

Exercise 5

Due at 3:30 PM (on paper), April 16, 2009.

Please type your answers

The questions below refer to the following database:

```
:- dynamic pop/2.
```

```
capital(france,paris).  
capital(uk,london).  
capital(peru,lima).  
capital(chile,santiago).  
capital(japan,tokyo).  
capital(china,beijing).
```

```
europe(france).  
europe(uk).
```

```
samerica(peru).  
samerica(chile).
```

```
asia(japan).  
asia(china).
```

```
% population in millions
```

```
pop(paris,10).  
pop(london,8).  
pop(lima,8).  
pop(santiago,5).  
pop(tokyo,28).  
pop(beijing,12).
```

1. (5 pts) Write a goal to find the French capital.
2. (5 pts) Write a goal to find the country whose capital is Lima.
3. (10 pts) Write a goal to find the capitals of Asian countries.
4. (10 pts) Write a goal to find cities with a population of at least 10 million.

5. (15 pts) Write a new rule that defines a sister city as a city with the same population as another city but on a different continent.

6. (10 pts) Suppose a new census reveals that the population of Lima has increased to 9 million people. Write the two lines necessary to change the database at interpretation time to remove the old population fact and add the new one.

7. (20 pts) The following is small database from the book that we talked about in class:

```
rainy(seattle).  
rainy(rochester).  
cold(rochester).  
snowy(X) :- rainy(X), cold(X).
```

Load the database into the Prolog interpreter. Give the results for a trace of the goal `snowy(C)`. Explain the meaning of `call`, `exit`, `redo`, and `fail`.

8. (5 pts) Examine the tic-tac-toe example on page 576 of the book. Suppose we change the rule

```
move(A) :- good(A), empty(A), !.
```

to read

```
move(A) :- good(A), empty(A).
```

What will be the effect of the change?

9. (20 pts) Create your own database of at least 10 facts and/or rules. The database can be related to a topic of your choosing: sports, entertainment, literature, and hobbies. Show at least 3 interesting queries on your database.