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E06 Queries on KB

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Contents

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

```
sameDistrict(R1,R2):-restaurant(R1,_,_),restaurant(R2,_,_),R1\=R2,branch(R1,B),bra
sameDistrict(R,R).

restaurant(mixuebingcheng,1998,drinks).
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restaurant(muwushaokao,2003,barbecue).
restaurant(diandude,1993,yuecai).
restaurant(ajukejiacai,2007,yuecai).
restaurant(hongmenyan,2015,yuecai).
restaurant(dagangxianmiaoshaoji,2015,yuecai).
restaurant(huangmenjimifan,1935,lucai).
restaurant(shaxianxiaochi,1998,mincai).
restaurant(tongxianghui,2013,xiangcai).
restaurant(yangguofu,2007,dongbeicai).


branch(mixuebingcheng,wushan).
branch(mixuebingcheng,lujiang).
branch(mixuebingcheng,shipaixi).
branch(mixuebingcheng,yiyuannan).
branch(mixuebingcheng,beiting).
branch(mixuebingcheng,xintiandi).
branch(mixuebingcheng,beigang).
branch(mixuebingcheng,chentian).
branch(mixuebingcheng,chisha).
branch(mixuebingcheng,longdong).
branch(mixuebingcheng,zhucun).
branch(mixuebingcheng,shiqiao).


branch(muwushaokao,gangding).
branch(muwushaokao,shayuan).
branch(muwushaokao,heguang).
branch(muwushaokao,tangxia).
branch(muwushaokao,dongpu).
branch(muwushaokao,shengdi).
branch(muwushaokao,xiaogang).
branch(muwushaokao,tonghe).
branch(muwushaokao,diwangguangchang).
branch(muwushaokao,runzhengguangchang).
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branch(diandude,huachengdadao).
branch(diandude,zhongshansi).
branch(diandude,huifudong).
branch(diandude,youtuobangshiguang).
branch(diandude,bainaohui).
branch(diandude,panfu).
branch(diandude,yangji).
branch(diandude,tianhebei).
branch(diandude,shiqiao).
branch(diandude,linhe).

branch(ajukejiacai,yongfu).
branch(ajukejiacai,xintiandi).
branch(ajukejiacai,shatainan).

branch(hongmenyan,xintiandi).
branch(hongmenyan,zhilanwan).

branch(dagangxianmiaoshaoji,yuancun).
branch(dagangxianmiaoshaoji,kecun).
branch(dagangxianmiaoshaoji,beishan).
branch(dagangxianmiaoshaoji,nanpudadao).
branch(dagangxianmiaoshaoji,xinshi).
branch(dagangxianmiaoshaoji,dongpu).
branch(dagangxianmiaoshaoji,huadong).
branch(dagangxianmiaoshaoji,fangcun).
branch(dagangxianmiaoshaoji,cencun).
branch(dagangxianmiaoshaoji,changxing).
branch(dagangxianmiaoshaoji,gaosheng).

branch(huangmenjimifan,siyoubei).
branch(huangmenjimifan,yuancun).
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branch(huangmenjimifan, dongxiaonan).
branch(huangmenjimifan, dongxiaonan).
branch(huangmenjimifan, dongqu).
branch(huangmenjimifan, dalingang).
branch(huangmenjimifan, pazhou).
branch(huangmenjimifan, beigang).

branch(shaxianxiaochi, kangwangnan).
branch(shaxianxiaochi, beigang).
branch(shaxianxiaochi, luolang).

branch(yangguofu, xintiandi).
branch(yangguofu, dayuan).
branch(yangguofu, shishangtianhe).
branch(yangguofu, chebei).

branch(tongxianghui, bainaohui).
branch(tongxianghui, tianhebei).
branch(tongxianghui, yongfu).
branch(tongxianghui, shimaocheng).
branch(tongxianghui, hanting).
branch(tongxianghui, yuanyangmingyuan).
branch(tongxianghui, zhongshanyilu).
branch(tongxianghui, huizhoudasha).
branch(tongxianghui, kaifadadao).
branch(tongxianghui, maoshengdasha).

district(wushan, tianhe).
district(shipaixi, tianhe).
district(longdong, tianhe).
district(gangding, tianhe).
district(heguang, tianhe).
district(tangxia, tianhe).
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```
district(dongpu,tianhe).
district(huachengdadao,tianhe).
district(youtuobangshiguang,tianhe).
district(bainaohui,tianhe).
district(tianhebei,tianhe).
district(linhe,tianhe).
district(yuancun,tianhe).
district(cencun,tianhe).
district(changxing,tianhe).
district(dalingang,tianhe).
district(shishangtianhe,tianhe).
district(chebei,tianhe).
district(bainaohui,tianhe).
district(hanting,tianhe).
district(yuanyangmingyuan,tianhe).

district(lujiang,haizhu).
district(yiyuannan,haizhu).
district(chisha,haizhu).
district(shayuan,haizhu).
district(xiaogang,haizhu).
district(runzhengguangchang,haizhu).
district(kecun,haizhu).
district(beishan,haizhu).
district(dongxiaonan,haizhu).
district(pazhou,haizhu).
district(huizhoudasha,haizhu).

district(beiting,panyu).
district(beigang,panyu).
district(xintiandi,panyu).
district(shiqiao,panyu).
district(zhilanwan,panyu).
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district(nanpudadao,panyu).
district(maoshengdasha,panyu).

district(chentian,baiyun).
district(shengdi,baiyun).
district(tonghe,baiyun).
district(shatainan,baiyun).
district(xinshi,baiyun).
district(dayuan,baiyun).

district(zhucun,huadu).
district(huadong,huadu).

district(diwangguangchang,yuexiu).
district(zhongshansi,yuexiu).
district(huifudong,yuexiu).
district(panfu,yuexiu).
district(yangji,yuexiu).
district(yongfu,yuexiu).
district(siyoubei,yuexiu).
district(zhongshanyilu,yuexiu).

district(fangcun,liwan).
district(gaosheng,liwan).
district(kangwangnan,liwan).
district(shimaocheng,liwan).

district(dongqu,huangpu).
district(luolang,huangpu).
district(kaifadadao,huangpu).
```

