

Group Project

Re-submit Assignment

Due Dec 20, 2020 by 11:59pm **Points** 80

Submitting a text entry box or a file upload

File Types doc, docx, pdf, txt, xls, and xlsx

You will turn in a paper with the following:

- Cover page with the names and ids of the members of the group, class, and semester (CSCI-755-M02 Fall 2020)
- The knowledge base and chain of reasoning to solve the problem below.
- Any other commentary to support your solution.

Your mission is to capture, in logical form, enough knowledge to answer a series of questions about the following simple scenario:

Yesterday Bob went to the local Stop-n-Shop supermarket and bought two pounds of tomatoes and a pound of ground beef.

Start by trying to represent the content of the sentence as a series of assertions.

You should write sentences that have straightforward logical structure (e.g., statements that objects have certain properties, that objects are related in certain ways, that all objects satisfying one property satisfy another).

The following might help you get started:

- Which classes, objects, and relations would you need? What are their parents, siblings and so on? (You will need events and temporal ordering, among other things.)
- Where would they fit in a more general hierarchy?
- What are the constraints and interrelationships among them?
- How detailed must you be about each of the various concepts?

To answer the questions below, your knowledge base must include background knowledge.

You'll have to deal with what kind of things are at a supermarket, what is involved with

purchasing the things one selects, what the purchases will be used for, and so on.

Try to make your representation as general as possible. To give a trivial example: don't say "People buy food from Stop-n-Shop," because that won't help you with those who shop at another supermarket.

Also, don't turn the questions into answers; for example, question (c) asks "Did Bob buy any meat?"—not "Did Bob buy a pound of ground beef?"

Sketch the chains of reasoning that would answer the questions. If possible, use a logical reasoning system to demonstrate the sufficiency of your knowledge base.

Many of the things you write might be only approximately correct in reality, but don't worry too much; the idea is to extract the common sense that lets you answer these questions at all.

A truly complete answer to this question is extremely difficult, probably beyond the state of the art of current knowledge representation. But you should be able to put together a consistent set of axioms for the limited questions posed here.

- a. Is Bob a child or an adult? [Adult]
- b. Does Bob now have at least two tomatoes? [Yes]
- c. Did Bob buy any meat? [Yes]
- d. If Sally was buying tomatoes at the same time as Bob, did he see her? [Yes]
- e. Are the tomatoes made in the supermarket? [No]
- f. What is Bob going to do with the tomatoes? [Eat them]
- g. Does Stop-n-Shop sell deodorant? [Yes]
- h. Did Bob bring some money or a credit card to the supermarket? [Yes]
- i. Does Bob have less money after going to the supermarket? [Yes]

Make the necessary additions or changes to your knowledge base from the previous exercise so that the questions that follow can be answered.

Include in your report a discussion of your changes, explaining why they were needed, whether they were minor or major, and what kinds of questions would necessitate further changes.

- a. Are there other people in the Stop-n-Shop while Bob is there? [Yes—staff!]
- b. Is Bob a vegetarian? [No]
- c. Who owns the deodorant in Stop-n-Shop
- d. Did Bob have an ounce of ground beef? [Yes]
- e. Does the Shell station next door have any gas? [Yes]

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f. Do the tomatoes fit in Bob's car trunk? [Yes]