

COSC 2P90 – Assignment 2

Due: Friday, October 25th (5pm)

Part A: Getting to know Prolog

Fill out the following worksheet. You are welcome to type queries directly into Prolog to see the results. After each question, answer in the space provided.

What is the result of each of the following queries?

?- 81=8*9.

?- 81=9*9.

?- 81 is 9*9.

?- X=X.

?- X=Y, X=33.

?- Apples=oranges.

?- key(Q,p)=key(w,O).

?- J is +(3,*(4,5)).

?- oh(MY)=Dear.

?- hmm(17)=hmm(_).

Lists

What is the result of the following?

?- [a,b,c,[]]=[A|B].

?- [a,b,[]]=[First,Second,Third|Fourth].

?- [a,b,[]]=[First,Second,Third,Fourth].

Give two different answers to fill in the blank:

?- <blank> = [a,b,[[c]]].

Heads = a,

Edge = b,

Tails = c.

Write a rule, third, that results in the first parameter unifying with the third element of list provided as the second parameter. If there is no third element, it should fail.

Part B: Writing a very simple knowledge base

For this task, you'll be writing a prolog program that includes the facts below, and includes the rules necessary for making inferences. (i.e. encode the following into facts and rules)

After doing so, follow the instructions to show proof of concept.

Background: You wish to categorize movies to decide whether or not they are horror movies. You know the names of all of the movies to be considered, and you know details about them that could be useful in classification. You also know certain basic truths: reasonings that allow you to derive additional knowledge about those facts.

Knowledge: Note that the knowledge below isn't in a Prolog-friendly format. Your job is to extract the pertinent information to determine the relevant facts and rules.

“So, what's your favourite kind of movie?”

“Horror movies, of course!”

“A fair choice, but now that I think of it, what *is* a horror movie, really?”

“What do you mean? Haven't you ever seen one?”

“Of course I have, but I probably have a different idea of what counts as a horror movie.”

“Fair enough. Still, I think that, if we consider enough movies, we can probably come up with a rule of thumb.”

“Well, is it a horror movie if it has monsters?”

“Usually, but not necessarily. Sesame Street has a vampire, but that's not horror.”

“The Count hasn't murdered anyone and feasted on their blood or entrails, though, has he?”

“I don't think so. Might've missed an episode or two. So a movie with monsters and killing counts?”

“Indeed. What counts as a horror-appropriate monster?”

“Werewolves, vampires, zombies, frankensteins, mummies, and clowns.”

“So, IT has a killer clown. Is it a horror movie?”

“Do they all float down here, Georgie?”

“... yes?”

“There's your answer!”

“But, wait, what about Texas Chainsaw Massacre? Isn't that one? But no monsters; just a guy killing.”

“I see where you're going with this. Because thrillers have humans killing, but aren't horror movies, right?”

“Oh, but the movies with killing, and a signature weapon are!”

“Perfect! So Scream has killings, and Ghostface uses Buck 120, so it's a horror movie!”

“What else has signature weapons?”

“Uh... Thundercats has the Sword of Omens. Krull has a Glaive. Ghost Rider has both chains and Nicolas Cage's terrible acting.”

“And how many of those had killing?”

“Ghost Rider. Anything else?”

“The Dentist is a horror movie.”

“Does that have a signature weapon?”

“The Dentist is a horror movie.”

“Any... reason?”

“The Dentist. Is. A. Horror movie.”

“So, what's a werewolf movie?”

“Teen Wolf, Ginger Snaps, and An American Werewolf in London.”

“I'm guessing Teen Wolf didn't have Michael J Fox eviscerating high school students?”

“That's correct. But the others had lots of killing.”

“And zombie movies?”

“Return of the Living Dead, Dawn of the Dead, and Fido. Fido wasn't really about killing, though.”

“Vampires?”

“uh... Dracula 2000? That was kind of kill-y. Probably. Not sure anyone's seen the entire thing...”

“Mummies?”

“Couldn't name one for you. But if there was one, and it had a lot of killing, it'd count!”

“Same goes for frankensteins, I suppose.”

Note that both the conclusions and the reasons for those conclusions are included above. However, for your code, use rules whenever possible, rather than only creating more facts than necessary. For example, don't write that Return of the Living Dead is horror; include the facts and rules necessary to *decide* that it's horror.

Once your program correctly stores the above information, answer the following:

1.
 - a) What are all horror movies?
 - b) Show the Prolog query that gives that answer.
2.
 - a) What movies have signature weapons?
 - b) Show the Prolog query that gives that answer.
3.
 - a) What non-horror movies have signature weapons?
 - b) Show the Prolog query that gives that answer.
4.
 - a) What movies are there?
 - b) Show the Prolog query that gives that answer.
5.
 - a) What movies aren't horror movies?
 - b) Show the Prolog query that gives that answer.
6. Add some movies of your own. Add whatever additional details are pertinent.
7. Write a question and corresponding Prolog query of your own.

If you received more results for some queries than you'd expected, consider why that is.

Using Prolog:

For this assignment, use SWI Prolog. Though you're welcome to install it on your own computer if you like, you can easily run it by typing `swipl` on sandcastle.

If you wish to start SWI Prolog, and have it automatically load `someprogram.pro`, then use:

```
swipl -s someprogram.pro
```

Additional Prolog References:

The Prolog Wikibook: <http://en.wikibooks.org/wiki/Prolog>

Learn Prolog Now! <http://www.learnprolognow.org>

Submission:

For the first part of this assignment, you may either print out the relevant pages from this assignment and fill them out by hand, or type out your own copy, at your discretion.

For the second part, print out a full copy of your source code, and a few sample executions. It's recommended that you type your answers to the questions.

Staple everything together, including a departmental cover page, and drop it into the 2P90 dropbox.

Additionally, remember to submit your program from the second part electronically (`submit2p90` on sandcastle). It is not necessary to electronically submit anything for the first part.