Q1 What restaurants have branches in beigang?

```
?- setof(A, branch(A, beigang), Res).
Res = [huangmenjimifan, mixuebingcheng, shaxianxiaochi].


Q2 What districts have restaurants of yuecai and xiangcai?


?- setof(A, A^( restaurant (R, _, yuecai ), branch(R, P) , district(P, A)), Res).
Res = [panyu, tianhe , yuexiu]


Q3 What restaurants have the least number of branches?


?- findall(R, (findall(Resu, setof(L, (restaurant(R, _, _), setof(B, branch(R, B), Bran),
length(Bran, L)), Resu), Results), setof(Bs, branch(R, Bs), Ls), length(Ls, Lm),
min_list(Results, Lm)), Res).
Res = [hongmenyan].


Q4 What areas have two or more restaurants?


?- setof(A, R^L^LL^( setof(R, branch(R, A), L), length(L, LL), LL>=2), Res).
Res = [bainaohui, beigang, dongpu, shiqiao, tianhebei, xintiandi, yongfu, yuancun]


Q5 Which restaurant has the longest history?


?-findall(R1, (restaurant(R1, Y1, _), restaurant(R2, Y2, _), R1\=R2, Y1<Y2,
setof(Rs, restaurant(Rs, Y1, _), Results), length(Results, 1)), Res).
Res = [mixuebingcheng, mixuebingcheng, mixuebingcheng, mixuebingcheng,
mixuebingcheng, mixuebingcheng, mixuebingcheng, mixuebingcheng,
mixuebingcheng|...].


Q6 What restaurants have at least 10 branches?


?- setof(R, Bran^L^B^(restaurant(R, _, _), setof(B, R^branch(R, B), Bran),
length(Bran, L), L>=10), Res).
Res = [diandude] ;
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Res = [mixuebingcheng] ;
Res = [muwushaokao] ;
Res = [tongxianghui] ;
Res = [dagangxianmiaoshaoji].
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Q7 Please de ne the new relation below using Prolog and test it.

```
?— sameDistrict(X,Y),X\=Y,write(X),write('<=>'),
write(Y),nl,fail.mixuebingcheng<=>diandude
mixuebingcheng<=>ajukejiacai
mixuebingcheng<=>hongmenyan
mixuebingcheng<=>huangmenjimifan
mixuebingcheng<=>shaxianxiaochi
mixuebingcheng<=>yangguofu
muwushaokao<=>dagangxianmiaoshaoji
diandude<=>mixuebingcheng
diandude<=>tongxianghui
diandude<=>tongxianghui
ajukejiacai<=>mixuebingcheng
ajukejiacai<=>hongmenyan
ajukejiacai<=>tongxianghui
ajukejiacai<=>yangguofu
hongmenyan<=>mixuebingcheng
hongmenyan<=>ajukejiacai
hongmenyan<=>yangguofu
dagangxianmiaoshaoji<=>muwushaokao
dagangxianmiaoshaoji<=>huangmenjimifan
huangmenjimifan<=>mixuebingcheng
huangmenjimifan<=>dagangxianmiaoshaoji
huangmenjimifan<=>shaxianxiaochi
shaxianxiaochi<=>mixuebingcheng
shaxianxiaochi<=>huangmenjimifan
tongxianghui<=>diandude
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tongxianghui<=>diandude

tongxianghui<=>ajukejiacai

yangguofu<=>mixuebingcheng

yangguofu<=>ajukejiacai

yangguofu<=>hongmenyan

false.

?—