CIS 365 Project 2: Logical Reasoning with Prolog

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Due Date

- at the start of class on Thursday, March 17.

Before Starting the Project

- Read the entire project description before starting. A team must consist of exactly two students and use a pair programming approach.

Learning Objectives

After completing this project you should be able to implement AI algorithms in the areas of: logical reasoning, formal proofs, and question answering.

Rubric

20 pts appropriate documentation	_____
25 pts concise fact/rule/goal design	_____
25 pts implementation	_____
30 pts results during testing	_____

Step 1: Install SWI-Prolog

- Follow the instructions in the provided "Installing SWI Prolog" guide to download and test your installation.
- Note: you may develop your solution using other command line or Windows tools. However, your solution will be tested with SWI-Prolog.

Step 2: Facts, Rules, and Goals

- Complete a single option from the following list. The answers to these questions should be nicely formatted and directly answered when running your program (without keyboard interaction).

Option #1 Intended Client: GVSU Registrar's Office

Step A: Create a Prolog database.

- Convert the Project2a dataset to Prolog facts.

Step B: Create rules and goals as needed to answer the following questions.

1. What does Dr. J. Leidig teach?
2. Does Dr. J. Leidig teach Database?
3. What is Dr. J. Leidig's schedule?
4. Who is scheduled to teach what subject on TTH, 10am?
5. When do Dr. J. Leidig and Dr. El-Said teach at the same time?
6. Who teaches at the same time as Dr. J. Leidig?
7. What courses do Jim and Pam have in common?
8. Who is taking CS courses?
9. What types of courses are Gaius Baltar taking?
10. Are there any scheduling conflicts of professors or locations?

Option #2 Intended Client: ancestry.com

Step A: Create a Prolog database.

- Convert the set of familial characters in Norse or Greek mythology to Prolog facts. Roman mythology, British royalty, French royalty, and Roman emperors are alternative options.
- Provide a visual diagram (family tree) of your relations so I can grade accordingly. Note: there are differing accounts of these relationships.

Step B: Create rules and goals as needed to answer the following questions.

1. List all of Thor's/Hera's descendants.
2. Who is/are Loki's/Apollo's parents?
3. Who is Vidar's/Ares' father?
4. Who are Forseti's/Aphrodite's aunts and uncles?
5. List all of Freya's/The Muses' ancestors.
6. Is Fenrir/Athena a descendant of Bor/Poseidon?
7. List all pairs of second-cousins.
8. List all first-cousins once removed.

Option #3 Intended Client: ???

Propose your own notable problem or case study requiring logical reasoning. Examples:

1. Which specific vehicles meet the needs of a variety of shoppers (e.g., type, options, etc.)?
2. Which games (e.g., card, video, board, etc.) are suitable for a given event (e.g., number players, type, etc.)?
3. Play a simple reasoning game (e.g., Guess Who?, organism food chain, etc.).

Step 3: Bundle your program

- Create a single .pl prolog file that will successfully execute your goals and write your solutions to the console when loaded into SWI-Prolog without further human interaction, i.e., ?- [YourFile.pl].
- Run your program and include the output in a second file with your submission.
- Ensure that your .pl file has suitable comments detailing the student names, etc.
- Ensure that your rules and goals are properly commented. Your comment descriptions should be complete enough that others do not have to reconstruct your logic to determine what a rule or goal does.

Grading Criteria

- There is a 50% penalty on programming projects if your solution does not execute or generates errors.
- There is a 50% penalty for not turning in a hardcopy (1st page of this document, code, and results) and softcopy (zip) to blackboard.
- Any options/approaches/requirements not specified in this document are left for your own decision making, in keeping with the spirit of the assignment.

Late Policy

Projects are due at the START of the class period and not accepted later. Not turning in the hard copy or soft copy by the due date is considered a late/missing project unless PRIOR arrangements are made.

Screenshot of Results:

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21 ?- ['CIS365_Project2_Rules.pl'].
1. What does Dr. J. Leidig teach?
[365,661,671,691]

2. Does Dr. J. Leidig teach Database?
false

3. What is Dr. J. Leidig's schedule?
[ (10:00 am, 11:15 am,TR), (6:00 pm, 8:50 pm,T), (6:00 pm, 8:50 pm,R), (6:00 pm, 8:50 pm,M)]

4. Who is scheduled to teach what subject on TR, 10am?
[ (Dr. P. Leidig,MIS), (Dr. J. Leidig,AI)]

5. When do Dr. J. Leidig and Dr. El-Said teach at the same time?
[ (6:00 pm,R)]

6. Who teaches at the same time as Dr. J. Leidig?
[Dr. P. Leidig,Dr. El-Said]

7. What courses do Jim and Pam have in common?
[452,457]

8. Who is taking CS Courses?
[Jim,Kara Thrace,Pam]

9. What types of courses are Gaius Baltar taking?
[IS]

10. Are there any scheduling conflicts of professors or locations?
Schedule Conflicts:
[ (Dr. Engelsma,10:00 am,MWF)]

Location Conflicts:
[ (EC 612,6:00 pm,R), (MAK B1118,10:00 am,MWF)]
true.
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