人工智能概论（张白一老师）

专家系统

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目录

题目：

按照张老师的要求，学生自己仿照狗专家系统设计一个专家系统，使用这个系统只需要根据窗口提供去回答“yes”或“no”，系统就会帮助我选择想要的东西。

一、设计题目

我想设计的是一个大学选择系统，我规定大学的一些属性，用户依据自己的喜好选择各个属性，最终得出符合用户要求的大学。

1、大学选择系统中大学的特性

（1） 是 985 或 211
（2） 不是 985 或 211
（3） 只有一个校区
（4） 不只一个校区
（5） 有博士后流动点
（6） 就业率高
（7） 上研率超过 40%
（8） 有国家级实验室

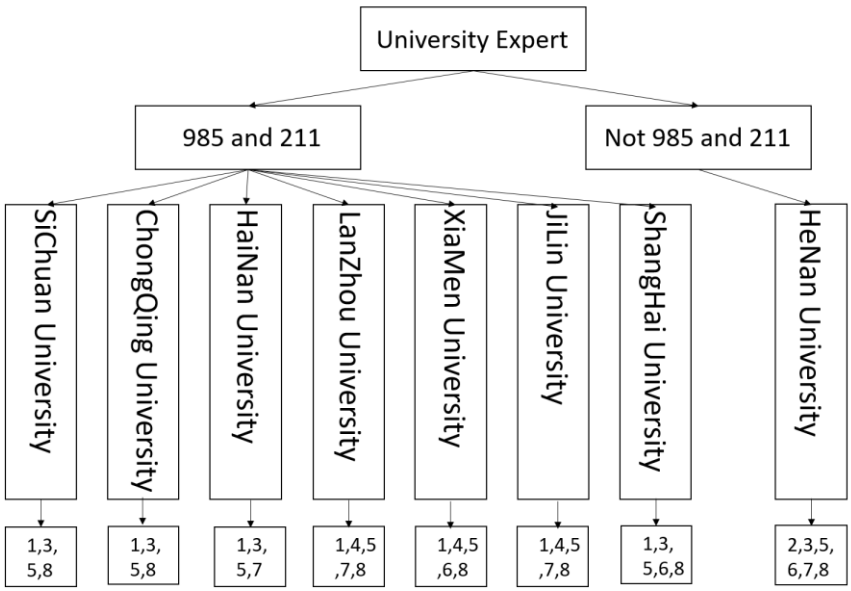
2、大学名称与特性表

每个特性应用到每个大学都有一个肯定的或者否定的回答，也就是说每个不同的大学具有或者不具有某一特性。各大学的特性如下：

大学名称	特性
SiChuan University	1,3,5,8
ChongQing University	1,3,5,8
HaiNan University	1,3,5,7
HeNan University	2,3,5,6,7,8
XiaMen University	1,4,5,6,8
JiLin University	1,4,5,7,8
ShangHai University	1,3,5,6,8
LanZhou University	1,4,5,7,8

二、专家系统的分类

该专家系统首先按照大学是否是 985/211 分类，分为是 985/211 和不是 985/211；然后再按照大学的名称给出大学的特性，如下图所示；最后根据大学及特性编写规则。



