

CSE 4/563 Knowledge Representation
Professor Shapiro
Homework 6
Maximum Points: 39
Due: 1:30 PM, Thursday, November 4, 2010

October 28, 2010

You must turn in the answers to this homework set in a submitted file by 1:30 PM on the date shown above.

The submitted file must be named `hw6.ext`, for an appropriate value of `ext`. **Include your name(s) and user name(s) at the top of the file.** Submit that file by executing the Unix command

```
submit_cse463 hw6.ext
```

or

```
submit_cse563 hw6.ext
```

whichever is appropriate for you. The file can be a text file, or produced by some word processing software, but it must be formatted so it is easy to read.

You are also to submit a file named `hw6kb.cl` as instructed below.

1. (18) Formalize the following domain in First-Order Predicate Logic using the syntax of SNARK. You must have one and only one SNARK assertion for each sentence. Make sure that SNARK issues no warnings when you load your assertions.
 - (a) (3) Everyone is alive between the year they are born and the year that they die, and only then.
 - (b) (3) Abraham Lincoln was born in 1809.
 - (c) (3) Abraham Lincoln was assassinated in 1865.
 - (d) (3) America declared independence in 1776.
 - (e) (3) The American Civil War started in 1860.
 - (f) (3) It is now 2010.
2. (6) Add the following background knowledge. Express each one in a single SNARK assertion.
 - (a) (3) When someone is assassinated, they die.
 - (b) (3) Once someone dies, they are dead in that and subsequent years.
3. (12) Formulate the following questions about the above domain using the `query` function. No numerical literal may appear in any of these formulations.
 - (a) (3) Is it the case that Abraham Lincoln was not alive at the time America declared its independence?
 - (b) (3) Was Abraham Lincoln alive at the start of the American Civil War?
 - (c) (3) Is Abraham Lincoln still dead?
 - (d) (3) In what year was Abraham Lincoln both alive and dead?

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Also submit the file of your SNARK assertions and your calls to `query`. Name this file `hw6kb.cl`. It should have the following format:

```
;;; <Name and other identifying information>

(unless (find-package :snark)
  (load "/projects/shapiro/CSE563/ask"))

(in-package :snark-user)
(initialize)

(mapc #'assert
  '(
    ;; All assertions, with comments, go here.
  ))

;;; All calls to query go here.
```

4. (3) Insert here in your answer file a transcript of your run of your program.