

E06 Queries on KB

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1 Problem Description

Given a KB `Restaurants.pl`, which describes the distribution of branches of 10 well-known restaurants in Guangzhou.

For example, `restaurant(ajukejiacai,2007,yuecai)` means that `ajukejiacai` was founded in 2007 and is a restaurant of `yuecai`. `branch(ajukejiacai,xintiandi)` means that `ajukejiacai` has a branch in `xintiandi`. `district(xintiandi,panyu)` means that `xintiandi` is an area of `panyu` district.

Please formulate each of the following questions as a query using Prolog's notation, pose it to Prolog, and obtain Prolog's answer:

1. What restaurants have branches in beigang?
2. What districts have restaurants of yuecai and xiangcai?
3. What restaurants have the least number of branches?
4. What areas have two or more restaurants?
5. Which restaurant has the longest history?
6. What restaurants have at least 10 branches?

Please define the new relation below using Prolog and test it.

- `sameDistrict(Restaurant1, Restaurant2)`: Restaurant1 and Restaurant2 have one or more branches in the same district.

You should write down a listing that shows the queries you submitted to Prolog, and the answer returned. Hand in a file named `E06_YourNumber.pdf`, and send it to `ai_201901@foxmail.com`

2 Codes and Results

Codes are also enclosed with this report, please be kind to refer to the file 'Sol_Ex6.txt' for a clearer observation.

```
1 1. What restaurants have branches in beigang?
2 setof(A,branch(A,beigang),Res).
3 >>> Res = [huangmenjimifan,mixuebingcheng,shaxianxiaochi].
4
5 2. What districts have restaurants of yuecai and xiangcai?
6 setof(
7   A,A^(restaurant(R,_,yuecai),branch(R,P),district(P,A)),Res
8 ).
9 >>> Res = [panyu,tianhe,yuexiu] .
10
11 3. What restaurants have the least number of branches?
12 %% Generate a list of the number of
13 %% branches of each restaurant:
14 %%      findall(Res,setof(...),List);
15 %% Use min_list() to determine which
16 %% restaurant has the least number of branches:
17 %%      min_list(Results,Lm);
18 findall(R,
19   (findall(Resu,
20     setof(L,
21       (restaurant(R,_,_),
22         setof(B,branch(R,B),Bran),length(Bran,L))),
23     Resu),
24   Results),
25   setof(Bs,branch(R,Bs),Ls),length(Ls,Lm),min_list(Results,Lm))
26 ,Res).
27 >>> Res = [hongmenyan].
28
29
```

```

30 4. What areas have two or more restaurants?
31 setof(A,RLLL^(setof(R,branch(R,A),L),length(L,LL),LL>=2),Res).
32 >>> Res = [bainaohui,beigang,dongpu,shiqiao,
33             tianhebei,xintiandi,yongfu,yuancun].
34
35 5. Which restaurant has the longest history?
36 findall(R1,
37     (restaurant(R1,Y1,_),restaurant(R2,Y2,_),R1\=R2,Y1<Y2,
38     setof(Rs,restaurant(Rs,Y1,_),Results),length(Results,1))
39 ,Res).
40 >>> Res = [mixuebingcheng,...,mixuebingcheng|...].
41
42 6. What restaurants have at least 10 branches?
43 setof(R,
44     BranLB^(restaurant(R,-,-),
45     setof(B,R^branch(R,B),Bran),length(Bran,L),L>=10)
46 ,Res).
47 >>>
48     Res = [diandude] ;
49     Res = [mixuebingcheng] ;
50     Res = [muwushaokao] ;
51     Res = [tongxianghui] ;
52     Res = [dagangxianmiaoshaoji].
53
54
55 7. Please define the new relation below
56     using Prolog and test it.
57 %% sameDistrict(Restaurant1,Restaurant2):
58 %%     Restaurant1 and Restaurant2 have
59 %%     one or more branches in the same district.
60 %% sameDistrict(R1,R2):-
61 %%     restaurant(R1,-,-),restaurant(R2,-,-),
62 %%     R1\=R2,branch(R1,B),branch(R2,B).

```

```

63 %% sameDistrict (R,R) .
64 sameDistrict (X,Y) ,X\=Y, write (X) , write ( ' <=> ' ) , write (Y) , nl , fail .
65 >>>
66     mixuebingcheng <=> diandude
67     mixuebingcheng <=> ajukejiacai
68     mixuebingcheng <=> hongmenyan
69     mixuebingcheng <=> huangmenjimifan
70     mixuebingcheng <=> shaxianxiaochi
71     mixuebingcheng <=> yangguofu
72     muwushaokao <=> dagangxianmiaoshaoji
73     diandude <=> mixuebingcheng
74     diandude <=> tongxianghui
75     diandude <=> tongxianghui
76     ajukejiacai <=> mixuebingcheng
77     ajukejiacai <=> hongmenyan
78     ajukejiacai <=> tongxianghui
79     ajukejiacai <=> yangguofu
80     hongmenyan <=> mixuebingcheng
81     hongmenyan <=> ajukejiacai
82     hongmenyan <=> yangguofu
83     dagangxianmiaoshaoji <=> muwushaokao
84     dagangxianmiaoshaoji <=> huangmenjimifan
85     huangmenjimifan <=> mixuebingcheng
86     huangmenjimifan <=> dagangxianmiaoshaoji
87     huangmenjimifan <=> shaxianxiaochi
88     shaxianxiaochi <=> mixuebingcheng
89     shaxianxiaochi <=> huangmenjimifan
90     tongxianghui <=> diandude
91     tongxianghui <=> diandude
92     tongxianghui <=> ajukejiacai
93     yangguofu <=> mixuebingcheng
94     yangguofu <=> ajukejiacai
95     yangguofu <=> hongmenyan

```