COGS 201 - Assignment 1

**Due:** Wednesday, September 26, at 2:30 pm (i.e. you have until the start of class)

For this assignment, you will need to use the Assignment 1 Dropbox on OnQ. The Dropbox only accepts one file, so make sure that you zip all your answer files together and submit the zipped file.

Question 1

Create a new file called robots.pl.

Write atomic and conditional statements in robots.pl to represent the following statements:

1. R2-D2 is cute.
2. WALL-E is cute.
3. R2-D2 is intelligent.
4. Data is intelligent.
5. The Terminator is dangerous.
6. Data has two arms.
7. The Terminator has two arms.
8. If a robot is intelligent, then it is dangerous.
9. If a robot is cute and intelligent, it will be famous.
10. If a robot is dangerous but not annoying, it will be famous.

There is more than one correct way to write these statements in Prolog. However, for full marks, your code should be:

* Syntactically correct
* Clear to a human reader (i.e. the marker can read your program and easily tell which of the statements is which - either because you named them clearly, or because you left comments where appropriate, or both).

Question 2

Save the file marvel.pl to your computer. This is a Prolog program containing facts about Marvel movies. It is larger than other programs we have worked with so far in this course. You will need to read the file carefully in order to understand what constants are used to represent the different movies and characters, and what predicates are used to represent information about them. There are comments in the file which should be helpful.

Load marvel.pl into the Prolog terminal and ask Prolog the following questions:

1. Is Loki an Avenger?
2. What year was "Captain America: The First Avenger" released?
3. What movies released in 2018 contain T'challa?
4. Which Avengers appear in "Iron Man 2"?
5. Which Avengers do not appear in Phase One?
6. What characters appear in "Avengers" who are not Avengers?
7. Does Hawkeye appear in any movies? (For this question, we want a yes/no answer, **not** the names of the movies.)
8. List a pair of movies from Phase Two that did not appear in the same year as each other. (For this question, the full list of pairs will be quite long; you can feel free to stop Prolog after displaying one or two results.)
9. List all the movies that were released in 2008, 2012, or 2016. (For full marks, use a single query.)
10. Find all the characters from "Captain America: Civil War" who also appeared in either "Black Panther" or "Spider-Man: Homecoming."

Copy and paste your queries and their results into a text file. The queries should be in the correct order and it should be clear which query is which. It will probably help to add comments to the text file to clarify or label the questions, but you can get full marks without comments if your file is sufficiently easy to read.

Save the text file as q2.txt.

Question 3

Open the file recipes.pl. This is a Prolog recipe book which represents recipes as a list of ingredients. It also has some atomic queries about different types of ingredients. A real recipe book would have many more recipes and would also include amounts and instructions, but the "list of ingredients" format will help us to practice lists.

Do not modify the existing code in recipes.pl. At the end of the file there is a comment showing where you can add your own code. After that comment, add your own Prolog clauses stating the following:

1. A list of ingredients is **vegetarian** if none of the ingredients are meat.
2. A recipe is **spicy** if at least one of the ingredients is a spice.
3. A recipe is very spicy if at least two of the ingredients are spices. (Hint: have **very\_spicy** refer to **spicy**.)

Hint 2: Because a recipe contains both the name of the recipe and the list of ingredients, you will need to keep careful track of when you are talking about a recipe and when you are working directly with its list. When you are creating a novel list of ingredients, you do not need to turn it back into a recipe.

Now save your modified version of recipes.pl and load it into Prolog. Ask it the following questions:

1. Is rice\_dish vegetarian?
2. Is the pasta casserole spicy?
3. Which recipes are very spicy?

Copy and paste your queries and their results into a text file. Save the text file as q3.txt.

Handing In the Assignment

Create a zip file containing the following files:

* robots.pl
* q2.txt
* recipes.pl (your modified version)
* q3.txt

Hand in this zip file to the Assignment 1 dropbox on OnQ.

This assignment is due by Wednesday, September 26 at 2:30pm.