三、程序

```
/*        wlO. pro        */
/* Program: University Expert */
/* Purpose: To Show the working of an expert */
/* It is a production rule _based system */
/* Remark: This is a University classification expert system */
/* It uses a set of production rules for the*/
/*        purpose of inferring.                    */
domains
database
        xpositive(symbol,symbol)
        xnegative(symbol,symbol)
predicates
        do_expert_job
        do_consulting
ask (symbol, symbol)
university_is (symbol)
it_is (symbol)
positive(symbol,symbol)
negative (symbol,symbol)
remember (symbol,symbol,symbol)
clear_facts
goal
        do_expert_job.
clauses
/* USER INTERFACE SYSTEM */
do_expert_job:-
     makewindow(1,7,7,"AN EXPERT SYSTEMS", 1, 16,15,58),
     nl,write(" ****************************************"),
     nl,write("    WELCOME TO UNIVERSITY EXPERT SYSTEM          "),
     nl,write(" This is a university identification system "),
     nl,write(" Please respond by typing in                "),
     nl, write("    'yes'    or    'no'.          Thank you          "),
     nl, write("                                                    "),
     nl,write(" ****************************************"),
     nl, nl,
       do_consulting,
       write("Press space bar."),nl,
       readchar(_),
       clearwindow,
       exit.
do_consulting:-
        university_is(X),!,
        nl,write("Your university may be a(n) ",X,"."),nl,
        clear_facts.
```

```
do_consulting:-
        nl,write("Sorry, unable to determine the university."),nl,
        clear_facts.
ask(X,Y):-
        write("Question:-",X," it ",Y,"?"),
        readln(Reply),
        remember(X,Y,Reply).
/* INFERENCE BIGING */
positive(X,Y):- xpositive(X,Y), !.
positive(X,Y):- not(negative(X,Y)),!,ask(X,Y).
negative(X,Y):- xnegative(X,Y), !.
remember(X,Y,yes):- asserta(xpositive(X,Y)).
remember(X,Y,no):- asserta(xnegative(X,Y)),fail.
clear_facts:- retract(xpositive(_,_)),fail.
clear_facts:- retract(xnegative(_,_)),fail.
  /*    Production rules    */
    university_is("SiChuan University"):-
            it_is("985 or 211"),
            positive(has,"only one compus"),
            positive(has,"Postdoctoral flow point"),
            positive(has,"have national laboratory"),!.
    university_is("ChongQing University"):-
            it_is("985 or 211"),
            positive(has,"only one compus"),
            positive(has," Postdoctoral flow point"),
            positive(has,"have national laboratory"),!.
    university_is("HaiNan University"):-
            it_is("985 or 211"),
            positive(has," only one compus"),
            positive(has, " Postdoctoral flow point"),
            positive(has,"more than forty percent of students go to graduate school"),!.
    university_is("HeNan University"):-
            it_is("not 985 or 211"),
            positive(has,"only one compus"),
            positive(has,"Postdoctoral flow point"),
           positive(has,"more than forty percent of students go to graduate school"),
            positive(has," high employment rate"),
           positive(has,"have national laboratory"),!.
    university_is("XiaMen University"):-
            it_is("985 or 211"),
            positive(has," more than one compus"),
            positive(has," Postdoctoral flow point"),
            positive(has," high employment rate"),
            positive(has,"have national laboratory"),!.
```

```
university_is("JiLin University"):-
        it_is("985 or 211"),
        positive(has,"more than one compus"),
       positive(has,"more than forty percent of students go to graduate school"),
        positive(has," Postdoctoral flow point"),
       positive(has,"have national laboratory"),!.
university_is("ShangHai University"):-
        it_is("985 or 211"),
        positive(has," only one compus"),
        positive(has," Postdoctoral flow point"),
        positive(has," high employment rate"),
       positive(has,"have national laboratory"),!.
university_is("LanZhou University"):-
        it_is("985 or 211"),
        positive(has," more than one compus"),
        positive(has," Postdoctoral flow point"),
        positive(has,"have national laboratory"),
       positive(has,"more than forty percent of students go to graduate school"),!.
it_is("985 or 211"):- positive(has," 985 or 211"),!.
it_is("not 985 or 211"):- positive(has," not 985 or 211"),!.
/*     end       */
```

