
X = 'Camila Li' ;  
X = 'Hadley Guerrero' ;  
X = 'Mason Watson' ;  
X = 'Lyla Stewart' ;  
X = 'Sebastian Fong' ;  
X = 'Elijah Ramos' ;  
X = 'Nora Le' ;  
X = 'Madelyn Scott' |
```

### Rule #3

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

?- is_director_finance_miami('Andrew Coleman'). is_director_finance_miami('Luna Sanders').

true.

false.
```

### Rule #4

```
?- is_asian_US_manufacturing_40M(S, T, V, X, Y).
S = 'Theodore Dinh',
T = 'Manufacturing',
V = 'Male',
X = 'Asian',
Y = 59 ;
S = 'Austin Vo',
T = 'Manufacturing',
V = 'Male',
X = 'Asian',
Y = 55 ;
S = 'Jack Cheng',
T = 'Manufacturing',
V = 'Male',
X = 'Asian',
Y = 42 ;
S = 'Colton Thao',
T = 'Manufacturing',
V = 'Male',
X = 'Asian',
Y = 55 ;
S = 'James Bui',
T = 'Manufacturing',
V = 'Male',
X = 'Asian',
Y = 64 .

?- is_asian_US_manufacturing_40M('Theodore Dinh', 'Manufacturing', 'Male', 'Asian', '59').
false.

?- is_asian_US_manufacturing_40M('Theodore Dinh', 'Manufacturing', 'Male', 'Asian', 59).
true.

?- is_asian_US_manufacturing_40M('Emily Davis', 'IT', 'Female', 'Black', '55').
false.
```

## Rule #5

```
?- greet(EEID).  
Hello, Emily Davis, Sr. Manger of IT, Research & Development!  
EEID = 'E02387' ;  
Hello, Theodore Dinh, Technical Architect of IT, Manufacturing!  
EEID = 'E04105' ;  
Hello, Luna Sanders, Director of Finance, Speciality Products!  
EEID = 'E02572' ;  
Hello, Penelope Jordan, Computer Systems Manager of IT, Manufacturing!  
EEID = 'E02832' ;  
Hello, Austin Vo, Sr. Analyst of Finance, Manufacturing!  
EEID = 'E01639' ;  
Hello, Joshua Gupta, Account Representative of Sales, Corporate!  
EEID = 'E00644' ;  
Hello, Ruby Barnes, Manager of IT, Corporate!  
EEID = 'E01550' .  
  
?- greet('E04105'). greet('1234').  
Hello, Theodore Dinh, Technical Architect of IT, Manufacturing!  
true.  
  
false.
```

## Rule #6

```
?- years_until_retirement(FullName, Age, Years_to_retire).
FullName = 'Emily Davis',
Age = 55,
Years_to_retire = 10 ;
FullName = 'Theodore Dinh',
Age = 59,
Years_to_retire = 6 ;
FullName = 'Luna Sanders',
Age = 50,
Years_to_retire = 15 ;
FullName = 'Penelope Jordan',
Age = 26,
Years_to_retire = 39 ;
FullName = 'Austin Vo',
Age = 55,
Years_to_retire = 10 ;
FullName = 'Joshua Gupta',
Age = 57,
Years_to_retire = 8 .

?- years_until_retirement('Luna Sanders', Age, Years_to_retire).
Age = 50,
Years_to_retire = 15.

?- years_until_retirement('Justin Messick', Age, Years_to_retire).
false.
```

## Rule #7

```
?- is_rd_black_midAge(FullName, BusinessUnit, Ethnicity, Age).
FullName = 'Eva Coleman',
BusinessUnit = 'Research & Development',
Ethnicity = 'Black',
Age = 37 ;
FullName = 'Gianna Williams',
BusinessUnit = 'Research & Development',
Ethnicity = 'Black',
Age = 27 ;
FullName = 'Samantha Foster',
BusinessUnit = 'Research & Development',
Ethnicity = 'Black',
Age = 34 ;
FullName = 'William Walker',
BusinessUnit = 'Research & Development',
Ethnicity = 'Black',
Age = 40 ;
FullName = 'Olivia Gray',
BusinessUnit = 'Research & Development',
Ethnicity = 'Black',
Age = 42 .

?- is_rd_black_midAge('Eva Coleman', BusinessUnit, Ethnicity, Age). is_rd_black_midA
ge('Justin Messick', BusinessUnit, Ethnicity, Age).

BusinessUnit = 'Research & Development',
Ethnicity = 'Black',
Age = 37.

false.
```

Rule #8

```
?- is_ITorFin_PHXorMIAorAUS(FullName, Department, City).
FullName = 'Austin Vo',
Department = 'Finance',
City = 'Phoenix' ;
FullName = 'Ruby Barnes',
Department = 'IT',
City = 'Phoenix' ;
FullName = 'Luke Martin',
Department = 'Finance',
City = 'Miami' ;
FullName = 'Bella Powell',
Department = 'Finance',
City = 'Phoenix' ;
FullName = 'Nora Brown',
Department = 'IT',
City = 'Austin' ;
FullName = 'Riley Padilla',
Department = 'IT',
City = 'Miami' .

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

?- is_ITorFin_PHXorMIAorAUS(FullName, Department, 'San Diego').
false.
```