四、实验结果

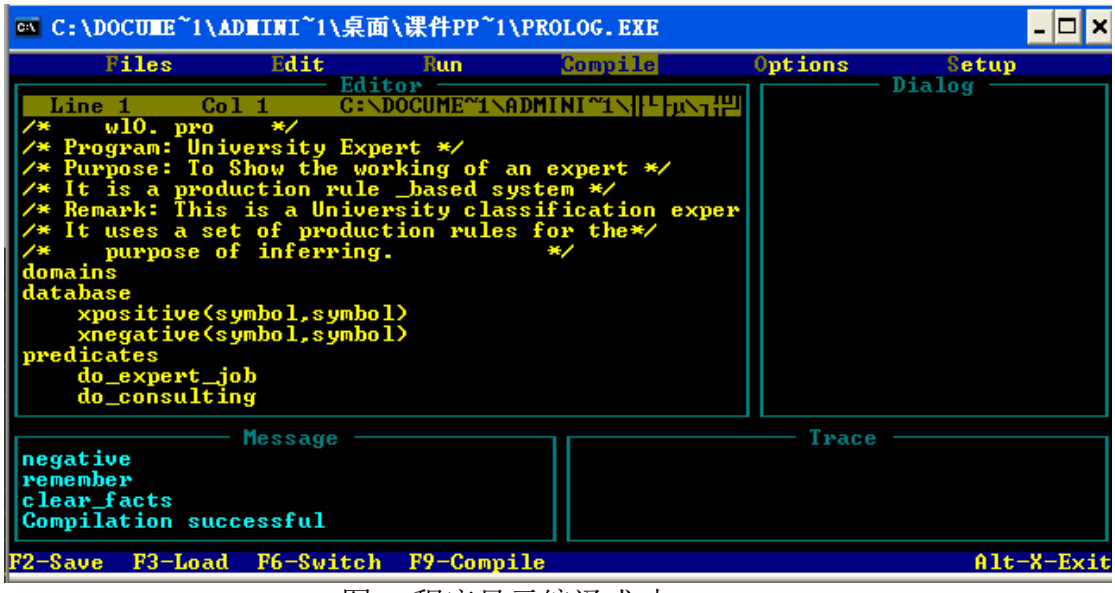


图 1 程序显示编译成功

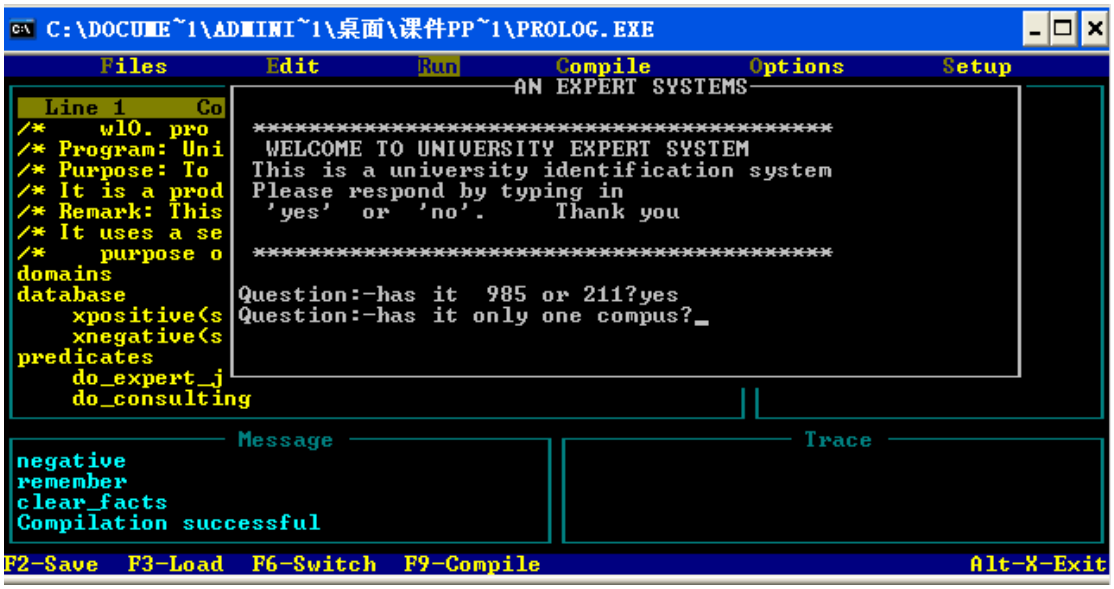


图 2 在对问题进行“yes”和“no”的回答

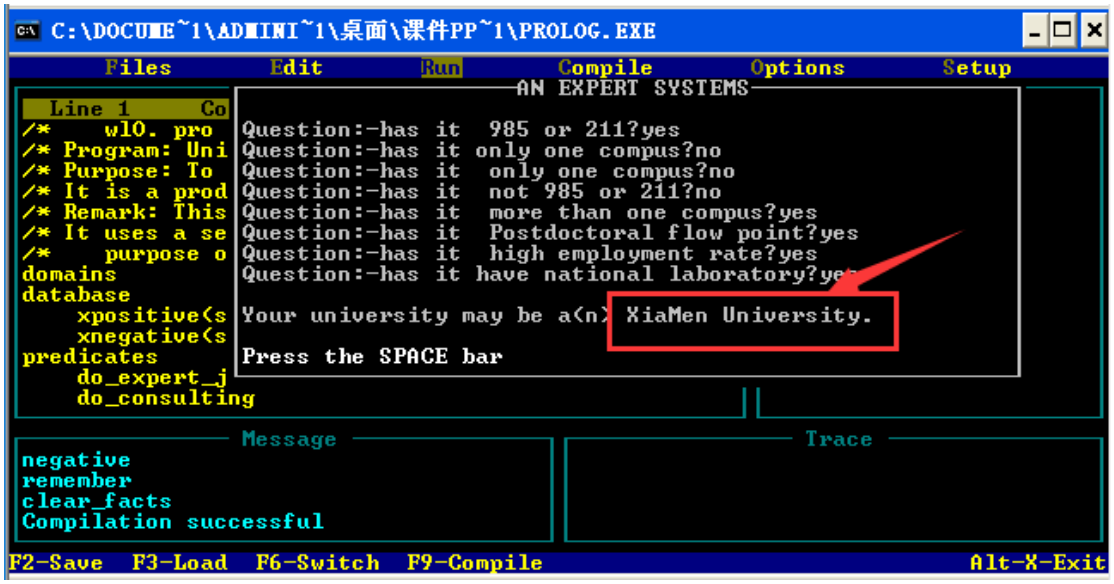


图 3 显示用户条件得出的结果是厦门大学

五、实验总结

[1] 专家系统是一个很有趣的实验，通过回答 yes 和 no 就可以从大学中筛选出我想要的大学是一件很有趣的事情，结果出来的那一刻感觉很开心，很有成就感。

[2] 在程序运行过程中出现了一些错误，我通过仔细的检查发现了错误，最终把错误解决。例如，我漏掉了“!”符号，在 prolog 编译器报错提醒下最终发现了错误。

[3] 总的来说，专家系统是人工智能里的经典问题，能够在老师给的框架下完成这件事情，令人兴奋。希望在以后的学习过程中多动脑，勤动手。而且这样一个实验为我以后出来相似问题提供了思路，是一件很有意义的事情。