#### Rule #9

```
?- is_female_senior_role(FullName, JobTitle).
FullName = 'Emily Davis',
JobTitle = 'Sr. Manger' ;
FullName = 'Madeline Walker',
JobTitle = 'Sr. Analyst' ;
FullName = 'Savannah Ali',
JobTitle = 'Sr. Manger' ;
FullName = 'Everleigh Ng',
JobTitle = 'Sr. Manger' ;
FullName = 'Camila Silva',
JobTitle = 'Sr. Manger' ;
FullName = 'Sadie Washington',
JobTitle = 'Sr. Manger' .

?- is_female_senior_role('Madeline Walker', JobTitle).
JobTitle = 'Sr. Analyst'.

?- is_female_senior_role('Krishna', JobTitle).
false.
```

#### Rule #10

```
?- is_highly_paid_senior_manager(FullName, AnnualSalary).
FullName = 'Emily Davis',
AnnualSalary = '$141,604 ' ;
FullName = 'Savannah Ali',
AnnualSalary = '$157,333 ' ;
FullName = 'Everleigh Ng',
AnnualSalary = '$146,742 ' ;
FullName = 'Camila Silva',
AnnualSalary = '$154,828 ' ;
FullName = 'Elias Alvarado',
AnnualSalary = '$146,140 ' ;
FullName = 'Sadie Washington',
AnnualSalary = '$122,350 ' ;
FullName = 'Peyton Huang',
AnnualSalary = '$125,633 ' .

?- is_highly_paid_senior_manager('Camila Silva', AnnualSalary).
AnnualSalary = '$154,828 '.

?- is_highly_paid_senior_manager('Justin', AnnualSalary).
false.
```



Rule #11

```
?- is_prime_age(FullName, Age).
FullName = 'Theodore Dinh',
Age = 59 ;
FullName = 'Easton Bailey',
Age = 29 ;
FullName = 'Eli Jones',
Age = 59 ;
FullName = 'Robert Yang',
Age = 31 ;
FullName = 'Isabella Xi',
Age = 41 ;
FullName = 'Logan Rivera',
Age = 59 .

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

?- is_prime_age('Justin', Age).
false.
```

Rule #12

```
?- average_salary(JobTitle, Salary).
JobTitle = 'Sr. Manger',
Salary = 141067.76363636364 ;
JobTitle = 'Technical Architect',
Salary = 79773.82352941176 ;
JobTitle = 'Director',
Salary = 171633.85123966943 ;
JobTitle = 'Computer Systems Manager',
Salary = 80346.80952380953 ;
JobTitle = 'Sr. Analyst',
Salary = 86402.95714285714 ;
JobTitle = 'Account Representative',
Salary = 62281.619047619046 ;
JobTitle = 'Manager',
Salary = 113275.6836734694 ;
JobTitle = 'Analyst',
Salary = 49950.666666666664 .

?- average_salary('Manager', Salary).
Salary = 113275.6836734694 .

?- average_salary(JobTitle, '1234').
false.
```

### Rule #13

```
?- total_salary(FullName, Salary).  
FullName = 'Emily Davis',  
Salary = 162844.6 ;  
FullName = 'Theodore Dinh',  
Salary = 99975 ;  
FullName = 'Luna Sanders',  
Salary = 195718.8 ;  
FullName = 'Penelope Jordan',  
Salary = 90856.91 ;  
FullName = 'Austin Vo',  
Salary = 95409 ;  
FullName = 'Joshua Gupta',  
Salary = 50994 .  
  
?- total_salary('Luna Sanders', Salary).  
Salary = 195718.8.  
  
?- total_salary('Erica', Salary).  
false.
```

Rule #14

```
?- takehome_salary(FullName, JobTitle, TakeHomeSalary).
FullName = 'Emily Davis',
JobTitle = 'Sr. Manger',
TakeHomeSalary = 113991.22 ;
FullName = 'Theodore Dinh',
JobTitle = 'Technical Architect',
TakeHomeSalary = 74981.25 ;
FullName = 'Luna Sanders',
JobTitle = 'Director',
TakeHomeSalary = 137003.16 ;
FullName = 'Penelope Jordan',
JobTitle = 'Computer Systems Manager',
TakeHomeSalary = 68142.6825 ;
FullName = 'Austin Vo',
JobTitle = 'Sr. Analyst',
TakeHomeSalary = 71556.75 ;
FullName = 'Joshua Gupta',
JobTitle = 'Account Representative',
TakeHomeSalary = 38245.5 .

?- takehome_salary('Penelope Jordan', JobTitle, TakeHomeSalary).
JobTitle = 'Computer Systems Manager',
TakeHomeSalary = 68142.6825 .

?- takehome_salary('Justin', JobTitle, TakeHomeSalary).
false.
```

Rule #15

```
?- total_years(FullName, Years).
FullName = 'Emily Davis',
Years = 5 ;
FullName = 'Theodore Dinh',
Years = 26 ;
FullName = 'Luna Sanders',
Years = 17 ;
FullName = 'Penelope Jordan',
Years = 4 ;
FullName = 'Austin Vo',
Years = 28 ;
FullName = 'Joshua Gupta',
Years = 6 ;
FullName = 'Ruby Barnes',
Years = 3 ;
FullName = 'Luke Martin',
Years = 1 .

?- total_years('Luna Sanders', Years).
Years = 17.

?- total_years('Justin', Years).
false.
```